The COOK Report on Internet

THE FUTURE OF THE INDUSTRY

Bill for Global Fiber Expansion, Optical and IP Technology, as Well as Problematic Accounting Hits Local & Global Players

Googin, Odlyzko, Isenberg and Klein Explore Why Impact of Optical and IP Technology on Telco's Is Producing Global Economic Train Wreck

A Special Combined Issue to Mark Beginning of Our Second Decade of Publication

Volume XI, Nos. 1-2, April May 2002
ISSN 1071 - 6327

Introduction

In this issue we shift from technology to economics and business models. A year after folk could no longer ignore the bursting of the bubble, the industry is still headed downward. We seek to define the problem and the reasons why. The reasons of course are to be found in a mixture of technology and business models as constrained by the policy frameworks in which they must operate.

The most critical insight to result from our efforts at problem definition is Roxane Googin's assertion that there is a combination of economic and technology forces eating away at the ILECs that will bankrupt them. While the same combination of forces will play out differently with the old line IXCs, their future (especially that of AT&T and MCI WorldCom) is also grim. Between 1985 and 1995 the legacy telco networks were structured for the digital delivery of circuit-switched voice with the purchase of a very expensive SONET based infrastructure. With data representing a small but growing share of traffic their business model seemed to permit them adequate time to convert their networks and financing to cope with a data dominant future.

What their planners hadn't reckoned on was the impact of the internet and web driving data growth even more rapidly than they had projected between 1995 and 2000. At the same time, rapid improvements in optical network and gigabit Ethernet technology greatly reduced the costs for both capital expenditure and operating expenditure while at the same time providing a more data-appropriate infrastructure. As a result, almost overnight their new SONET networks were rendered obsolete. This flew in the face of the 20 or 25 year economic life cycles anticipated by the ILECs for their SONET gear, as exemplified by the 20-25 year amortization schedules for this equipment. They used these amortization schedules as the basis of their bond repayment schedules. Consequently, the quality of such bonds now must be viewed with increasing skepticism.

Meanwhile, new players with newer networks, therefore lower cost bases, are able to offer less costly transport and connectivity services, which further erode the revenue base of the incumbents. Notwithstanding, these new players have not grown fast enough to reach economic viability. Most are bankrupt or tottering on the brink.

What is left for the incumbents is a high cost obsolete local loop in a era where people want broadband that the copper cannot deliver. Furthermore, the ILEC infrastructure requires a work force of hundreds of thousands to maintain it limiting their financial flexibility in the face of their need to replace that equipment. Legacy ILEC operating expenses are not to going to be able to be rapidly reduced. In the past, as long as operating income was growing, the difference between revenues and expense in the form of earnings would permit the ILECs to try switch to a newer and more cost-effective infrastructure. But today, the difficulty of carrying out such a switch is increasingly obvious.

On the Inside

Googin points out that in 2001 something absolutely critical happened. While ILEC data growth continues, data does not bring in anywhere near the revenue that voice does. Furthermore, voice as measured in number of access minutes to ILEC networks and number of lines in service is now not only flat but actually declining. The result is that revenues are going down while costs are not and profits are disappearing. When the profits are gone, and the bondholders can no longer be paid, the outcome (bankruptcy and restructuring) appears to be inevitable. Our small panel of experts assembled for this issue sees no deus ex machina waiting in the wings to reverse the current course. The only variable looks like the speed of the downfall. There readers will find some difference of opinion in the essays that follow.

In Need of Cassandra?

Who will speak the painful truth? Two years ago the commonly accepted wisdom said that the net heads would take their IP, fiber and stupid networks and sweep the old line phone companies aside. But even then there were some cracks in such an assessment. Andrew Odlyzko three years ago began to explain why the foundation of bandwidth doubling every 90 days on which both the dot com craze and fiber builds of 1996 – 1999 were based was not reality but a myth.

In a similar vein Roxane Googin for about two years has been explaining why the much feared re-integration of telcos into an ILEC led monopoly won't happen either. If Odlyzko delivered the first piece of bad news by telling us we had geared up for a demand that wasn't there, Googin has a her own dose of harsh reality to present. The new technology although itself not yet built into viable companies is eroding the base on which the circuit switched telcos operate rendering their balance sheets unsustainable as well. It is our contention that if we grasp both of them and understand how one flows from the other we will begin to be able to address industry's problems. It is our objective to do just this in this issue of the COOK Report.

We are at about the same point in perception of Googin's message that we were with Odlyzko's at the end of 1999. She has been a subscriber for several years but, until David Isenberg described her analysis in mid December, we had not understood what an important contribution she had to make. We persuaded her to follow up with us what she had begun with Isenberg. She had concluded in Isenberg's Smart Letter #64 http://isen.com/archives/011216.html that the industry had tanked and the only recourse to a prolonged downturn would be recognition of the severity of the problem by wiping balance sheets clean and starting over again.

While this injunction may be more easily said than carried out, the conclusion to be drawn is that, until people realize the breadth and depth of the problem, change will not occur. Instead we will simply continue this downward spiral as the black hole of debt absorbs all economic growth, just like Japan. While Wall Street optimists may continue to forecast a second half rebound (just as they did last year) they are simply deluding themselves. Unresolved debt in Japan has contributed to an 18-year decline. If we don't restructure this debt, however, that is just where we are headed.

Roxane Googin believes that problem definition is the order of the day. Agreeing, we asked her to do a core dump. Three hours of interviews just before Christmas have been followed by further extensive voice and email correspondence over the past three weeks. The result is the interview that forms Part One of this issue. We asked David Isenberg, Andrew Odlyzko and Bill Klein (an internet infrastructure equities analyst) to join in reacting to and commenting on the interview. Isenberg's reaction was his Enronization of Telecom article in Smart Letter 67 http://isen.com/archives/020206.html.

Comments and questions by Odlyzko, Klein and your Editor are contained in Part Two below. In Part Three Googin responds to Odlyzko's critique incorporates a key part of his argument and shows that her key insights are still valid. David Isenberg's Enroonizaztion of Telecom that was inspired by his participation in our discussions. appears as Part Four

In an essay that appears in Part Five Bill Klein presents his analysis of the fate of the carriers and explains the perils inherent in any attempted nationalization of telco assets. Part Six Why the fiber-based greenfield model has failed shows how overcapacity is dragging everyone down. Part Seven is your Editor's own brief look at ATT, Print, MCI, and Global Crossing. Part Eight is our detailed examination of Level 3. In Part Nine Andrew Odlyzko concludes that the ILECs may be able to survive by adopting an assets based approach. Part Ten is by Gordon Cook and contains two sections. (1) Why Congress and everyone elseshould regard claims by Internet2 to have an answer to the broadband problem and why funneling money to the NSF for an Internet 2 solution to broadband and shot in the arm for the industry would be a bad idea. (2) What is asset based telecom and why it is likely the only answer for the industry's problems.

A Few Words About COOK Report Format and Schedule

We are experimenting with a new format in this issue. We intend to explore it further in the next issue on wireless in the local loop, 802.11 b technology and policy issues and a look at where wireless technology and policy is going. Our approach will be founded on an interview with Peter Cochrane, ex CTO of British Telecom. As in this issue we will bring other experts in to comment on the interview draft and offer their own opinion of issues raised. Estimated publication mid April. Attempting to predict in advance how this approach will go is fraught with difficulty. For this issue it has proved to be exceptionally fertile and has produced a considerable amount of material. We consider the minimal length of an issue to be 24 pages an amount that we have been greatly exceeding. Readers should consider pages in excess of 24 to be bonus material. We honestly intend to cut down. One way of doing that may be to have a dual issue like this one in the future if we generate too much material. We will still define ourselves as monthly but serve notice that the 12 monthly issues may on occasion be combined. If symposium issues are fertile, they may run as combined issues. We also define a subscription as providing at least 288 pages of solid original material. We invite readers to send us their assessment of this value proposition.

Why the ILECs Are in Trouble

New Technology Has Stood their Business Model on its Head and Is Beginning to Erode their Revenue Base

Googin Asserts that Caught in a Vice Between Shift to Unprofitable Data, Declining Use of Network and Long Depreciation Schedules for Heavy Debt ILECs Will Find Themselves Unable to Pay their Debt

Highlights, or Exec. Sum

Editor's Note: Roxane Googin is Editor of the *High Tech Observer* published by Global Investment Research (203) 791-3830. She has a BS-EE from the University of Tennessee, and an MBA from the UVA Darden School. In addition to operational experience in development and manufacturing, She has had a successful 15-year track record as an analyst and investor. Eschewing the typical narrow vertical focus of trading-oriented Wall Street analysis, she focuses on the major cycles that govern entire market dynamics We interviewed Roxane via phone on December 22 and 23rd. We followed up with extensive email and voice conversation in late January and early February.

COOK Report: Let's expand the discussion you had with David Isenberg in his Smart Letter 64 http://isen.com/archives/011216.html in November. Why are you so pessimistic and pessimistic especially with regard to the local phone companies?

Googin: Because one of the largest single industries in the world is, as currently structured, no longer viable. We have a series of problems arising from the law of unintended consequences. When AT&T was split up and the Baby Bells formed, the regulatory regime allowed them a "return on assets." They were allowed to earn a profit that was in proportion to the assets under their control. The higher the value of the assets under their control the more money they could earn. As a result, they came up with an extremely expensive architecture superficially justified by the need for five nines of reliability. They did what the regulators promoted coming up with the world's most expensive possible bandwidth. The FCC sets national policy and the state PUCs set prices within their borders.

Now these guys just knew they were a monopoly and that they would last forever. So they convinced the bond holders to lend them money and to do so on a long term basis. They'd be paid back no matter what because the phone company simply could not disappear. AT&T has bonds with 35 year maturities. Bonds not due until 2035. Do you think AT&T will still be around to retire them? Everyone has been playing a little game which now is ending because of IP. Everyone is saying IP will drive prices down by a factor of ten. What people have forgotten about asking is what happens when you own that great big house that you have mortgaged to the moon and all of a sudden your income goes down by 90%.

The answer is that you can no longer pay the debt. And we are talking about huge amounts of debt in addition to the debt of the ILECs. AT&T, despite a major debt reduction effort, still has 34 billion dollars in outstanding bonds. This debt is not just in the US. It is in Japan, and Germany, and France. It is in every developed country all over the world as well.

COOK Report: So when the phone companies go broke who will take over their operation. What will happen?

Googin: I think it will go wireless. You and I are using pieces of wire connected to COs with a big batteries inside for our communication. The fact that we are doing this is an anachronism of a century old technology. The wires will go away. The minutes of use on their wired networks are now declining. I predicted this a year ago and it started actually happening six months ago. The companies are required to report this on their 10Qs. Therefore it is hard verifiable data.

I have been saying all this for a year now. But what has been obvious to me for a very long time is hard for other people to hear. Let me just ask how you can possibly understand that the IXCs are in trouble and not understand that the local guys are in the same boat? There is no natural boundary separating the two. They are using the same technology. They both have the same cost disadvantages. The difference of course is that competition is easier to manifest itself the long distance arena. Consequently, the problems got a head start here. As a result they are easier to see.

A Problem Does Exist

What I am suggesting is that we must start by looking at the problem and get people to accept that there is a problem. Do this by studying the manifestations of the problem. And then look for solutions. People are confusing the problem and its manifestations with solutions because they can't stand the tension of not knowing what will happen. But its only after you sit with the uncertainty for a while can you come up with a good solution. Knee jerk solutions based on inadequate understanding won't help.

Here is how the competition will manifest itself in the local market. Networks are loosing minutes of use. Email replaces a lot of voice. Instead of calling SBC and asking them to send you their financials, you just download them from the SBC web site. Behavior is changing at the expense of voice telephone traffic. What you get via email and the web in most instances is far more useful than

what you can get via voice.

COOK Report: You are saying that telecommunication is moving inexorably toward the adoption of a technical infrastructure that costs a tenth as much and delivers a tenth of the revenue because it also delivers more of what people want.

Googin: Yes it is a much better solution because now you have streaming media, audio and video along with email and the web. Circuit switched technology has seen its day and ultimately will have to go away. As what we want to be able to do changes the infrastructure that we use to do it on will have to change. We are seeing patterns of communication change in a way that is driving more and more voice minutes off the network. Rather than waste time with phone tag, I'll email you. I want to be mobile. I will use my cell phone. All these activities take minutes off the network. The minutes are leaving. You can see that in their reports. They will find excuses to deny what is happening but the excuses won't change what have become inexorable trends.

Are the local guys in trouble or not? Well look at their networks. They are loosing volume. What happens when this loss accelerates? It will. And as they start loosing money, you will get to the point where they cant pay the interest on their bonds. I walk into a room as a consultant to large investment clients and I say my message is that the largest industry in the world is bankrupt. Not surprisingly people hate hearing that message. They don't want to accept it and they come up with a gazillion reasons why it must not be so.

COOK Report: So what you're saying is that there is a long-term problem with the viability of the local phone companies, burdened as they are with inefficient (at least from the data transport point of view) circuit switched SONET-based infrastructure; with heavy debt loads; with several hundred thousand employees necessary to maintain the copper local loops; and burdened already with billions in debt. Given the existence of many new players with more efficient less costly digital technology, even though the attackers themselves are in debt, their market depends on their ability to undercut what is that of the antiquated infrastructure and pricing of the local exchanges. To maintain their infrastructure and end pay their debt the local exchange carriers depend on a traffic mix where their voice traffic provides profit and in effect pays the bills at a time when they are losing voice business to the IP based and digitally based technologies of the new competitors. As profit-making life sustaining voice traffic disappears from their networks, the amount of time in which they can remain financially viable diminishes. Sooner or later, the exodus to the new technologies picks up speed and the cost of the LECs infrastructure and business model is no longer sustainable? Is that the message?

Googin: yes. And in better times they call this progress. Tall ships were rendered inviable when the canal's came and the canal's in turn were replaced by the railroads.

The thesis that I've been putting forward for more than a year now is that the Telecom problem is certainly not isolated to the newcomers. To me the fact that people seem to think it is isolated to the newcomers is a bad sign. Because the real Telecom problem is with the incumbents. This makes things even messier because the new green field companies that we were counting on to implement the new technology are themselves damaged. We are in danger of finding ourselves in a situation where the attackers are unable to succeed and where the older players with nonproductive technologies are seen as unable to fail. The attackers are running out of cash before they can get big enough for their operations to scale and pay their operating expenses.

One of the reasons that they are in trouble is that prices for bandwidth fell more rapidly than anyone had predicted. Demand has been less than we had assumed. Huge capacity was built. And, with the bust of the dot coms and other events, demand to fill the capacity did not arrive and prices for bandwidth plummeted. Anticipated corporate buyers of bandwidth simply have not come on stream yet. No one managed to plan successfully for a deregulated telecommunications market. Technology that our older debt leveraged infrastructure could not absorb came online.

The other issue that people simply don't appreciate is that in order to move in a sustainable way into this new economy - into the networked economy or whatever people want to call it - we must move off of the SONET infrastructure. We must understand that SONET is too expensive and narrow band to be an adequate platform on which to build gigabit Ethernet and DWDM Technologies. The technology to deliver the new and inexpensive bandwidth does exist in the hands of the next generation providers. As these companies are forced to restructure, someone will step and then buy their assets and the prices of bandwidth should continue to come down.

What people don't appreciate is that these developments not only render the old guard uneconomic. They render all of them equally uneconomic. The long distance carriers are really in no better shape than the local providers. Because the issue is not whether you're long-distance or local. The issue is whether you are on SONET or on gigabit Ethernet over fiber. "Optical IP " as John Chambers puts it. No one debates that optical IPis one-tenth the cost of SONET to provision and deliver services on.

COOK Report: In other words the stability of their platforms depends on being able to sell a minute of voice in the neighborhood of seven times more than they can sell a minute of data? If their cash rich voice minutes begin to decline, they will find themselves in increasing trouble?

Googin: What will happen is that their revenues will no longer be sufficient to enable the operation of their networks much less pay for the corporate overhead, the SG and A, or the interest. Well simply this is what you're seeing now. If you read the financial statements of all the RBOCs for 2002 what is the first thing that they're saying? That they will cut capital expenditures.

Why are they talking about cutting capital expenditures? Because they all understand that their revenues are coming in below projections. Therefore they have less to spend and must adjust expenditures. But you can only adjust capital expenditures so far. As prices in minutes of use a fall toward the levels that can be delivered by the new technology, you will find that, capital expenditures aside, they cannot cover operating expenses much less their debt payments.

SBC

[**Editor**: The 4th quarter report is available as http://www.sbc.com/Investor/Financial/Earning_Info/docs/4Q_IB_FINAL_COLOR.pdf]

Googin: Let's start with SBC. Now often what they don't say is as important as what they do say. Notice that in their quarterly investor briefing http://www.sbc.com/Investor/Financial/Earning_Info/docs/3Q01_IB_FINAL.pdf they talk about everything except local voice – their core business. Go to page 10. Look at operating revenues from land line local service. Third quarter 2001 down .4% from 3rd quarter 2000. Now look at page 10 on their 4th quarter report. Down 2.8% from fourth quarter 2000. From the 9 month figure of a 5.4% increase over 2000 and a yearly comparison 3 months later that was a mere 3.3% increase you can tell their revenues are steadily deteriorating. "Now their total Consolidated Revenues are fown 10.6% for the year because their share of Cingular Wireless is no longer included in their income statement. If you go on to page 11, you will see Normalized income statements. They have re-inserted their proportional Cingluar results for comparison purposes. With Cingular, Normalized revenues are up 2% for the year. The deterioration is seen in the 2.5% year-to-year decline in Consolidated Q4 revenues (without Cingular results re-inserted).

COOK Report: What is the "other" figure (down 30.8% or 550 million dollars for the third quarter and 1.25 billion for the year) all about?

Googin: That is their slush fund. Telecom reporting is notoriously opaque. They can move things around like you wouldn't believe. No one outside their inner circles will know what they have buried there.

Notice that the network access income is up. This is the money charged for terminating long distance calls and explains how they over charge AT&T and the other IXCs. This fee has always been notoriously high. This is the toll they charge to allow calls from outside their area to cross their bridge.

Now don't get excited about the overall decrease in revenues. With Cingular they moved 5 billion dollars off their consolidated statement of income. Nevertheless, note that local wireline service, their core business, the essence of what they as they phone company do is shrinking. They move stuff all around all the time. They might move the month in which they publish their directory if they need more revenue for the quarter in question. They are master at shell games. To try to have the uninitiated come in here on their own doesn't work. Even the professionals are getting confused. Note that "Other" is down 17%. It means that this could be worse but they are hiding it in "Other."

Look on page 15. These are things that they have to tell you. Notice where they put these particular figures. Page 15 out of 16. Look at the 9 month figure on access lines served. Down 1.7 percent. And on page 15 in the forth quarter report. Down for the entire year by 2.8%. This is new under the sun. this has never happened before. Their business is not only not growing. It has started to shrink. Residential lines are down 4.7%. This is substitution. People are adding a cell phone and getting rid of a land line.

Look at their VGEs (Voice Grade Equivalents). These are 64 kilobit measures for equating higher speed data lines with numbers of voice lines. The problem with these numbers is that they are going up while revenues per line derived from them are going down. Therefore the price of the bandwidth represented is declining. The problem for them is that this is happening more rapidly than they can cut their cost of operations. They probably manage to cut their cost of operation by about one percent a year. There operations costs are really head count of employees. Their equipment costs are fixed.

COOK Report: Do you understand the implications of the Canadians wanting to give users their own light waves? You may not even need the carrier then.

Googin: But that is a solution. I don't want to even think about solutions at this point. I just want to deal with problem definition. Look at their VGEs again. They are going up and doing so much faster than their revenues. This means that they are having to provision new bandwidth without getting paid anywhere near what they used to be paid for doing so. Note on page 4 that their data revenues as a percent of wireline revenues are peaking at just over 20 per cent. Much higher rates of growth in voice grade equivalent lines are not increasing the overall percentage that data contributes to their bottom line. Finally note that on page four of their fourth quarter report they have actually changed their entire tune. They show you that data transport is growing at rates of 16% year-to-year in the quarter but they no longer give you absolute values for total data revenues. You therefore cannot go backwards in history to develop trend data. It is becoming too embarrassing.

What do they own that runs all this? Big expensive SONET gear. They have 100,000 union workers to operate all this. How fast can they cut costs? They cannot cut costs as fast as the volume drops that they are already beginning to experience. What happens when they become less and less competitive with alternative ways of communication? People change their behavior. They use more phone cards. Corporate networks do more VoIP. There is also a break point where the pace of changed behavior accelerates. I don't know how close we are to such a break point but, when we get there, I know what happens. When Joe Six Pack figures it out, bang. And he will probably do so in a tough economy.

Access Minutes of Use

These are just pieces of evidence. Capital expenditures (CAPEX) are way down.

Minus 39% on the 3rd quarter and 12% on the nine months. Why would they cut CAPEX so much? Their access minutes of use are down Access minutes are down by only a tiny amount in the third quarter and by 1.4% in the fourth quarter. Their total access minutes of use had never declined before June of 2001. But now it is declining for all of them.

[**Editor's Note**: Access Minutes measure the minutes of long distance calls that the LECs terminate for the carriers. They do not measure minutes of use of the local voice network where no tolls are charged. We simply do not have accurate statistics on total minutes if use of the local voice network. However on page 54 below Andrew Odlyzko points out a fascinating statistic from the United Kingdom - namely that minutes of use of the local network in the form of dial up internet access are more than 50% of the total as of July 2001.]

COOK Report: Could we go on to discuss BellSouth's third and fourth quarter results?
http://www.bellsouth.com/investor/pdf/4q01p.pdf
http://www.bellsouth.com/investor/pdf/3q01p.pdf

Googin: Poor BellSouth. Of all the local exchange carriers they try hardest. And yet their minutes of use are falling faster than anyone else's. Again minutes of use of the networks are falling across the board for all the providers. Of the three largest LECs SBC's minutes of use fell the least (They were flat). Verizon was in the middle and BellSouth fell the most - down 6.7%.

On page 6 of the BellSouth Third Quarter statement you will find something called Access Minutes of Use. They all call this by different names, but, by law, they all have to put certain statistics in the their statements. These statistics include how many access lines and they have provisioned and the total of minutes of use of their network for completion of long distance calls. You will see that access minutes is it down 6.7% for the quarter and 4% so far for the year.

Table LD Access Minutes - negative numbers appear in parenthesis

	Bell South	SBC	Verizon	Qwest
3rd quarter2001	(6.7%)	(.01%)	(2.2%)	not available
4th quarter2001	(5.8%)	(1.4%)	(2.7%	not available
full year 2001	(4.4%)	.6%	(1%)	not available

Therefore, this is not the first quarter that the access minutes had been declining. The decline is accelerating as minutes of use begin to leave the network. And this, in fact, is the behavior that you would expect. Cheaper more flexible technologies are beginning to be substituted for the more archaic single function application of voice. Cellular, wireless, e-mail, and the practice of using web pages to get information are all competing with ordinary voice communication.

If you were to look at their press release from two years ago, you would find that they would have led with either the words "voice," or as SBC calls it, their core business. What you would have seen over the past two years is that the voice, or the core business, part of the press release will appear later and later in an the pages as the bad news was buried ever closer toward the rear. The reports all talk about their growth initiatives. But then because they're required to do so, they throw in the legal minimum about their really important statistics of profitability like minutes of network use.

I see the fact that minutes of use now carry the negative signs in front of them as not terribly surprising but knowing that many many people consider these companies be eternally positive annuity streams, I am alarmed.

COOK Report: We're talking now about voice minutes of use and the impact on over all revenues of the loss of such a minute (depending on pricing) would be seven to 10 times as great as the loss of a data minute? Correct?

Googin: Yes. The voice minutes are the high-priced services. I doubt in that they make any profit on their data services.

COOK Report: They talk about revenues increasing from data services.

EBIDTA

Googin: But they don't show you anything. Not only don't they show you anything, but if you look at their wireless, you'll find that they talk about EBITDA. If you look at their international results, you will find that talk about EBITDA, but you will never find them talking EBITDAfor their data. It's not just BellSouth. It's all the RBOCs who never talk about EBITDA, in association with their data business.

COOK Report: In other words there are no earnings to talk about? But isn't EBITDA misleading also in and that it doesn't factor in debt payment?

Googin: I'm not sure I would call it misleading. It's simply the way it's done. But for people who don't normally look at these reports, one needs to make sure that they don't walk away without having examined the impact of debt payment. On BellSouth's third Quarter statement you will see EBITDA mentioned as footnote five. You will see on page 13 of the 3rd quarter report that it is defined as "operating revenues less operational and support expenses." At least they do define it even though it is several pages later. But the real 'got you" on some of these phone companies is that they have lump-sum payments that come due. For example, say they did a big debt offering that actually comes to maturity and they are unable to roll it over into a new one. You can have a billion dollar hit in a given quarter.

For example say that AT&T and which has $40 billion in debt. Say that 20 billion dates from five years ago and 1 billion of the 20 has a five year maturity.

Table EBITDA

	Bell South	SBC	Verizon (operating income)	Qwest
3rd quarter 2001	(4.1%)	(3.6%)	(2.2%) (-25.6% overall p. 8)	(5.3%)
4th quarter 2001	4.4%	(2.9%)	-1% (-86% overall, p. 8)	(18.9)
Ebitda margin for 2001	(1.6%)	(2.6%)	-.4% (-32% overall for year)	7%

They then have to pay that 1 billion back. All these companies have debt repayment schedules that are not just interest. They sometimes actually roll over or payback maturing debt. In such an instance, if the capital markets shut them down, you could go from a viable to a bankrupt company rather quickly. If you are going to do really careful job, you probably need to look at the maturity of all their debt obligations.

Now if you look at their third quarter 2001 earnings compared to their third quarter earnings in 2000, you will see that the total has declined by 4.1% and that their EBITDAhas likewise declined by 400 basis points which in this case is 4%. In a scenario like this, this is what you would expect. As their income-producing voice traffic declines and their fixed cost of operations does not decline, they will earn less. The EBITDAmargin is a percentage of the difference between their operating income and expenses. EBIDTA margin is the EBITDA absolute number divided by the revenue absolute number. Since these companies sell a service and not a product, what we are really looking at is their operating margin.

It is saying that for every dollar that we took in our operating expenses were 50.7 cents compared to 46.7 cents a year earlier. Out of the 49.3 cents per dollar left after subtracting operating expenses they must also then pay interest expense, dividends, taxes and amortization of equipment. EBITDA is a perfectly appropriate measurement just as long as you pay attention to what it actually represents.

Access Lines

Access lines are another important indicator of what is happening. Third quarter 2001 is down 1.4%.. That is new. It means that people are leaving the network.

COOK Report: But the Access Line Equivalents have grown by 47.1%?

Googin: This allows them to show 'growth'. What they do is take the 64,000 bit bandwidth of a voice grade line and divide that into the total bandwidth of the T1s and DS3s and higher lines that they have sold. One T1 equals 24 access line equivalents..

COOK Report: So when businesses and ISPs are buying many new high speed lines they are buying them for data and the price the LEC gets for a T1 doesn't begin to equal the revenue they would get from 24 voice phone lines. Now they add the access lines and the access line equivalents and get a combined total that looks like it shows substantial growth. But it is a false growth in that it does not produce proportional increases in revenue.

Googin: That's right. The bad news here on page 6 is that in the 3rd quarter their access line equivalents have grown by 47.1 % while their digital and data revenues as shown on page 1 grew by only 27.7%. This shows you that 64 kilobits of data bring in much less revenue than 64 kilobits of voice. Now go back to page 6 where they claim this 22.4% overall growth in access line equivalents. Ask yourself: did their revenues grow 22.4%?

COOK Report: No. Back on page 1 again we see the operating revenues for the communications group (voice and data) grew by 4.6% and year to date by only 3.7%.

Googin: And to gain about 4% in revenue, they are having to provision an overall capacity growth of 22% of their communications producing revenue infrastructure.

COOK Report: Thus the real problem is the infrastructure they are having to provision is OSMINE compliant SONET purchased and installed with expectations of voice revenues supporting it. This is SONET is designed with a redundancy to support five nines of reliability for voice which is now increasingly running packet switched best effort data. Using expensive infrastructure to support packet data services that can be provisioned by others with infrastructure costing perhaps 10 percent of what the LECs have had to spend. It sounds like they are trapped in a corner where it may be difficult for them to get out.

They spin all this in an interesting way. For example in a November 5, 2001 press release they attempt to parlay their data growth (what certainly appears in our discussion to be a weakness) into a strength. They say:

"DATA TO PLAY CRITICAL ROLE IN ALL MARKET SEGMENTS Data continues to play a critical role in BellSouth's evolving product mix. Data services have gained an increasing share in BellSouth's revenues through consistent top-line growth and robust product margins. [Italics ours. It might be interesting to hear what they consider robust – **Editor**.]

BellSouth expects to end 2001 with approximately $4.5 billion in data revenues highlighted by three consecutive quarters of billion dollar revenues. Leveraging an expansive and growing product portfolio built on connectivity and integration, BellSouth projects to end 2002 with 22-25% growth in network data revenues.

BellSouth attributes its success in the data market to its "network-cen-

Table - Access Lines

	Bell South			SBC		
	Overall	**residence**	**business**	**overall**	**residence**	**business**
3rd quarter 2001	(1.4%)	.5%	(1.7%)	(1.7%)	(4.0 %)	+2.4
full year 2001	(1.9%)	(2.1%)	(1.0%)	(2.8%)	(4.7%)	. 6%
Voice Grade Equivalents (bandwidth in multiples of voice grade lines)				**Data Traffic**		
	22.0			8.0%,	4.0 %	11.1

	Verizon			Qwest		
	Overall	**residence**	**business**	**overall**	**residence**	**business**
3rd quarter 2001	(1.4%)	1.2%	(1.5%)	(.4)	(2.2)	3.2
full year 2001	(2.1%)	(1.4%)	(3.3%)	(1.7)	(3.1)	1.0
Voice Grade Equivalents (bandwidth in multiples of voice grade lines)				**Data Traffic**		
	13.0		23.8	1.6	31.9	

tric" focus. Over the past decade, BellSouth has emerged as the leading RBOC in working fiber channels by investing in 4 million miles of fiber, 749 broadband (ATM/Frame Relay) switches and 20,000 SONET rings in service in its network. This investment has resulted in a next generation network that allows BellSouth the capabilities to provide advanced data network services."

One might ask them what they are bragging about? Those data services could be provided on existing fiber with gigabit Ethernet and especially with coarse gigabit Ethernet, at a small fraction of what their SONET infrastructure costs them.

Googin; Right. And of course that is where all this is headed.

COOK Report: And you have more danger signs ahead. On January 29, 2002 you had the following blurb on CNET: "Consumers are pulling the plug on traditional phone lines at home as wireless service and broadband connections become cheaper, according to a recent survey from Forrester Research. New communication services, such as those offered by AT&T Wireless and Sprint's PCS business, have already replaced landline service in 1.7 percent of households."

"By 2006, more than 5 million U.S. homes will start using mobile and high-speed broadband networks as their primary connection, according to Forrester. That would make wireless services the primary means of communications in 11 percent of households. [SNIP] Charles Golvin, senior analyst at Forrester predicts that broadband providers' offering of voice over IP service in 2002 will also take voice business away from traditional telephone companies. By 2006, voice over IPis expected to displace more than 4 million traditional lines and around $1.5 billion in revenue." http://news.com.com/2100-1033-825104.html

Meanwhile the more public focus is 'what are you doing about broadband?' And it almost seems that, by way of delaying the discovery of their financial problems, they are glad to point out all these wonderful statistics of increases in numbers of DSL lines. The fourth Quarter SBC reports out January 25 take the same track. Data growth (page 4); Broadband and DSL Internet (page5), Cingular wireless – gain of 760,000 subscribers (page 6), Long Distance Growth, (page 7); International Growth (page 8). But local voice, the company's core business is ignored because it is going away.

Googin: Yes. Furthermore, if you look at the numbers cited in the digital growth areas, what is happening is that the analysts have boxes in their spread sheets into which to plug these numbers. If their numbers increase, they are happy. They don't ask whether they are profitable services. They are failing to see how the numbers don't add up. What the LECs are successfully doing by this kind of reporting is successfully getting people to stay off subject.

Verizon

COOK Report: How about Verizon? The URLS for 3rd anf 4th quarter reports are http://investor.verizon.com/financial/quarterly/VZ/4Q2001/4Q2001.pdf and http://investor.verizon.com/financial/quarterly/VZ/3Q2001/3Q01Bulletin.pdf

Googin: Sure. Now one thing that I would comment on is that of course they are going to blame declines in their minutes of use on September 11. Other than 9/11, SBC if you look at their third quarter report had the most amazing diatribe against: "the regulators." Lashing out at "the regulator's" they are externalizing the problems they face. The investment community is buying off on what they are doing. The second quarter of 2001 was really the first quarter of declines in voice minutes.

COOK Report: For all the ILECs?

Googin: Yes. It's really like the level of water. The geographies are a little different and the local economies may be a little different. But still a trend is a trend across the board. Verizon was pretty funny on the third quarter call because they said that after all they had lost a large Manhattan Central Office. Someone asked: "well how many lines did you loose?" Their answer: "we don't know."

COOK Report: When they say in their report: "increased long distance sales goals reached in 9 months," I am under the impression now that the reason they are so eager to get into long distance is that they need to do anything that will give them an opportunity to sell a voice minute because each voice minute brings in more revenue.

Googin: Right. Their entire network is built for voice. It is not the right architecture for data. But they have now to run data because that is what is growing. The reason that they want to get long distance and the reason that AT&T's Michael Armstrong is so angry is as Amstrong put it that running just the "middle" of a network is not a natural business. You need to have an end as well as the middle.

If you look at the ILECs revenues, you will see two entries. Something called network revenues and then something called access revenues which generally is about a third of their revenues. Those are the termination charges. There are artificially high. What they want to do with long distance is to keep the termination charges artificially high and get rid of the guy in the middle. They would then have control of the entire call gaining for themselves a monopolistic position in their geographic area. Then since they hope that no one will remind anyone else, they will be able to charge access minutes on their own long distance and turn everything into an annuity.

They negotiate their termination charges with the regulators and have managed to keep them extremely high. In my opinion the only reason they want long distance is to preserve these outrageously high access (termination) charges and get cash flow out of that.

COOK Report: But can't they also get proportionately more money for the use of their network for voice than they can for data?

Googin: Absolutely. About four times as much. If you look at their EBITDA, it is now about 50% This means that for every dollar in revenue their expenses are fifty cents. Ask what happens if each of their revenue dollars drops to twenty five cents?

COOK Report: If the network still costs them about the same to run, and it will, they will be spending a dollar on operations for each dollar they take in and they will have nothing left for paying taxes, interest, depreciation or amortization.

Googin: Right. And that's one reason you don't hear them talk about data and profits in the same breath. Their ability to generate enough revenue to pay operating and their other business expense is being steadily eroded because people are beginning to use the network less and less. The uses that are increasing (data) do not bring in enough revenue to pay expenses.

But let's go to Verizon's report on switched access lines in service for residences. The number (on page 13) is down 1.2% for the quarter and 1.5 percent for businesses. Further down on the same page you see that total minutes of use of their network has declined in the third quarter by 2.2 percent and but .4 per cent so far for the whole year. Note that their total voice grade equivalent lines are up by 20.5 % whereas BellSouth increased 47.1 percent. It shows that BellSouth is actually doing a credible job in a bad situation. People noticed this relatively small increase. It was considered a bad part of their conference call.

On Verizon's third quarter statement on page 13 notes that they wind up with 61, 967,000 voice lines and 66,557,000 voice line equivalents or data circuits. The voice line equivalent or data circuits are 51.78 per cent of the total. And yet note the operating revenues of $10, 666,000 from what they call domestic telecom (comprised of local, long distance and access charges for voice service). Note that what is shown on page 13 is a subset of overall operating revenues on page 9. Here you have 10.6 billion domestic voice wireline, $4.5 billion wireless, $600 million from international activities and $1.1 billion from 'information services' which is the phone directories. So note that 51.78 percent of their network which is also the part of the network where all the growth is produces only about 17% of the wireline network revenue. They don't say precisely how the 1.776 billion in data revenue is accounted for in the total 10.666 billion of the wireline network. But there is no other place in their report where it could be hiding.

If they were getting the data from a different, cheap-to-operate and amortize network, this would not be so significant. But they are carrying the data on their voice network. The data is taking half of their access line equivalents while it provides less than a quarter of the revenue. And this is the part of the business that is growing, we have a problem. The part of the business that is shrinking namely the voice side is the part that generates 75% to 80% of the revenues and is keeping the rest of the business afloat.

Reported 3rd Versus 4th Quarter Income

COOK Report: The year end fourth quarter report announced by Verizon on January 31 contained a real shocker. Page 8 of the third quarter report (released in October) contained a hint of what was to come when operating income declined by 25.6%, net income declined by 45.9 percent. And earnings per share by 45.7 %.

For the 4th quarter of 2001 operating income declined from 3.379 billion a year earlier to 447 million down 86.8 %. On top of this they added a loss in equity of 1.736 billion and interest expense of 742 million. With some miscellaneous figures thrown in the operating revenue of 447 million disappeared completely and became a 2.037 BILLION dollar loss. Earnings went from 70 cents per share in the 4th quarter of 2000 to a loss of 75 cents per share in 4th quarter 2001. Earnings for the year declined from 4.31 per share in 2000 to 14 cents per share in 2001. And yet on the next page (page 9) they show ADJUSTED earnings of 77 cents per share in the 4th quarter of 2000 and 2001 and earnings for the full year 2001 are $3.00 per share and $2.91 in 2000.

Googin: The difference here is outlined at the middle of page 3. There the reported expenses include $4.1billion of "one time" charges including: Severance costs for about 10,000 people, investment markdowns including Genuity, restructuring at CTI, sales or exits from non strategic businesses and Other asset impairments. One may debate which of these items is one time, but no details are given. The adjusted income numbers are on page 9, which are supposed to reflect ongoing operations. Here operating income falls 2.1% from $3.71b to $3.63b. While after Global Crossing words like "adjusted net income" may cause problems, we lack more data as to what costs are one time and what costs are recurring. Auditors used to be expected to figure that out, but apparently not these days.

COOK Report: On page 3 we read: "Reported results incorporate the net after-tax effect of gains and charges. For the fourth quarter 2001, Verizon reported a consolidated loss of $2.0 billion, or 75 cents per diluted share, compared to net income of $1.9 billion, or 70 cents per share, in the fourth quarter 2000. Results for the fourth quarter 2001 include charges totaling $4.1 billion, or $1.52 per diluted share. These charges relate to a variety of items, including severance costs for the reduction of approximately 10,000 employees, primarily through the fourth-quarter voluntary program; charges reflecting the current market values of investments, including Genuity; a restructuring of CTI, the company's wireless affiliate in Argentina, as a result of recent economic events in that country; charges for the sales or exit of non-strategic businesses and other asset impairments; and merger transition costs. Reported net income for year-end 2001 was $0.4 billion, or 14 cents per diluted share, compared to $11.8 billion, or $4.31 per share, for 2000."

What is going on? Is this a grand sweeping write off of investments gone sour?

Googin: Yes. And they don't even have to say what they are doing!

COOK Report: Here is the largest phone company in the US reporting a 4th quarter decline of revenue of 207.1% and annual decline of net income of 96.8%! Yet page one reassures investors "Verizon Communications reports solid results for fourth quarter . . . company posts adjusted earnings per share of 77 cents."

Googin: This is supposed to reflect ongoing operations, but only their auditor knows for sure. We are supposed to just accept this. What matters is the size of the hit, equal to half a quarter's operating expense, and the fact that they keep laying people off despite having this great "growth" business in data. If your business is growing, you should add people not get rid of them. This behavior tells me their profits are falling and they have no choice. First you cut CAPEX then people, then your dividend, then your bond payments. CAPEX was $17.3 billion in 2001 and is projected to be $15-$16 billion in 2002. Again, that is not growth behavior.

EBITDA Again

COOK Report: How do they handle EBITDA?

Googin: On page 13 they talk about operating income of 2.274 billion having already subtracted depreciation and amortization which is listed separately at 2.333 billion. If you added both these together you'd get EBITDA. Calling it operating income is GAAP accounting. Whereas EBITDA is the newer term.

COOK Report: Their operating income for the three months is down by 10.9%. Roughly 225 million dollars less that the third quarter of 2000.

Googin: Yes. And their operating income margin (profit) is 21.3% down by 2.2% from a year previous. Their operating cash flow: 4.607 billion (the sum of 2.274 income and 2.333 D&A) is actually their EBITDA figure. That is 43.2% down .6% from the year previous. The D&A is really the amortization of their capital expenditure.

If the depreciation figures were accurate. Namely if their installed base of SONET equipment were going to be viable for the next 15 to 20 years which is what their depreciation schedule implies then your operating cash flow (income plus D&A) would account for your replacement costs.

EBITDA excludes depreciation. Operating income includes depreciation. This is part of the difference between those two numbers. Depreciation is the money you set aside to ensure that you can replace the equipment that you need to operate your network when the network wears out. From the operating income figure you primarily have to worry about paying the interest on your bonds and your taxes.

The declining numbers that we are seeing here are new within the last two quarters. Previous to this everything has been growing. Year after year. Seeing them begin to decline if you have been following this stuff is shocking and for the holders of their bonds it should be especially shocking. The ILECs have lots of excuses for the numbers being down and you see the footnote on page 13 saying that were it not for the terrorist attacks, the Verizon numbers would have not been down nearly as much.

Wireless

COOK Report: Where does wireless come in? Cingular for example.

Googin: Cingular is jointly owned (60 – 40) by BellSouth and SBC. Wireless is still a bit new and treated a bit differently. They are considered to be in build out mode and no one seems really to care if they are cash flow negative. Their EBITDA margins look OK. Their Capital expenditure seem high. But never forget while the wireless part of their business is growing, the less people are using their wireline network. Substitution of cellular for wireline is one reason that access lines are declining.

The important thing to remember about wireless is that they used to be very territorially bound. But now we have six wireless carriers that are nationwide and we have 40% market penetration and Europe has 70% penetration. Everyone is

saying that the US is going to go from 40% to 70%. The suspicion is that everyone of those six carriers wants to go for dominant share and that a price war will be the result. They have been cutting their prices. History would seem to say that one of these guys will want to get dominant market share because of huge sums of money at stake and because they feel that once dominant, they will be able to preserve dominance with the result of having dependable income that functions just like an annuity. Consequently, now is the time to get the land grab done. But over time I will bet that your revenues per unit will go down.

Qwest

COOK Report: How about Qwest? The quarterly reports are available as HTML down loads from http://www4.qwest.com/ireye/ir_site.zhtml?ticker=q&script=700. The third quarter is http://media.corporate-ir.net/media_files/NYS/q/3q2001.htm and 4th quarter is http://media.corporate-ir.net/media_files/NYS/q/q_1_28_02earnrel.htm

Googin: OK. Let's go to Attachment E on the third quarter 2001 report. Look at access lines. Business up 3.2% but consumer lines down by 2.2% and total numbers of access lines down by .4%. Now in Voice grade equivalents (data) they list a business growth of 46.2%, consumer 2.1% and over all of 32.9%. Their growth here is way ahead of Verizon but not as fast as BellSouth. Data revenues grew by 20 percent while totaling only 23% of gross revenues. Note that this is the same old problem of the fastest growing part of the business producing only a small revenue stream. Since they are basically unprofitable minutes so you could say: "who cares?"

You can't prove they are unprofitable. But when you look at the EBITDA margins and how fast data provisioned lines are growing relative to the revenues received, they certainly look unprofitable. Their EBITDA was down 5.3% on the quarter which means that they had 5.3 % less income to pay operating expenses than the year previous. Total revenue was unchanged. When you compare their financials, in addition to the fact that they leave out such statistics as minutes of use, the fact that the merger of Qwest with US West and write off involving KPN Qwest took place in the time under consideration makes meaningful data difficult to extract. Note also that Qwest remains heavily invested in KPN Qwest. "Qwest announced an agreement to increase its ownership of KPNQwest to 47 percent."

One thing that people quite correctly don't like about EBITDA is that fact that they throw in funny things to make it look good. Or they say "oh that is just a one time expense item." Since there is no GAAP procedure for such one time expense, people can do some fudging with that part of EBITDA.

COOK Report: Can one company's application of EBITDAdiffer from how another might apply it?

Googin: Yes. Because it is not GAAP restricted, they can make up their interpretation as they go along. They typically put explanations in footnotes and you have to know that you better pay close attention to them because EBITDAis not a GAAP number whereas net income and operating income are GAAP numbers. A GAAP number has a commonly understood uniform definition that is legally binding in court.

One problem with EBITDA is when a company like Cisco uses it. Cisco regularly uses its stock to buy other companies for which they take these one time write offs. Some people wonder how the size of the write off for such an acquisition is determined. Is Cisco including other expenses which it saves up and then bundles as part of the write off for a newly acquired company? Amortization and depreciation may average 8 or 9% quarter after quarter. When suddenly in one quarter it jumps to 25% and then goes back to the 8 or 9 percent average it is hard to know how to value the 'aberrant' quarter. Is it a fluke or should the regular quarterly figure be 2 or 3 per cent higher?

COOK Report: To return to their quarterly report, note that it brags: "As a result of this expansion and the acquisition of some additional international fiber-optic assets, Qwest has completed its network expansion and now has a global network totaling more than 190,000 route miles, with broadband facilities to six continents." Given the problems facing the other ILECs it seems that one would not want one's phone service dependent on a local exchange carrier that is burdened with the additional weakness of being a global fiber provider.

Googin: Part of the point you are making is illustrated by Qwest's loss of $2.41 per share when the reported profits for the other LECs are a few dollars per share.

ILEC REVENUES in Millions

	Qwest	SBC	BellSouth	Verizon	
2000	18.954	51.374	27.450	63.423	
2001	19.743	45.908 (no Cingular rev included)	29.589	67.190	
Change	4.2%	(10.6)	7.8	3.8	
2000 earnings	$(0.06)	$2.35	$2.24	$2.91 adj	$4.31 reptd
2001 earnings	$(2.41)	$2.16	$2.34	$3.00 adj	$0.14 reptd

Qwest US West Merger Accounting

(DOLLARS IN BILLIONS)	PRELIMINARY PURCHASE PRICE ALLOCATION	ADJUSTMENT	FINAL PURCHASE PRICE ALLOCATION
Identified intangibles	$4.1	$ —	$4.1
Investment in KPNQwest, N.V	7.9	(3.1)	4.8
Tangible assets and liabilities, net	0.8	0.3	1.1
Deferred income taxes	(0.7)	(0.1)	(0.8)
Goodwill	27.9	2.9	30.8
Purchase consideration	$40.0	$ —	$40.0

The accounting for the merger is interesting. You see this in the 10Q form filed by Qwest with the Securities and Exchange Commission on November 14, 2001. Available at http://www.sec.gov/Archives/edgar/data/1037949/000103570401500481/0001035704-01-500481-index.htm

Let's start with Note 2 "Merger with US West' on page 4. Here US West is listed as the acquiring company (a reverse acquisition) even though it did not keep its name. The reverse acquisition was valued at 40 billion dollars and the following table shows how it was derived.

The statement says: " The identifiable intangibles consist of the following (including related amortization periods): $2.2 billion in product technology (10 years), $1.2 billion in customer relationships (10 years), $100 million in assembled workforce (3 years) and $600 million in trade name value (40 years)."

Now note what this also says: tangible assets acquired by US West were 800 million. Plus an investment in KPN Qwest that was initial valued at 7.9 billion and lost 3.1 billion in value by the time the deal was consummated. Deferred income taxes (that they did not have to pay) equaled 800 million. For $40 billion worth of Qwest stock, the only tangible assets that US West share holders received were 800 million worth of switches, routers, fiber, and so on. Now since this was all stock, it was in a sense a kind of "funny money."

If you pay more for something than its assets are worth, the excess is labeled "goodwill" in accounting terminology. But because it is not cash it is just this annoying thing that everyone has to 'deal' with.

COOK Report: Didn't this in effect dilute by a huge amount the value of the equity held by US West shareholders?

Googin: Yes.

COOK Report: And out of 18 million access lines they are going to sell 800,000 to small operating companies? Why? Because these are the most rural and isolated and least profitable? And because US West serving the rural west had the lions share?

Googin: Absolutely. This is what the universal service fund is all about and why it is becoming a much larger portion of the remainder of the phone bills of the rest of us. It is a big mess.

COOK Report: Their voice minutes will be decreasing because they are getting rid of these rural lines. Therefore, even if we could find the minutes of use statistic, it might not make a great deal of sense because of this problem.

Googin: That is true. But they could restate things on a comparible basis.

COOK Report: On page 19 of the 10Q we find a paragraph called: Commercial Services Revenues. This material is not to be found in the 3rd quarter report.

Form 10Q says: "Commercial services revenues are derived from sales of IP, data, voice and wireless products and services provided to both retail and wholesale business customers. For the three months ended September 30, 2001, commercial services revenues decreased by $48 million or 2.0% from the comparable period in 2000. While sales of our IP and certain data services (DSL, DIA, VPN, traditional private line, professional services, web hosting and dial Internet access) continued to grow, these increases were more than offset by the reduction in optical capacity asset revenues and IP equipment sales. Declining optical capacity asset revenue sales were the result of softening wholesale demand and a shift in customer purchasing behavior away from network asset purchases to shorter-term agreements."

Let's translate. Optical capacity asset revenues are sales of IRUs where the right to use a strand of fiber for its expected lifetime of 15 to 20 years is sold. The revenue for the entire lease is booked up front as income. Declining revenues from asset sales are explained by the Qwest report as the result of a "shift in customer purchasing behavior away from network asset purchases to shorter-term agreements." Indeed.

All the carriers with fiber assets are selling lambdas or light waves. For a carrier, that owns fiber and has spent large sums to light various strands of fiber, can sit back and sell upwards of a few dozen lambdas or lightwaves from a single strand of fiber. The bandwidth of each lambda is huge (2.5 or 10 gigabits). The

price however is much cheaper than an IRU and the length of a sale of normally one year is much less frightening from a risk management point of view than the purchase of a 15 or 20 year IRU. In 1998 an entity with a lot of capital might have reasonable assumed there was a viable business in the purchase of a fiber IRU with the assumption that there was a business to be found in lighting the fiber and reselling lambdas from the lit fiber. However, since, by the end of 1999, almost every one with fiber assets was selling lambdas, the viability of this as a successful business was largely gone.

It seems safe to predict with Global Crossing having just filed chapter 11 that all players will have little choice but to keep their investments as short term as possible. This means that when a player needs bandwidth, it will purchase a lambda. Not an IRU. Qwest was booking large sums of up front revenue from IRU sales. That is now coming to a crashing halt.

Form 10Q says: The increase in commercial services revenues for the nine months ended September 30, 2001 as compared to the same period last year was $1.139 billion or 16.6%, and was primarily attributable to growth in our data services and IP (DSL, DIA, VPN, professional services, web hosting and dial Internet access) and optical capacity asset sales. During the three-and nine-month periods ended September 30, 2001, we recognized $133 million and $989 million, respectively, in revenues from optical capacity asset sales under indefeasible right of use ("IRU") agreements versus $232 million and $648 million, respectively, for the comparable periods in 2000.

2000 IRU sales		**2001 IRU sales**
3rd quarter	232	133
1st 9 months	648	989

From the figures above it looks as though IRU sale income for Qwest ramped up in the last half of 2000, and went way up in the first two quarters of 2001 (an average of 425 million per quarter in the first half of 2001 only to fall by two thirds in the third quarter of 2001). Qwest has booked some hundreds of millions in commercial sales of IRUs — income that it is not likely to see again any time soon.

Indeed in the 4th quarter results released on January 29, 2002 Qwest's commercial income plunged by 14% or $396 million compared to a year ago. For the full year it had a gain of $700 million or 6.7%. We are now seeing a dramatic deterioration in Qwest commrcial income which before had been growing slightly. The other 3 ILECs don't separate their revenues in this fashion listing them by service type. For the most part 2001 revenues compared to 2000 have suffered declines of a few per cent. Qwest's 4th quarter total corporate revenue decrease was 6.3% but, propelled by 850 million of IRU sales in the first 2 quarters, revenue for the year experienced a gain of 4.2%.

Form 10Q says: "Certain rule-making bodies, such as the Financial Accounting Standards Board ("FASB") and the Emerging Issues Task Force ("EITF"), are currently discussing matters that may impact the accounting for sales-type leases. We actively monitor these rule-making activities and evaluate [sic] their impact on our current accounting practices."

COOK Report: What Qwest is saying here is that it may be forced to change its methods of accounting for IRUs with possibly dramatic impact on restated balance sheets in the future.

Googin On December 23 2001: Indeed. What you are seeing here is the fall out of the IRU sales. I suspect that they were swapping bandwidth trades with Enron. The word on the street was: "we are doing all this wholesale business." In reality what I believe we will see established as what actually happened was that they were trading back and forth with each other and booking the full value of the trade up front. Enron was pledged as the market maker. When it blew up they couldn't complete the trades. The Enron bandwidth trading unit took the big write off toward the end of the second quarter and started shutting down its trading operation. Consequently, during the third quarter they seemed unable to complete trades as they could in the second.

COOK Report: There is increasing evidence that what you said on December 23 is correct. For example: On June 11 Global Crossing closed at $12.16 On June 20 it closed at 6.92. On June 14 2001, an executive informed me there was a reorganization going on and he was trying to decide whether to stay. Before the end of the month he left.

Meanwhile on January 30 according to the Los Angeles Times: <http://www.latimes.com/news/printedition/front/la-000007613jan30.story?coll=la%2Dheadlines%2Dfrontpage>

A finance executive at ailing Global Crossing Ltd. warned the firm's top attorney in August that the company's financial condition was being enhanced with misleading accounting techniques, according to a letter obtained by the Los Angeles Times.

"The five-page letter, written by Roy Olofson, former Vice President of Finance, contains a detailed analysis of what he called deceptive accounting practices involving Global Crossing, its sister firm Asia Global Crossing and its auditor, Andersen. [SNIP] His Global Crossing letter takes aim at a little-known accounting policy embraced by Global Crossing and other major communications network operators known as "indefeasible rights of use," or IRUs. These instruments are used to sell bandwidth on Global Crossing's fiber-optic network typically for 25 years."

[SNIP] "In some cases, Global Crossing would buy an IRU and book the price as a capital expense, which would spread the expense over a number of future years. It would then resell that capacity and book the proceeds as revenue, leaving some investors to see the increase in revenue, but not the expense, said Susan Kalla, a telecommunications analyst at Friedman, Billings Ramsey. "That's perfectly legal to do, but a better way to do

it so that investors could better understand what was going on, would have been to book the IRU as an expense and then register the revenue against the expense," said Kalla, who has been so bearish on the industry that she gained the nickname "Dr. Doom.""

"The way Global Crossing, Qwest Communications International, 360networks and others handled the IRUs" might have made it look like the revenue was being generated from the capacity that the [respective companies] put in, but it was capacity that they bought and then resold to another carrier," Kalla said. "They were selling stuff to each other. . . . I would sell you an IRU, and then you would sell it back to me."" [End of excerpt from LA Times.]

And on January 1, 2002 Peter Behr had written in the *Washington Post*: "Enron's lofty revenue and profit projections required it to quickly draw major telecommunications and Internet firms into this market. But it had to settle for trading with a handful of other energy companies. ''The trading environment was pretty much a joke,'' said Thomas Blakeslee, a former trading executive at Global Crossing Ltd., a major fiber-optic network operator. He called Enron and a handful of other energy companies that traded broadband ''the Houston poker game." " The bad news for broadband kept coming, and by July, when Enron reported second-quarter revenue of just $16 million from the business, the venture was dead."

COOK Report: Not bad after the fact confirmation for what you said on December 23rd.

Googin: Well the third quarter was the one in which Qwest, Broadwing and Global Crossing all blew up because they were getting so much of their reported revenue on these bandwidth trades reported with Enron that after Enron's July report they could no longer complete. The deal on the IRUs is that you book the revenues up front and amortize the cost over 20 years. The costs in the period in which they were reported were negligible and the revenues were bogus. The problem became obvious to those who bothered to look. The IRU revenues became over half their stated revenues and it was their fastest growing area growing at twice the rate of their customer revenues. It was ridiculous. Not only that. They weren't buying any gear from JDSU which told you that they weren't provisioning anything.

What Will Happen?

COOK Report: I am left with the impression that; given the shrinking of the voice markets you have spot lighted, combined with the twenty two billion dollar bankruptcy of Global Crossing; the exposure of Enron's bandwidth trading as built on air or fraudulent depending on your point of view; Wlliams Communications January 29 announcement that it was delaying reporting quarterly earnings; and Level 3's January 29 statement http://www.totaltele.com/view.asp?ArticleID=48208&pub=tt&categoryid=0 that "it might not meet some of its financial obligations this year," we have a situation where a lot of debt dominoes are beginning to fall. Furthermore, that collapses in some areas will lead to collapses in others. WorldCom shares have just hit a 7 and a half year low with rumors of down grade on bonds to junk status. AT&T revenues are down.

At what point does this snowball beyond the ability of the US government to do anything?

Googin: Probably this year.

COOK Report: What you are saying is that it is a real possibility?

Googin: No it's inevitable. The only uncertainty is the precise timing. They will restructure. It will be ugly. People will loose money. But we will live through it. Here is an analogy. To the phone companies minutes of use on their networks are like lawyers'billable hours. The network is the only thing the have to generate and income.

So say if you are a lawyer and all of a sudden a new type of lawyer comes along who promises to charge only one tenth of your customary and normal fees, what happens? You will start to loose clients and billable hours. And if just bought a large house with an expensive monthly mortgage, you will be in trouble.

This is no mystery. It has happened so many times before in the history of our economy. No one disagrees that the new architecture can operate at one tenth the cost of the old. Or that it will do voice one of these days or that voice will be subsumed into a rich media mix. This has all been talked about for years but no one has been asking the obvious follow on question: what happens under these circumstances to the voice infrastructure? We are now about to find out.

Part Two

Andrew Odlyzko Critiques the Googin Interview

Odlyzko Finds Some Areas of Technical Disagreement -- Cook and Bill Klein Comment

Highlights, or Exec. Sum

Editor's Introduction: What follows includes comments by Andrew **Odlyzko** on the Roxane **Googin** interview along with question we asked on his comments and his responses. Andrew is currently director of the interdisciplinary Digital Technology Center at the University of Minnesota. As a member of AT&T Labs - Research, between 1997 and 2001 he did landmark studies on the rate off Internet data growth show that estimates of doubling every ninety days were vastly exaggerated. His papers and are available at http://www.dtc.umn.edu/~odlyzko

Editor's Note: Readers overburdened with the amount of material in this issue maywant skip ahead to page 21. The Googin material here is repeated from the interview on pages 3 to 13 in order to give context to Odlyzko and Klein's comments. Also many of the points made here by Odlyzko are also made in his essay beginning on page 53. Some of Klein's points will also be found in his essay starting on page 26. Readers should be warned however, that the points made here are the key ideas to which Roxane Googin responds in her essay on page 21.

William B. **Klein** has 20 years experience in investments on Wall Street, most recently with Dresdner Kleinwort Wasserstein (formerly Wasserstein Perella) covering the Data and Telecommunications Infrastructure and Services sector. Prior to covering the services sector, he was involved in analyzing broadband access equipment companies, particularly DSL technologies. Currently, Mr. Klein is a founder and managing partner of Seydlitz Capital, a private equity investment firm focused on the data and telecommunications industry.

Googin: When AT&T was split up and the Baby Bells formed, the regulatory regime allowed them a "return on assets." They were allowed to earn a profit that was in proportion to the assets under their control. The higher the value of the assets under their control the more money they could earn. As a result, they came up with an extremely expensive architecture superficially justified by the need for five nines of reliability. They did what the regulators promoted coming up with the world's most expensive possible bandwidth.

Odlyzko: Rate-of-return regulation was the historical norm for a long time, but by the late 1980s (I don't recall the exact date, and in any event this took several years to accomplish) it gave way (largely because of complaints like those above about the distortions it was introducing into investment decisions) to price cap regulation. In this regime, carriers are obliged to lower their prices at a certain constant annual rate (determined by regulators based on previous experience and projections) and are allowed to keep any savings for themselves. This produces incentives to lower costs, and all the empirical evidence is that it worked. Productivity in the telecom sector has been increasing.

COOK Report: By my recollection of Ameritech's in Access Indiana 'program' the implementation of price cap was the 1992-1993 time frame. By this time the LECs had locked themselves into the SONET purchase and were starting to take delivery. Any stats on that increasing productivity you mention or is it just something that a telco person "knows'?

Odlyzko: There are some real stats on increasing productivity. If you go through the documents at the FCC Web site, you will find that things like number of lines per employee at the ILECs have been going up by around 3% a year. Not the productivity increase of the computer industry, but faster than for the economy as a whole. A quick search through paper files I have led me to the Feb. 1998 FCC report, "Trends in Telephone Service." (This is issued twice a year, and more recent issues are available at <http://www.fcc.gov/ccb/stats>) and this one shows (p. 17) rapidly rising productivity in the telephone communications industry, but that unfortunately mixes long distance and local.

Klein: No matter what you say about productivity the incumbents early 1990s investment the tried-and-true SONETarchitecture and protocols (read: voice quality) has left them with huge problem. As prices across the board dropped faster than anyone had expected over the past few years, the incumbents were left with outdated equipment with long depreciable lives (and financed with fixed instruments) and short economic lives. Therefore, very little cost savings for the incumbents to report to investors. As far as productivity improvements specifically in the telco sector, do we really have any evidence that the sector has improved due to technological changes at a greater rate than any other sector of the economy? I am from Missouri on this point.

[Snip]

Googin: Everyone has been playing a little game which now is ending because of IP. Everyone is saying IP will drive prices down by a factor of ten. What people have forgotten about asking is what happens when you own that great big house that you have mortgaged to the moon and all of a sudden your income goes down by 90%.

Odlyzko: Not "[e]veryone is saying IP will drive prices down by a factor of ten." As I pointed out 4 years ago in "The

economics of the Internet," at that time it cost most corporations more to send a large file over their IP Intranet (if we allocate costs by volume of transfer) than it would have to send it using a modem over the long distance voice network in the US. That may not be true any longer, but much of the common wisdom in this area is wrong. Those huge declines in costs (and it is not by any fixed factor, like 10, but by increasing factors as time goes on) are true in a sense, but (i) are largely confined to the core of the network, and (ii) are caused more by technical advances, economies of scale, and so on. The big advantage of IP that made it take over the world was not lower cost, but greater flexibility.

The big problem with that last sentence, about income going down by 90%, is that it takes things out of context and out of proportion. A better analogy, in my view, and this will be supported by further arguments below, is with cars. Let's assume that Detroit pays around $100 for a set of tires for a new car. (I am just guessing this is the right order of magnitude at wholesale, and we can find out what the right figure is, but let's not worry about it for the moment.) Suppose that Ford suddenly figures out how to produce tires for 10% of the industry average, and decides to keep the process to itself. Is it then going to drive GM, Toyota, etc. into bankruptcy? No, because the final product, the car, which is all that consumers really care about, will go down in price by at most $150 (allowing for various markups, etc.). That is not enough to affect the market too much (although it would allow for fattening Ford's bottom line). Similarly in telecom, my contention is that new technologies are not affecting the bulk of the costs, at least not fast enough to lead to dramatic changes.

COOK Report: Isn't this a key question? Namely how much evidence does one give each side of the argument?

Odlyzko: Yes, definitely, this is a complicated industry.

Klein: I believe Andrew **Odlyzko**'s point about the huge declines in costs in the core. The metro area is the problem, as it has been for some time. The local incumbents have obstructed competition for years, and it appears as if they have won the battle against all comers. I agree with both Roxane and Andrew, wireless (point-to-point and multicast) will evolve into a viable technology in many cases, as will the growth in cellular technologies.

I am somewhat skeptical about Andrew's tire analogy. Finding ways to decrease costs per unit for a particular process or product is critical, no doubt, but it does not entirely address why a particular customer chooses one carrier over another. Telecom is not like the auto industry, where an end user chooses one producer at the exclusion of all others - on the contrary, many enterprises like having multiple providers based not only on price/QoS, but for redundancy as well. I always believed that Harvard should do a business study as to why AT&T was able to maintain its core customer base for so long despite service(s) that were/are behind its competition in many areas. Why would they build an overlay network with Velocita, et. al., when a combination of Level 3, Williams and others would give them the network footprint that they need, as well as repackaged transport services. Therefore, they could focus on what they do well, namely, customer service, rather than transport.

Enterprise customers take services from a particular provider due to a number of factors. Price is obivious. Branding is another. But QoS cannot be ignored. Customers have been testing services, such as 1-800 service, for example, from upstart carriers such as Qwest for some time, later to take other services from them as well. Price declines were a critical factor in getting the upstart in the door at the enterprise, but QoS delivered far more revenues (and, more importantly, margins) than price itself.

COOK Report: Certainly the business model is changing. This is why L3 and Global Crossing are interested in value added non commodity services. L3's Softswitch services, for example, maybe its biggest success. When a LEC provisions a VGE is it using its own SONET infrastructure or is it buying Softswitch services?? And in doing so is sending them over fiber acquired from L3

[Snip]

Googin: The answer is that you can no longer pay the debt. And we are talking about huge amounts of debt in addition to the debt of the ILECs. AT&T, despite a major debt reduction effort, still has 34 billion dollars in outstanding bonds. This debt is not just in the US. It is in Japan, and Germany, and France. It is in every developed country all over the world as well.

Odlyzko: The problem with the alarmist tone here and later is that it gives the impression that the telco debt load is enormous. Yes, it is big for AT&T, but not because of investments in SONET or anything like that, but because of the failed attempt to transform itself by buying cable TV companies at inflated prices. It is also big at (now bankrupt) Global Crossing. The entire 2001 revenues of Global Crossing (which, by-the-way, has modern equipment) were around $3 billion (and some of those revenues were somewhat questionable, as Roxane and Gordon discuss later, because of those IRU trades), yet they had to support (and failed to support) a long-term debt of $7.5 billion.

On the other hand, the situation is very different at the ILECs. Let us look at SBC, say. Their annual revenues are over $50 billion, EBITDA is over $20 billion per year, and free cash flow (after dividends) is about $3.6 billion. On the other hand, their long-term debt is $18 billion. They can pay it back with one year's EBITDA! Yet another way to look at SBC is to consider their stock market valuation. At this past Friday's closing price of $36.96 per share, market cap was $124 billion. Add to that their long-term debt, and we get enterprise value of around $140 billion. The $18 billion of long-term debt is not all that large.

Klein: It is not the question of what AT&T did with the proceeds from the debt offering, but more importantly the fact that they followed a failed strategy.

They have the debt on the books regardless if they bought more cable headends or more SONET equipment. The key question is, how will they be able to repay that debt with their existing suite of services? My guess is, that they won't, without severe restructuring (at the expense of the equity holders, most likely).

As far as the LECs are concerned, look at their depreciation and amortization - how much is for outdated equipment with long tails, and how much is for goodwill, with no economic value whatsoever. EBIT would be a better measure (and Andrew is right - they aren't all that bad), but I get back to my original point: are the revenues and margins growing with their existing (and newer) core assets, or are they shrinking?

[Snip]

Odlyzko: I am very skeptical of the claims about declining minutes of use. The only data supporting this that I can find (and that are cited later in the interview) are for "access minutes of use," which is just one specific type, and can be hard to interpret. Access minutes refers just to traffic that is handed off by the ILEC to a long distance company. It ignores the much higher volume of traffic that is handled by the ILEC itself (something like 85% of total voice traffic is within a single LATA). It also ignores the bypass traffic (as when AT&T has fiber to a business customer, and the long distance voice traffic to and from that customer never goes over ILEC lines). There could be all sorts of things going on (including the recession).

COOK Report: What happened to minutes in the last recession? Does anyone have stats on that?

Odlyzko: Access minutes can be obtained from FCC stats, as can total long distance minutes. Looking into the same Feb. 1998 "Trends ..." report mentioned above, we see that access minutes continued climbing all through the 1990-91 recessions.

I am not sure there are good stats on total volume. FCC does publish some statistics on things like dial equipment minutes, but my recollection is that those are based on sampling, so may not be all that precise. Still, they do show (p. 56 of "Trends ...") continued growth all through the last recession, but slipping down to 1% a year:

year	**increase over previous year**
1984	6%
1985	5
1986	3
1987	2
1988	5
1989	3
1990	2
1991	1
1992	4
1993	5
1994	5
1995	5
1996	8

We simply do not have comprehensive statistics on volumes in the telecom world in the US. Why? Because telcos often do not measure very carefully things they don't bill for (like local calls for residential customers with flat rate service). Further, the FCC does not force full disclosure, especially for the new upstarts.

In general, I am pretty skeptical of all claims of decreased usage. I agree that wireless is the big threat in the long run, and have been saying that for a while (most specifically in the paper "Content is not king," published a year ago), but I do not expect it to be happening yet.

COOK Report: but there are trends showing up in decreased access lines?

Odlyzko: Perhaps. We need to see more pronounced trends, and be sure they are not due to the recession or missed measurements. Now I do expect to see lots of disconnects eventually, the question is when.

One reason I am skeptical is that where I can get detailed data, I don't see such effects. For example, let us consider Britain. The UK regulator, Oftel, requires carriers to provide detailed statistics, which are then made available to the public at <http://www.oftel.gov.uk/publications/market_info/index.htm>. Here is some data I have extracted from there. The quarters listed are calendar quarters (not British government fiscal quarters used in the reports), and the columns are as follows:

Hopefully we'll soon get the data for fixed phones for 2001q3 to see if there really is a much of an effect, but basically we see stable usage of fixed voice, while cell phone usage, Internet access, and SMS are all growing vigorously.

COOK Report: But aren't all the stats are down in the second quarter of 2001 just like in the US?

Odlyzko: Yes, it is a matter of interpretation. However, notice that the recession might be affecting the British as well as us. Also, there seems to be a seasonal effect there, as 2000q2 was also weak compared to 2000q1 and 2000q3.

Note that the wireline voice infrastructure is now used almost as much for Internet access as for voice. So sure, voice eventually will go wireless. But how quickly? It has not done so yet (and my prognosis is that it will take a few years for this to happen, as carriers will need to deploy 3G, and also to give up their chimerical mobile Internet access dreams for 3G, and use it to stimulate voice usage). In the meantime Internet access will be growing. That also is not stable, as people will eventually start migrating to broadband, but but the telcos might have a chance to get in there and provide broadband with DSL. Eventually that will also give way to fiber to the home, but that will take a while.

[Snip]

Googin: I have been saying all this for a year now. But what has been obvious to me for a very long time is hard for other people to hear. Let me just ask how you can possibly understand that the IXCs are in trouble and not understand that the

local guys are in the same boat? There is no natural boundary separating the two. They are using the same technology. They both have the same cost disadvantages. The difference of course is that competition is easier to manifest itself the long distance arena. Consequently, the problems got a head start here. As a result they are easier to see.

Odlyzko: No, no, no. IXCs and ILECs are in very different boats. IXCs compete with each other directly. A typical major city switching center will have a dozen IXCs in it, providing the same service, which is increasingly a commodity one. ILECs still have a monopoly on the local connections.

The technologies are also different. Sure, large parts of the plants of IXCs and ILECs are the same, but the local loop is specific to the ILECs, and technology is not improving very rapidly. The main reason AT&T, Sprint, and other long distance voice carriers are in trouble is that technology in long haul has improved dramatically. This has lowered costs for long distance voice to well below one penny per minute (as judged by wholesale rates). When costs are that low, and you have vigorous competition, prices have to follow.

Klein: What happens here if the ILECs are forced to divest into wholesale and consumer markets? This may indeed happen faster than anyone wants to consider. Those extreme prices that the ILECs charge for handoffs may become much more transparent, which is why they are fighting this tooth and nail. For the time being, however, I do agree with AO that the IXCs and ILECs are in different situations. Where the ILECs suffer, however, is in the data market. The ILECs do not offer an enterprise-quality suite of national and international data services, nor do they have the strong customer bases of the IXCs. It will cost untold billions to gain those capabilities. (And how will they finance such a move?). Further, the ILECs push into national Long Distance will increasingly push them into costly competition with the IXCs, which again will cost billions.

[Snip]

Googin: Networks are loosing minutes of use. Email replaces a lot of voice. Instead of calling SBC and asking them to send you their financials, you just download them from the SBC web site. Behavior is changing at the expense of voice telephone traffic. What you get via email and the web in most instances is far more useful than what you can get via voice.

Odlyzko: This is where I have a very serious disagreement. I do not see much displacement, at least not yet. This fits the historical pattern, by-the-way. The telephone eclipsed the telegraph in the US by 1900, but the number of telegrams sent continued to grow, and peaked only in 1945. See also the British statistics above.

Yes, I can now download SBC financials, but those can then make me call up their investor relations department for info. As a specific example, I had both a cable modem and DSL installed in the last 6 months. Unfortunately I did not keep track of the time I had to spend on the phone to get these ordered/installed/operating/repaired, but it was many hours, all contributing to voice usage. As simple information needs get supplied by Web access, more complicated ones come up that require human intervention.

This is similar to what happened in the PC industry. Today's PC is in many ways simpler to handle than the one of a decade ago. But we have compenstated for this by piling up new complexity, such as home LANs, wireless links, synchronizing PDAs, etc. As a result, the world we face is just about as complicated. In a paper a couple of years ago, I predicted that we would continue to live "on the edge of intolerable frustration," and I see no reason to regret that prediction.

[Snip]

Googin: The thesis that I've been putting forward for more than a year now is that the Telecom problem is certainly not isolated to the newcomers. To me the fact that people seem to think it is isolated to the newcomers is a bad sign. Because the real Telecom problem is with the incumbents. This makes things even messier because the new green field companies that we were counting on to implement the new technology are themselves damaged. We are in danger of finding ourselves in a situation where the attackers are unable to succeed and where the older players with nonproductive technologies are seen as unable to fail. The attackers are running out of cash before they can get big enough for their operations to scale and pay their operating expenses.

Odlyzko: Yes, I fully agree here.

Klein: I predicted long ago that we would not see another major backbone provider in the US in our lifetime, and the latest developments do not cause me to reconsider. It is now far easier to by a lambda from an upstart, or wait for that upstart to declare bankruptcy and buy the assets.

Googin: One of the reasons that they are in trouble is that prices for bandwidth fell more rapidly than anyone had predicted. Demand has been less than we had assumed. Huge capacity was built. And, with the bust of the dot cons and other events, demand to fill the capacity did not arrive and prices for bandwidth plummeted. Anticipated corporate buyers of bandwidth simply have not come on stream yet. No one managed to plan successfully for a deregulated telecommunications market. Technology that our older debt leveraged infrastructure could not absorb came online.

Odlyzko: This applies almost exclusively to the long haul market.

Klein: I would point to the major POPs in the metro areas to counter Andrew's point; namely transport into 1 Wilshire in Los Angeles, 60 Hudson in New York City and other key major metro POPs have seen significant competition over the last few years as the ILECs have lost their edge. Access to the customer prem is most certainly at the mercy of the ILEC (unless an upstart has built fiber to the basement -getting tougher today), however the upstarts have been layering on other value added services to increase

revenues and margins.

Googin: The other issue that people simply don't appreciate is that in order to move in a sustainable way into this new infrastructure - into the networked economy or whatever people want to call it - we must move off of the SONET infrastructure. We must understand that SONET is too expensive and narrow band to be an adequate platform on which to build gigabit Ethernet and DWDM Technologies. The technology to deliver the new and inexpensive bandwidth does exist in the hands of the next generation providers. As these companies are forced to restructure, someone will step and then buy their assets and the prices of bandwidth should continue to come down.

Odlyzko: Yes, again agreed.

Klein: Ditto. But who in their right mind will finance such an undertaking?

COOK Report: If you mean that a new round of loans for some new player is unlikely, which makes sense, then the only one who may want to "play" is a cash rich entity like Microsoft. A company that doesn't need financing.

[snip]

Googin: What people don't appreciate is that these developments not only render the old guard uneconomic. They render all of them equally uneconomic. The long distance carriers are really in no better shape than the local providers. Because the issue is not whether you're long-distance or local. The issue is whether you are on SONET or on gigabit Ethernet over fiber. "Optical IP " as John Chambers puts it. No one debates that optical IPis one-tenth the cost of SONET to provision and deliver services on.

Odlyzko: I don't agree with this. In local most of the cost is independent of whether one uses SONET or not. SONET provides transport only from the central office onwards, and is not relevant for the local loop, which is where so much of the cost lies.

Klein: What matters most is what the customer needs and can afford/willing to pay for. SONET hasn't died because customers demand high QoS, however irrational, for many of its services. The carriers have not done an adequate job, IMHO, of educating the enterprise customer how advantageous an all-IP solution would be realtive to SONET. The fault lies not with the customer, but with the carrier, and most carriers are not pushing for change fast enough.

[Snip]

Googin: Note on page 4 that their data revenues as a percent of wireline revenues are peaking at just over 20 per cent. Much higher rates of growth in voice grade equivalent lines are not increasing the overall percentage that data contributes to their bottom line. Finally note that on page four of their fourth quarter report they have actually changed their entire tune. They show you that data is growing at rates of 16% per quarter but they no longer tell you what per cent of wireline revenues are attributable to data. It is becoming too embarrassing.

Odlyzko: The conclusions here are questionable. Sure, big data pipes bring less revenue per VGE than smaller ones (or than voice lines). but then they are also less expensive. The rule of thumb is that to provide 4x the bandwidth you incur 2.5x the cost.

COOK Report: Isn't the cost largely determined by the amount of sonet infrastructure used?

Odlyzko: No, not at all. If I have just a single T1, it is much easier to handle than if I have 24 data lines of 64 Kb/s that have to be multiplexed onto that T1, then directed onto other T1s, and finally demultiplexed at the end.

Klein: Again, what is the customer demanding. How many customers do you know that can handle multiple T-1s at a single facility? As a percentage of total enterprise customers - not many. They must be multiplexed/demuxed at some point, which means expensive equipment.

[Snip]

Googin: What do they own that runs all this? Big expensive SONET gear. They have 100,000 union workers to operate all this. How fast can they cut costs? They cannot cut costs as fast as the volume drops that they are already beginning to experience. What happens when they become less and less competitive with alternative ways of communication? People change their behavior. They use more phone cards. Corporate networks do more VoIP. There is also a break point where the pace of changed behavior accelerates. I don't know how close we are to such a break point but, when we get there, I know what happens. When Joe Six Pack figures it out, bang. And he will probably do so in a tough economy.

Odlyzko: I agree with this, but question how quickly the crisis will appear.

[Snip]

Googin: Capital expenditures (CAPEX) are way down. Minus 39% on the 3rd quarter and 12% on the nine months. Why would they cut CAPEX so much? Their access minutes of use are down. By only a tiny amount in the third quarter and by 1.4% in the fourth quarter. Their total access minutes of use had never declined before June of 2001. But now it is declining for all of them.

Odlyzko: CAPEX could be down because they over invested in prior years, responding to perception of CLEC threat and the myth of insatiable demand for bandwidth. It could also be down just because of Wall Street pressure to save money and show good profits.

Klein: This is true.

[snip]

Googin: And to gain about 4% in revenue, they are having to provision an overall capacity growth of 22% of their communications producing revenue infrastructure.

Odlyzko: This again gets to the issue of pricing. Lower per-bit revenues do not have to mean lower profits. We have to consider costs also. In my papers I do

have discussion of pricing structure, which at least to some extent reflects cost structure. If most of your costs are people costs, then what matters is the number of connections you have to deal with, and not the bandwidth of the connections. In the enterprise market, whether you have 10 Mb/s Ethernet, or 100 Mb/s Ethernet, the costs do not vary much.

[Snip]

COOK Report: When they say in their report: "increased long distance sales goals reached in 9 months," I am under the impression now that the reason they are so eager to get into long distance is that they need to do anything that will give them an opportunity to sell a voice minute because each voice minute brings in more revenue.

Odlyzko: Yes, and because this would be almost pure gravy. They have all the billing and other back office systems in place, and can buy long distance voice at wholesale rates of under a penny a minute. When they resell it to their customers at 7 to 10 cents a minute, they get rich.

Klein: Except to the savvy enterprise customer! One doubts that Verizon could buy wholesale service cheaper that Qwest could offer it on a competitive basis.

Googin: Their entire network is built for voice. It is not the right architecture for data. But they have now to run data because that is what is growing. The reason that they want to get long distance and the reason that AT&T's Michael Armstrong is so angry is as Amstrong put it that running just the "middle" of a network is not a natural business. You need to have an end as well as the middle.

Odlyzko: Yes, that is the problem for AT&T and the rest of the long distance industry.

Klein: Also, capacity utilization has been rising over the past few years - it is becoming critical for the older incumbent IXCs.

[snip]

Odlyzko: Yes, we are living in interesting times. The question is, how quickly will these things evolve? Are we facing a collapse? Sure, the new long haul carriers are on the ropes, and the traditional ones are in trouble as well. But ILECs are doing OK, and I am not persuaded that there is any imminent threat to them.

COOK Report: To sum up. I see Roxane's take on the situation as useful in getting folk to question and think about the unthinkable and useful in showing folk where and how to look at telco economic reporting on their own. On the other hand Andrew seems to be saying that her big picture focus doesn't take adequate account of various complexities and subtleties. Which is also useful.

So we have a question which is can the LECs pare their work forces and replace technology rapidly enough to adjust to the new world before their profits have evaporated to the point where they can no longer pay their debt? Andrew thinks they may be able to.

But Andrew when you say the lecs may not be in trouble, surely you must exempt Qwest which as a hybrid seems to have the worst of all worlds?

Odlyzko: The general summary of Roxane's and my position seems accurate.

As for Qwest, yes, they do have problems, but I suspect that they will pull through, although not as well as the pure ILECs. The local monopoly that Qwest bought in USWest will be their salvation, just like Time Warner has kept AOLfrom the fate of Yahoo.

Part Three

Googin Replies and Incorporates Odlyzko's Voice Versus Cost Data Figures Plugs Revision into Her Framework and Shows the ILECs still Going Broke

Highlights, or Exec. Sum

Dear Gordon:

Thanks for forwarding Andrew's comments. I am grateful for his corrections and operational insight. As a long-term industry insider, I am sure he has forgotten more than I know about the industry. I particularly was not aware of the nuance of access minutes-of-use being pure access versus network usage. However, this is the best metric we have, and it is following other financial parameters down, for the first time ever I might add. Also, until these companies get long distance in all of their markets, traffic behaviors of this metric relative to the overall should remain fairly static. As such, it should represent a fairly steady percentage of total minutes-of-use, therefore still representing a very useful proxy.

For instance, at year-end 2001, Verizon had 7.4 million long distance customers out of 61.551 million access lines, versus 4.7 million long distance customers and 62.902 million access lines at year-end 2000. The comparable numbers for SBC are 4.9 million long distance customers out of 59.523 million access lines at year-end 2001 versus 3.0 million long distance customers out of 61.25 million access lines at year-end 2000.

However, the issue at hand is so massive, I doubt it can be understood by reductionist, incremental, thinking that I see in Andrew's critique. While this use of bottoms-up logic forms the well-proven basis of the scientific method, it does not address radical change well. I am therefore approaching the problem from a top-down, holistic viewpoint. I am basically asking what happens when the irresistible force (optical/IP pricing) meets the immovable object (legacy Telco infrastructure, debt, headcount, equipment, copper, and all).

While holistic hand-waving with no basis in operational reality is certainly of no value, I believe in a practice of matching massively divergent "boundary conditions" within which the local telcos must operate with the incremental physical reality of their operation. The results of matching should be "non-linear", in that you cannot get an answer that makes sense. We are trying to understand a problem here. We are not yet trying to solve anything. Declaring whether or not the RBOCs can pull out of this is not a relevant point, because it is pure conjecture. I am concerned here with deterministic trends only. Answers will come in due course.

Incremental thinking in this situation tends to get the viewer lost in trying to grasp the financial implications a myriad of (purposely) poorly documented operational details. Consequently, we have to make do with best guesses. For instance, even if we cannot know the exact network minutes of use (MOU), or the exact cost of one T1 line, versus 24 "access" lines, we can know that our best MOU proxy, long distance access MOU, is headed down for the first time ever. We can also know that a growing stream of data traffic that brings in only 25% of the revenue derived from each"VGE" unit of voice traffic spells trouble for a company with EBITDAmargins of 50% and a fairly constant cost for both services, as they are provisioned over the same network.

For instance, we can try to solve for this divergence mathematically (scary, for a BS-EE arguing with a math PhD). What we know is that about 20% of RBOC "Communications" revenue comes from data, with the rest coming from voice. We also know that EBITDA margins for the best run companies approaches 50%. While this number is for the company overall, it is the best proxy we have for their base communications operations. I have also determined that over the past two quarters for all three RBOCs on a very consistent basis, implied revenue per " data VGE" is about 25% of that for a "voice VGE". Trying to reduce this to an equation with one variable and one unknown, to solve for voice margins per revenue dollar per "voice VGE" I get the following: $0.2*(.25x) + 0.8x = 0.50$ This solves to $x = 0.588$, which implies that voice costs per "Voice VGE dollar" input is 41.2%. Next, I use Andrew's rule of thumb that says to provide 4x the data bandwidth costs 2.5 times the cost of voice bandwidth, which is to me the same as saying that the dollar cost per bandwidth unit of data is 62.5% as much as voice (2.5 divided by 4.0). Applying that to the "voice VGE cost" of 41.2% yields an implied data VGE cost of 25.7% per dollar "voice VGE".

This boils down to my saying that using the sketchy information available, phone companies are about breaking even on their data revenues on an EBITDAbasis, as they recieve about 25% of "voice VGE" dollars in on a product that costs about 25% of "voice VGE" dollar to provide. Since EBITDA means earnings BEFORE interest, taxes, depreciation and amortization, this means we have a growing problem if you hold the bonds, or want to sell them any gear.To my best guess, this scenario says that the declining (voice) business has to pay ALL interest, cap-ex and debt principal payments. This would explain the recent RBOC behavior in terms of cap-ex and headcount cuts, with continued declines in margins.

As to the asset-based price model changing to a price-cap one in the 1980s, my point is that the basis of the newly divested industry was developed during

the ROAperiod. The price caps were developed within a paradigm that originated from high-priced SONET gear, OSMINE certification, 99.999% uptime, and the "life-line" theory, all of which are extremely expensive, narrowband, solutions that sprang from the economics of ROA. While ragging on the benefits of "life-line" use of wireline infrastructure is not very politically correct, I would note that during 9/11, it was not land lines that people were reaching for. Telcos use that to cover themselves from tough questioning, but reality is that even that excuse is over.

Thus, the questions to ask include:

Can Optcial/IP networks deliver bandwidth at 10% the price of "legacy" infrastructure, or not? Lots of companies have raised billions of dollars of public money on this supposition, and lots of lawyers have reviewed that documentation. So, they had better be close to right, or Enron is not our biggest problem. Sub-questions here include: (1) Where is Optical/IP saving money and where is it not? (2) How close to the end-user can this technology reach? (3) What are the metro issues, and their estimated time for resolution? (4) How far away are we from functional Optical/IP OSS systems? (5) What applications run successfully on this infrastructure?

For telco people, this last point bears comment. I follow not only the telecom business, but the entire "IT eco-system" from a top down viewpoint. One basic thesis I follow is that hardware follows software. Period. On an economic basis (which is my principal concern), this translates into "what is the next productivity paradigm?". Note that we are always hooked on the "next" productivity improvement, since living on our last one implies no marginal change, and hence no growth. Given all of the variables in the "IT eco-system", it is clear that the next productivity paradigm will come from the "virtual value chain" of collaborative inter-business communications. This is Cisco CEO John Chamber's "wave after wave" of new applications.

Our inward-looking LAN-based, client-server based ERP applications will be turned inside out, to hook between companies instead of inside departments. This, in turn, will use "Web services" software based not on procedural code, but on portable object-oriented code, mostly Java. As these applications come on line (in about a year according to industry insiders), the traffic currently directed inside departments over LANs will need to travel between corporations over WANs. It is this traffic that will drive the ROI for Gig-E on service provider networks. Until then, we are running our same old inward-looking ERP applications that were designed around a narrowband WAN paradigm. Since software drives hardware, period, it is the applications, and their resulting collaboration-based productivity improvements, that will drive the investments. These applications are not being installed yet, as the software standards remain immature. Getting XML to work between groups is worse than getting MPLS to work between vendors.

Next question: Is the legacy local loop a valuable monopoly, or not? Or is it a legacy cash-sink? This includes DSL. My belief is that if copper local loops were valuable, RBOCs would still be building them. They are not, and since these things rot, I see them as a legacy, narrowband, voice-only means of wasting assets. In fact, the access lines in use are declining. Wireless will replace this functionality at a lower cost. I personally believe we have copper lines only as a legacy of the fact that Bell developed the phone 100 years ago. Sub-questions here include: (1) Is wireless voice more cost-effective to provision and maintain than wireline voice? Does the advent of 2.5G systems alter this? (2) How does web-surfing effect voice usage patterns? (3) What are the likely price dynamics of having six national wireless services vying for dominance? What does that do to the theoretical value of the local wireline monopoly?

We can ask all day how fast prices will decline, how fast traffic will move, or what regulators will do, but that hinges individual human behavior, which is inherently non-deterministic. Here, one person's guess is as good as another's.

What is of use to ask is "What happens to a leveraged, legacy, infrastructure when a "killer" technology that costs 1/10th as much to own and operate comes along?" One might say, "it will drive down prices and profits". Then, you start looking for declining prices and profits, which is exactly what we are seeing now. I report what I see, not what I think people will do.

The RBOCs are not healthy today. They are losing their all-valuable access lines, and those pricey access minutes. They are cutting cap-ex and headcount, and are still struggling to meet reduced expectations. I am an analyst's analyst, the one professionals call in to see whether their own analysts are giving them the straight poop. I am paid to know clearly what Wall Street thinks. From this vantage point I can state categorically that these companies are not cutting cap-ex to keep analysts happy, they are cutting it (and their people too) because the base profitability of their business is declining. They are worried not about Wall Street analysts, but about their debt ratings (as well they should be). Note how this quarter they all spoke about their solid debt ratings and balance sheets on their conference calls. They only do that when they are worried about those issues.

Their growth businesses are all of low (or no) margin. Even in their own words, their future lies in "LD, wireless and data". Well, two of the three are cash-flow negative, offering questionable long-term margin stability. LD is a nice diversion, but their constant discussion of what voice bundle is going to be attractive to small business, while faced with these pressing issues, amounts to re-arranging deck-chairs on the Titanic. Whether the bow goes before the stern does not change the outcome.

Substitution is happening now. I will let managements speak for themselves. These comments are from the Q4 earnings calls:

ATT management stated clearly when explaining why their Consumer Segment

(voice) revenues were expected to fall 20% year-to-year: "substitution has increased and represents the most significant factor impacting (consumer) segment margins and revenues". They noted that "LD" revenues were being replaced by wireless minutes and Internet products at an "accelerating" rate. This trend impacted "growth" negatively by "low single digits" at the beginning of 2001, accelerating to a "low double digit" impact by the end of 2001.

Verizon management noted that "no doubt wireless minutes are substituting for second lines, which is part of the flattening of the access line growth".

A recent Gallup poll noted in USA Today (the source of all knowledge) noted that 20% of a recent poll of 625 cell phone owners considered their cell phone to be their "primary" phone, with an error of plus or minus 4%.

Finally, just go to any airport or convention. Are people lining up at pay phones, or are more talking on their cell phones? Compare that to 5 years ago. Verizon management summed it up well when they ended their call with the comment: “There is no question that we will see changes as the market moves forward".

Andrew made some comments on debt manageability. Let me provide some specific figures. For the non analyst types among your readers PPE stands for "Plant, Property and Equipment", or the working assets of the telcos. Gross PPE is the sum of all dollars spent to date, at the time of purchase. Net PPE takes into account depreciation and amortization, which basically accounts for usage and aging of the gear. You could theoretically sell the used equipment for close to the Net PPE amount, while Gross PPE is more like replacement cost. Current debt is bad, as the principal is due within 12 months. Long term debt can be bad also, but at least it is not due until later.

For those interested in debt and PPE statistics, (basically assets versus liabilities) some follow.

SBC has $26.166B in debt outstanding, consisting of $9.033B in current debt and $17.133B in long-term debt. PPE consists of $127.524B gross investment, and $49.827B on a depreciated basis. Verizon has $64.326B in debt outstanding, consisting of $18.669B in current debt and $45.657B in long term debt. Their PPE consists of $169.586B in gross investment, versus $74.419B in depreciated value. BellSouth has $20.21B in debt outstanding, consisting of $4.611B in current debt and $15.599B in long-term debt. The depreciated PPE on the books is $24.943B. In terms of access lines served, SBC has 59M, BellSouth has 25.4M and Verizon has 61.5M.

ILEC Debt (Short and Long Term) & Assets, (in Billions of Dollars) & Phone Lines (in Millions)

	Total	shortterm	long term	PPE Gross	PPE Depreciated	Access Lines
SBC	26.166	9.033	17.133	127.524	49.827	59
Verizon	64.326	18.669	45.6577	169.586	74.419	61.5
BellSouth	20.21	4.611	15.599		24.934	25.4

Part Four

THE ENRONIZATION OF TELECOM

by David S. Isenberg February 6, 2002

Highlights, or Exec. Sum

Editor's Note: David Isenberg is author of the 1997 paper Rise of the Stupid Network. This paper has to be one of the three or four most influential essays of the Internet era. He may be reached at isen@isen.com. Those who are overwhelmed by the length of the other essays in this issue should start here. David packs a lot into a few words.

THE ENRONIZATION OF TELECOM by David S. Isenberg

Irony (n) (1) The use of words to express something different from and often opposite to their literal meaning. (2) Incongruity between what might be expected and what actually occurs.

Enrony (n) (1) The use of accounting to (nexpress something different from and often opposite to its financial meaning. (2) Incongruity between what might be expected and what actually occurs.

I just received a startling reaffirmation of the idea that the even the mightiest telcos could be heading for a fall from The Precursor Group, a Washington DC institutional investor advisory service. The Precursor Group has an inside track on the Washington DC tech-reg scene, including issues before the FCC, Congressional committee action, etc. They're not the place to watch for outside disruptive influences (in a year-old survey of telecom technologies they left out fiber and unlicensed wireless), so when they say that something is happening, you can be sure it is mainstream-ready.

Precursor Watch (2/5/02) says: "The fundamental health of the [telecom] sector is likely to get worse before it gets better . . . The combination of: the sector's anemic growth outlook, the cannibalizing competitive mega-trends of wireless substitution, voice to data migration, Bell entry into long distance combined with local competition, and the bubble-induced excesses in debt and over-capacity, all create a powerful wealth destroying dynamic. Telecom's 'debt spiral' has gotten so bad that even the relatively strongest players who are still able to raise significant capital (VZ, SBC, and BLS) don't want to assume any more liabilities or business risk. Consequently, Precursor is reversing its long held view that consolidation can help improve the sector from excess capacity and debt any time soon."

The Precursor piece ends ominously: "Policymakers throughout the Government remain largely oblivious to both the magnitude and economic implications of the telecom-tech meltdown and the destructive role government competition policy has played in helping precipitate this market debacle." [For more info see http://www.precursorgroup.com]

Roxane Googin, following from her interview in SMART Letter #64, has given a longer, more in-depth interview for the next issue of the Cook Report on Internet. Gordon Cook has a Ph.D. in Russian history and a nose for behind-the-scenes shenanigans, so 'in depth' is pretty deep. Googin and Cook cite chapter, verse, row, and column (and provide URL pointers to ILEC annual reports) to show exactly where incumbent telcos are losing lines, minutes, revenues. They deconstruct the Annual Report as a literary form -- for example, "Over the years, the voice, or core business, part of the income statement appears later and later as the bad news is buried ever closer toward the rear." And -- surprise! -- Googin and Cook find places among the reports where it is impossible for even an Arthur Andersen accountant to infer what is going on. Fall into the GAAP.

[The *Cook Report on Internet* is only available by subscription -- see http://www.cookreport.com/ for subscription info and executive summaries. The Googin edition of the Cook Report will be worth the annual subscription fee itself. An extended commentary on Googin by bullshit-buster Andrew Odlyzko, which takes issue with many of Googin's specifics but concurs on general direction, is also included. It is also worth the subscription fee itself. (For comparison, this edition of the SMART Letter is worth a mere 5.2% of its subscription fee.)]

I've been thinking about Googin's plaint for a year and a half, off and on. I'm coming to the view that she's seeing two loosely coupled, separable phenomena. The first thing she's seeing is the general malaise in the telecom sector, aggravated by bubble-busting, debt-hiding, other accounting tricks, and not-very-radical technology substitution (e.g., cell phones for land lines, email for phone calls). The second phenomenon, the stranding of network assets because they're rendered obsolete by radically cheaper, fundamentally simpler networks, is potentially much more powerful, but is a longer-term phenomenon that has not yet hit the local telco's fan.

The long distance market provides a model for how the latter might happen. Qwest (the former aggressive startup) was the first long-haul network company to build a nationwide network using the new, radically simplified, radically abundant fiber technologies. The Qwest network came on line in 1997 and 1998. Joe Nacchio, Qwest's CEO, sitting pretty on a plush pile of potential profit margin, said that he did not want to start a price war. And at first he didn't.

But Qwest's new network set up a powerful economic tension. When GTE made Qwest an offer to buy twelve transcontinental fibers, which would (for all intents) pay for Qwest's entire build,

Qwest could not refuse. Suddenly there were two competitors with radically reduced cost bases, radically increased capacities, and an insatiable hunger for new traffic. Suddenly it was inevitable that long distance prices would fall steeply. Nevertheless, it has taken the long-distance-classic sector (AT&T, Sprint, WCOM) four years to show visible financial signs of tottering. (The long-distance guys did a pretty good job of holding off incumbent LEC entry into LD, so this is a fairly pure case.)

In contrast, the local market is still an old guard, old tech monopoly. The incumbent-killing economics of radical abundance have not kicked in. There is not that much fiber in the ground. Most of the fiber that exists is not available to its potential market. According to Steve Garofalo, the visionary founder of MetroMedia Fiber Network (since Enronized), building the new local network will require about 25 times the time and 25 times the expense of the long-haul network build-out. All the accounting tricks in the world will not reduce the time or effort required.

[I did an extensive interview with Garofalo last May (with Annie Lindstrom), and I'm still waiting for MetroMedia Fiber Networks' permission to publish it. I'm guessing they're too busy Enronicizing.]

Meanwhile, the SONET/ATM access networks of the local telecom giants are clunky, complicated, expensive and inappropriate for Internet Protocol data, but they have not been superceded by radically cheaper *installed* technology (except in rare cases).

There is a plausible scenario in which multihop unlicensed wireless mesh networks will render access-a-la-ILEC obsolete long before the local giants are killed by IP- over-light. Multihop wireless networks have some very nice properties that favor near-term installation, but they don't pack as much bang per buck as fiber, and benefits are more linearly related to costs, so a tech-related ILEC collapse due to multihop wireless technology will be a much slower motion affair.

Eventually fiber will be the preferred method of access. Eventually Steve Garofalo's vision of fiber connections in every room in the developed world will come to pass. But it is still years away. The ILECs might not last that long. And if they fail prematurely, before substitute networks are rolled out, we'll *really* be in a pickle.

To repeat Precursor Watch's warning: "Policymakers throughout the Government remain largely oblivious to both the magnitude and economic implications of the telecom-tech meltdown . . . " Washington turns ugly when it is surprised. The re- regulation following an ILEC collapse could be as panicky and ill considered as the USA PATRIOT Act that followed the collapse of the World Trade Towers. The Precursor gang is noted for its insider judgments of Washington reactions. But in this case, I'm hoping they're wrong.

David Weinberger and I have written an essay inspired by Googin's insight that the best network is the hardest to make money at. We call it, "The Paradox of the Best Network." Find it at http://netparadox.com. In it we try to outline some policy and business responses that would paint a more optimistic future for telecom.

Part Five

Some Thoughts on the Strategic Future of Wireline Services

by William Klein

Klein Assesses the ILECs and Carriers and Describes Difficulties Inherent in Any Federalization of Carrier Assets

Highlights, or Exec. Sum

Editor's Note: Bill Klein moves downward from the very high level big picture trend discussed by Roxane Googin into his own assessment of the more specific business case issues faced by the LECs and the Carriers. He concludes with a provocative discussion of the problems that would be inherent in a proposed federal takeover of fiber infrastructure belonging to the bankrupt players. One business model that seems to be emerging is an assumption that the defunct players simply go into court and then emerge with their debts to their equity holders for given and debts to bondholders nearly forgiven. Apparently they can achieve this, but in the current atmosphere of the destruction of confidence and trust, we wonder how they can possible expect to get access to new capital?

The position of the RBOCs (ILECs) in the metro and local markets is unparalleled. Despite the fact that at least a portion of this physical infrastructure is obsolete, the fact remains that Congress and the regulators have for the time being mandated that they have access to every home and business in the local market. While the upstart providers have built furiously into the local customer premise, it is highly unlikely that they will have the capital to match the RBOCs' reach. However, the RBOCs are assured over the next few years of a steady stream of revenue from their local networks, allowing them to pursue long distance approvals (through service improvements) and future applications. The balancing act that the RBOCs will be facing over the coming years is in the financial arena. Today, the RBOCs have among the strongest balance sheets in the sector. However their ROI (Retun on Investment) is not high by historical standards, as voice service margins are being continually squeezed. It is assumed that they will be spending heavily to build a national and data presence. However their equity valuations at this time will not allow them to become overly aggressive either through acquisitions or massively accelerating capital spending towards these goals. The fact that RBOCs would rather pay hefty regulatory fines than improve service in their local markets, further reinforces my views.

Operationally, the RBOCs fall short in two areas; data services and a national customer base. Historically the RBOCs have been extremely weak in IP-based data applications beyond the local loop (specifically DSL access), and do not offer advanced applications such as hosting to their business customers. I believe that at the current time the RBOCs lack the expertise and capital to aggressively pursue the customer bases of the national carriers, and that they may not be able to effectively compete on price once they do gain national long distance approval. They perhaps may not face the scrutiny that the national upstart competitors did with corporate IT managers, however their ability to garner a large market share and margin expansion initially will likely be limited. Further, they face more difficult legislative and regulatory constraints than the newer service providers, given their local infrastructure deeded them by the legislature.

The RBOCs may also face difficulties building a national business customer base. Businesses in general have widely accepted the RBOCs for local voice service, and in some instances for long distance voice service. However for data services, the RBOCs have yet to prove that they are capable of offering much beyond high speed DSL as broadband access in certain metro markets. What they are doing is well behind the progress of either the incumbent long haul providers or the next generation service providers. Even if the RBOCs are able to offer national data services, it may be some time before they are competitive either on a pricing basis or in developing a comprehensive suite of service offerings.

Of the long haul incumbents, the greatest question remains AT&T which for reasons unknown to me, is bent on building an IP overbuild network. This, in my opinion, is madness, given their financial flexibility and suite of service offerings today. How they have managed to hang on to their customer base frankly baffles me. Obviously, Armstrong's strategy (for both the consumer and enterprise markets) has failed miserably, causing investors great pains over the past few years. It would be far better for AT&Tto bite the bullet and outsource its transport service, as IBM did when it transformed itself from "big iron" towards services. There is absolutely no reason, in my opinion, why AT&T could not buy lambdas from Level 3, Qwest, Williams and others for transport, and focus its capital expenditures on such important areas as innovative applications/services, as well as customer service/retention. [**Editor**: Does Klein suggest an assets based model here? AT&T functions as an advisor to its customers and is no longer intent on being their single source of one stop shopping. Bill replied affirmatively to this question: "Yes, Gordon, I am suggesting that the asset based model is the future of transport. 2/16/02]

The new long haul service providers such as Level 3 have been wildly successful in both their Softswitch and lambda offerings, which I believe are keys to the future of wholesale transport (voice and data). AT&T should be in negotiations with these carriers now, or else I firmly believe that they will not survive the next few years.

WorldCom appears to have "gotten religion" regarding its data offerings. It has a relatively decent network, and some nice data applications both through recent acquisitions and internal development. The MCI acquisition has hurt the company, and the ultimate survival of the company is certainly questionable due to its high level of financial leverage (debt). On the positive side, customers are more than willing to accept advanced services from WorldCom, and its international presence is a plus for the company. However, its lack of wireless services presents a significant hurdle for management going forward. But its management also has shown significantly more intelligence than AT&T in moving towards co-opetition with other carriers, notably its recent lambda capacity talks with Level 3. Its recognition that it cannot compete alone speaks volumes, in my opinion, for management's intelligence about the future of telecom. If shareholder value were foremost in mind, WorldCom's management, would be looking towards more alliances ahead, with the ultimate goal of a merger/acquisition by the company that is also a major global player. It would probably be best if it were with a major Asian carrier (preferably one with a strong wireless segment), as its presence in that part of the world is currently weak.

Qwest represents an interesting problem. On one hand, its financial outlook is far murkier than that of any of the incumbents (both from the view of reported gross/net income and its balance sheet), however its physical network and data services are far more advanced. Where it has a local presence outside of its 14 state region, it is capable of cleanly beating the RBOCs, and its long haul network is among the most advanced. However it suffers on the wholesale transport business, as no other competitor would choose Qwest over any other "deep fiber" provider such as Williams or Level 3 due to Qwest's simultaneous position as an aggressive retail competitor. The salvation of the company resides in its ability to migrate to national long distance quickly, and in taking share from the long haul incumbents in the enterprise market. I do believe Nacchio when he states that Qwest will ultimately become a part of a major global provider over the next few years, which is why I am still positive on the company as an equity investment vehicle. I do not believe that management will relent on its aggressive pricing and service offering policies over the next few years, which is certainly bad news for the incumbent carriers. The key variable will be what price current holders will receive for their Qwest shares, as if the industry outlook stays subdued, management may be forced into unfavorable terms when it comes time to be acquired.

Where Qwest becomes really interesting is that it is likely in the short term to be the only major competitor to AT&T for large national enterprise accounts. WorldCom has its own set of financial burdens to bear, and appears to be stumbling a bit on the national stage. The RBOCs have yet to get a national long distance voice, let alone a national data, presence. Qwest over the past couple of quarters has made an excellent living taking enterprise revenues away from AT&T for basic voice and some data services, and their enterprise customers appear ready to trust them with more of their IT budgets. The critical variable will be how fast Qwest can get national long distance voice approval. Their PR department has been in overdrive putting out press release after press release about the stringency of their testing measures. but state and federal approvals are still necessary. Should they get national long distance approvals within the next twelve months, Qwest would be in an excellent position to overtake WorldCom as the second largest provider of choice to the enterprise market.

The RBOCs are also in an interesting position. While they have a near monopoly on the local loop, they are relatively clueless on national data services. They have made the initial small steps towards national long distance, meaning that the IXCs' bread and butter revenues will become even more vulnerable. However, for the RBOCs, taking the next steps in landing large national enterprise data accounts will perhaps take more experience and financial resources than they have available at this time. They could also be limited if the move towards breaking up their wholesale and retail businesses increases, which would mean that their pricing schemes become more transparent to carrier customers.

My own personal take would be that many more investors will be sucked into Verizon, SBC and BellSouth before they go away (much to the future investors' chagrin). For the RBOCs will indeed go away. What needs to be determined is how will they go away. If their management is smart, they will negotiate themselves an acquisition or merger with one or more major foreign telco, and use their balance sheet to purchase national lightwaves from a next generation long haul carrier (after, of course, obtaining national long distance voice approvals). From there, they will migrate their service towards all-IP, and import the data applications from their partner/parent to the US enterprise market. Further, they will integrate their wireless operations to both increase their footprint and their suite of services.

Alternatively, the RBOCs could continue the course that they are currently following, namely milking their local loop monopoly towards national long distance in the hopes that this cash flow will allow them to spend heavily to build a competitive national data presence. I firmly believe that this road will lead to disaster, as the RBOCs do not have the financial wherewithal to spend their way to a dominant market share in this increasingly competitive market. The demise of the RBOCs may take longer than say, a next generation long haul provider, however I believe that the eventual outcome will be the same.

Consider regulatory (RBOC wholesale/ retail split, et. al.) issues. A major wild card in my scenario is the governmental

entities, state, local and federal. The Bush administration has yet to clearly make its mark on the industry. Moreover, the early indications are not terribly encouraging (and I am a supporter of the current administration). Chairman Powell has not made many statements that tell me that he has a clear vision of where the industry should be over the next four years, and it appears that Congress will have an unduly large influence as to where we head from here. The Tauzin bill appears to be dead for now, but it is only a matter of time before we get a refined (read: watered down) version of that bill. Further, as I stated earlier, momentum is building for a separation of the wholesale and retail markets at the RBOC level. Such separation could be very damaging to the ultimate survival of the local incumbents. My best guess is that we will have a separation of these businesses, as the RBOCs will have an increasingly difficult time defending the deeding of their monopolies in front of Congress.

Lambda (Asset Based Networks) Sales as Savior

As evidenced by Level 3, Williams, et. al. and in St. Arnaud's remarks on the need for an asset based telecom model, lambda sales could be an important trend for the next generation carriers as a replacement for the sale of dark fiber. This should be very obvious to all who have paid any attention to industry trends over the past few months. What lambda sales are to Level 3 and others are as critical to the next generation carriers as national long distance is to the RBOCs – a major source of revenues and margin improvements that will allow them to support their massive debt loads and perhaps to write off those assets that have little or no economic value (i.e. Level 3's write off of its empty conduits in Q4 01 report).

While WorldCom touts that it is able to keep a large percentage of the customer's data on-net, I would argue that enterprise customers place on-net traffic as a priority below that of network reliability and price elasticity. Capital spending (and future financing) could be severely curtailed by the major carriers if they admitted to all that the transport war is over, and that the war for application services has yet to be joined. There will be minor skirmishes held in certain geographies, of course. However technology advances have made transport passé for all the carriers as a key battleground.

For argument's sake, let's accept Roxane's premise that many (if not all) today's carriers are dead. The question should be, what do we as a country do to save a very significant portion of our national infrastructure? Would it be acceptable to both end users and the taxpayers (often one and the same) for the federal government to declare the current installed network a national asset? Alternatively, would it be better to let the markets decide who should be the winners and losers, even if it meant that at the end of the day we would probably have some extreme cases of monopoly power? Carrying this point further, foreign ownership of domestic assets is highly likely, which would introduce an entirely new set of variables. In my opinion, there is no comfortable compromise between these alternatives.

Why Asset Nationalization is Unlikely

Those, who argue for the nationalization of telco assets, point to the example of other countries or some of the more forward-thinking localities domestically, where the carriers take space on the government's network in order to offer voice and data services. The appeal would be that the carriers could focus on advanced voice and data applications, as well as strong customer service and support. Capital expenditures, as well as maintenance expenses, would be far below what it is today, implying that the debt loads of the carriers could be better met than it is today, and paid down over time. Transport would be purchased most likely in the form of lambdas, however the nationalized network would have the right to determine what is best for both the taxpayer (as a replacement for the debt and equity holder, in the form of an ROI), as well as for the competitive market for application services.

Where I personally have a problem with this solution is in its politics. What is preventing either the executive or legislative branches of the federal government from tinkering with a national asset, much as they have with Amtrak and other so-called national assets!?. Should, for instance, some powerful politician/agency decide, for instance, that it is absolutely critical that every home in Bismarck, South Dakota have 100 megabit access, who is policing the spending or the rationale for this action? The taxpayers are put at great risk, as they are the ultimate source of funding for what could be absolute boondoggles at the whims of career politicians or bureaucrats – very much like what we have seen since our Great Society spending binge over 30 years ago. I will not attempt to address the problems of political lobbying, as the telcos are among the largest contributors to politicians today, but I do believe that the efforts of the lobbyists would be even more nefarious should our communications infrastructure be declared a national asset (campaign finance reform issues aside).

Moving beyond our national boundaries, one should ask what role would subsea cabling play in the nationalization of the communications infrastructure? Would we have the right to declare that cabling between the US and other countries becomes US government property (very much like the real estate where we have embassies), landing points and all? This would introduce issues that only the World Court or some other supra-national agency could address, and I am not of the opinion that we would find the outcome favorable. In cases of grave national emergency, our communications infrastructure could fall under the DoD, implying that US troops could land ashore to protect our property, rather than land in a location where we would be in the best position to take on enemy forces.

The question of wireless spectrum, hosting centers and other infrastructure also needs to be addressed. Would the government expand its reach beyond the local and long haul wireline network? It would make sense, given the improve-

ments in technology, to nationalize wireless spectrum and facilities, as well as those POPs where traffic aggregates/disaggregates. If we are deciding that nationalization is the best course of action, where do we draw the line at the government's reach? Would we allow some portion of the network to remain in private hands? Most likely not, in my opinion.

Further, who would compensate the builders/owners of the nationalized infrastructure, and at what price would they be compensated (if at all)? Whereas equity values have been decimated over the past few quarters, there are assets out there today with at least some residual value – how much do we pay those investors to seize those assets? I have very little doubt that the government would pay the absolute minimum (just look at the S&L industry experience), implying that equity investors would be wiped out completely. Nothing creates a panic in the markets like rumors that an unfriendly, unopposed suitor is looking to take over your assets. Equity prices would plummet further, in my opinion, should the government look to nationalize the communications infrastructure. Perhaps equity investors will be wiped out anyway (and debt holders perhaps, as well) should market forces play out over the next few quarters and years. Such an outcome would be far more rational and orderly (even with the Global Crossings of the world), in my opinion, than if the government steps in and simply seizes the assets outright.

Finally, I firmly believe that government control of the infrastructure would stifle improvements in technological innovation. Whereas some may point to our military as an excellent example of how well private industry and the federal government cooperates to bring the latest technological developments to our troops in the field, I would counter by stating that the DoD has a more immediate and recognizable goal than would those that control the communications infrastructure. Nationalizing our communications infrastructure would be for the benefit of consumers, businesses and the state, local and federal government itself, whose interests at times conflict. Would, for instance, margins for service to consumers be capped beyond what they are today, and would subsidies be expanded to include groups not currently subsidized at the expense of more profitable end users? To take this point one step further, would the equipment providers be forced into "cost-plus" contracts typical of other vendors that serve the government? Most certainly, this would force the equipment vendors to re-assess their R&D budgets, as the ROI from the government would most likely be far below that which is found in the private sector.

A more rational and economic path would be for the market forces to play out, and let the chips fall where they may (regulatory and legislative agendas considered, of course). Should Level 3, Williams, AT&T or others fail, let private investors decide what assets have value and at what price. In the short-term, this may be a more painful route, however market forces have a far better track record at assessing asset value than does the government. I do believe, as does Roxane, that the debt and equity investors who have invested in many of the telecom companies today will not get most of their money back, in fact, many will be wiped out entirely. This is the cruel flip side of the capitalist system, and let the investor beware.

Some have suggested that Microsoft, Cisco, General Electric, the public utilities or others with an interest in the future of communications would be the natural buyers of infrastructure assets. I agree, and further I would prefer this solution to that of the nationalization of these assets. The argument against other private entities taking control of these assets have focused on the demonization of particular individuals, i.e. Microsoft's Bill Gates, controlling such assets that are so vital to our economic system. My counter-argument is that the control of these assets, should acquisitions clear all the appropriate regulatory and governmental hurdles, would be better in private hands as private companies have more accountability in the form of stakeholders than does the governmental and bureaucratic agencies. Every business day, individuals and institutions vote with their money as to the policies and practices of these companies, as expressed through the prices of debt and equity instruments in open market transactions. Should investors believe that it is not in the best interest of companies that they own for managements to purchase/use communications infrastructure, they can always sell their investments in those companies. Private accountability is far superior to public, governmental authority and accountability (or lack thereof, in the case of career bureaucrats), in my opinion. It is on this accountability that I make my case for private market forces even at the expense of some short-term displacement of particular carriers and the ruining of private investment portfolios. [Editor: perhaps we might hope for the introduction of some regulatory balance. Enron has shown that investors or not management may wish to defraud. Given the current environment investors now know that they place their bets at a major disadvantage. ICANN is but one more entity that is showing us that the premise of self regulation in the telecom industry is a sham undeserving of respect.]

Let the Investor Beware! – Virtually every carrier today has taken at least some steps towards paring their debt/interest payment loads, all with limited success short of a full-scale reorganization under Chapter 11 of the Bankruptcy Code. Asset sales, equity issuance, debt-for-equity swaps, and the laughable new breakup of AT&T into four tracking stocks are all designed to hide the reality of Roxane's point that prices (and revenues) and margins are falling faster than fixed assets can be depreciated and replaced with newer assets. This is a high-cost, highly leveraged industry that is experiencing the flip side of what drove share prices late in the last decade. The death spiral of the industry cannot be denied any longer.

I believe that the best course for most companies that wish to remain independent would be to clear the decks at the expense of current investors, under a controlled, long-running restructuring plan. Essentially, the carriers would write down their undepreciated uneconomic assets, eliminating shareholder's equity, translating into the elimination of the

current equity class of stakeholders. Simultaneously, management would have to renegotiate with debt holders, offering either severely reduced stakes or perhaps equity in the restructured entity. Debt holders must be made to understand the predicament that the carriers face today. Management would have to perform quite a balancing act under the current environment of declining revenues and margins, so as to avoid bankruptcy. Write downs would have to be performed over a period of time so as to avoid a negative equity position.

A major problem with this approach is in how this information is communicated to investors, and how it is disseminated in the marketplace. Most certainly any reorganization plan would be quickly filtered through the marketplace in the form of depressed investment prices, both debt and equity. Management must be extremely careful as to how it controls the flow of information, and how it approaches current stakeholders, customers and suppliers, and the public at large. However, in light of an environment that may not improve for some time, addressing the financial issues sooner rather than later may be the best approach for management, in order to avoid severe litigation at a later time. By offering a clear plan publicly that will at least offer some investors some hope of recovering a portion of their investment would be far better than to take a piecemeal approach in the hope that the environment will miraculously improve.

Telcordia Comments on Googin's Analysis

George Garceau is the managing director of the group within the Customer Solutions and Technology organization at Telcordia Technologies responsible for assessing the business challenges presented by the industry transition from wireline voice networks to mobility and data. -

I have reviewed a draft of the Cook Report addressing the future of the industry and the challenges that the ILECs must address to survive and prosper. I am one of many in Telcordia who have been focused on these very topics for quite some time. We have used telco operations, technology, and financial information to analyze numerous industry and carrier-specific scenarios associated with the transition from circuit switched voice networks to data networks. I am providing some facts that pertain to this transition - but first, our conclusion:

Conclusion: While financial pressure on the US ILECs is real, they have the assets and can muster the resources to effectively respond. An extensive part of the investment needed to operate in a data-centric world has been made in recent years. Timely actions must be taken to significantly reduce expenses in the traditional business and to grow earnings in wireless and data to meet financial objectives. Success will depend on execution - a field in which the ILECs have a previous track record, once they get moving.

Background Facts

Displacement of circuit switched voice by wireless and broadband is occurring. However, in a country that has about 180 million switched access lines, 125 million wireless subscribers, and about 10 million DSL and cable modem units in service - the actual replacement of working circuit switched lines by wireless and broadband has been less than 3 percent to date. Based on several years of analysis, our current projection is that about 30 percent replacement could occur by the end of 2005. So one of the clear ILEC challenges is to replace the revenue and earnings associated with these lost lines.

But the current base of capital assets will not be stranded. A significant part of the ILEC capital additions in the last several years has been associated with fiber cable, packet switching and routers. The relative spend on circuit switching, copper cable, and SONET equipment has been diminishing. This fiber can and will be used as transport for gigabit ethernet and other advanced services. (Several ILECs have already introduced GbE services.) Consensus projections are that over 90 percent of the ILEC traffic by 2005 will be data - the predominance of it will be IP. The ILECs are well aware of this and will leverage technologies like MPLS, PON, and DWDM to take full advantage of the fiber and packet investment that they have already made. A tremendous increase in traffic can be accommodated without creating capital spending problems.

Most of the ILEC expenses are not associated with SONET. The two biggest expenses in a local telco are associated with service orders and repair. There are between 40-50 million service orders a year generated by customers changing physical locations and a similar volume of orders involving changes in service. (An example of this is a customer calling to get caller ID or voicemail service.) There are also a significant number of orders involving interconnection with wireless operators, interexchange carriers and CLECs. On the repair side, there are about 35 million initial trouble reports annually. So it's not a surprise that customer service representatives and outside technicians comprise half of the ILEC labor expenses. (The other half is distributed across sales, marketing, IT, operator services, assignment, testing, engineering, revenue operations, inside technicians, general, and administrative - very little of it related to SONET.) Migration to an online customer environment and taking advantage of reduction in the number of working switched access lines to reduce outside dispatches will reduce these expenses.

There is no question that the ILECs face challenges in trying to maintain and grow shareholder value in a dynamic environment. Expenses for operating the circuit switched network must be significantly reduced to maintain earnings. The ILECs made similar reductions between 1990 and 1995 - and know where further cuts must come from. The larger ILECs have been on a path to replace lost fixed line voice revenues with wireless, data transport, and advanced services - only about 60-65 percent of 2001 revenue was fixed line voice. We have studied many scenarios and have identified several realistic strategies that these ILECs can take to effectively meet financial objectives over the next 4-6 years.

Why the Carriers Are in Even Worse Trouble Than the ILECs

Crushed by Commodity Services, True Competition With No Captive Users, and Huge Over Capacity

Running Headlong Into a Wall of Debt and Unable to Pay

Highlights, or Exec. Sum

Caught in a Glut With No Way Out

On January 29, Ivan Seidenberg, Verizon co-chief executive officer in a keynote address at Comnet said that Verizon would not be interested in buying any of the failed fiber players because when Verizon needed new capacity it was much more cost effective to buy a wave length. For example ten gigabits per second from New York to San Francisco - $75,000 a month. Down by about 50% in the last six months.

During the past year there has been speculation that an ILEC might buy WorldCom, or Level 3 or Qwest or Global Crossing. What better time than now when they could be acquired at fire sale prices? Wrong. What a year ago was seen as a great asset is now a huge liability. Much if not most of the dark fiber in the ground may never be lit.

Demand was only about 1/15 of what the fiber moguls supposed. The fiber was extremely expensive to light. By comparison, a transcontinental strand was cheap. The Greenfield players may have preached IPbut they put SONET on their fiber as well. They did this just in time raise their expenses, increase their debt and render them non competitive to ten gigabit Ethernet. Trying to become globally dominant they dug their own graves. Huge advances in DWDM made it possible to place and sell many light waves on a single strand. Desperate for revenue to compete against other over builders they sold all services to all comers. The price of bandwidth plunged in the midst of a chaotic market where

When lambda sales came on line in December 1999 they were very attractive. Now virtually every player with lit fiber will also sell a lambda and as Light Reading pointed out by last fall and Seidenberg acknowledged above, it became generally cheaper to buy a lambda from someone else than to light a fiber and provision one's own bandwidth. Moreover, as Global Crossing pointed out in its interview with us in August it would likely never need more than 12 fibers in its North American Network. Six to provision the next generation net and six to run its current operation. As traffic grew it would just add light waves to the current operational strands. Qwest, Global Crossing and Level 3 IRU sales all peaked in the first half of 2001. Effective with the third quarter they started to decline. The budding scandal of second quarter IRU flipping between Qwest Global Crossing, Enron and likely others in June 2001 will make it difficult for outsiders to decide what financial information released by these companies can be trusted.

Given what we have been able to piece together on the basis of email and phone discussion with Bill St Arnaud and in a phone discussion with Robert Schult, Senior Analyst TeleGeograpy in London, we believe that we now have overall understanding of the overcapacity that has been built on a global level. We contend that a huge problem for policy makers and the investment community is that with no reporting requirements for the optical bandwidth market, it is nearly impossible to get any big picture view. The optical carriers aren't going to make their sales and prices clear for "competitive reasons." Corporate customers won't talk likewise for competitive reasons. Bill St Arnaud is in a rather unique position where for some time (unlike Internet2 which runs on donated light waves from Qwest), he has been buying optical service. Over the last five months since the release of the RFI for Ca*Net4 Bill has been in the interesting position of being a customer with money in his pocket since December 14 for purchasing lambdas. In this market he has had a unique opportunity to find out who the players are, what is lit, and what systems are in place. Information which he has made available in aggregate to us and which in the context of our other research has been a serious eye opener. Information in the next two paragraphs has been summarized from discussions with St Arnaud and cross check with Robert Schult in London. (We present the discussion in detail in the article on pages 34-36 below) Although it is by no means a scientific study it opens a very interesting window on the current state of $500 billion dollars of global investment. Here is what we learned.

Essentially, when you look at the networks that have been built since 1995 you have a situation where not more than about 5 or 6 percent of the long haul inter city fiber installed has been lit or will be lit in the foreseeable future. Of the fiber that is lit by 80 wavelength capable boxes only about 8% of what these boxes are capable of is in use. Each incremental wavelength used costs only a few thousand dollars per line card per a couple of dozen boxes to install. Adding ten gigabits to a backbone is relatively trivial and compared to the original cost of

building and lighting the incremental cost of doing so is very small. Currently only about four to eight wavelengths per carrier are lit.

Conclusion: You have huge unused capacity

Consider demand. Just as the demand for dark fiber IRUs has peaked and fallen off, the demand for wavelengths may now be peaking. Until the fiber owners start publishing verifiable numbers every quarter on how many wavelengths they have "sold" via IRU and via lease there is no credible way to judge changing trends in supply and demand. We can however extrapolate a few things. For example, the size of the Sprint IP data backbone and that of ATT is currently about ten gigbits or one lambda per backbone. If we assume that, given carrier statistics, voice and data traffic are now roughly equal, then a voice backbone for each major carrier would fill another lambda. We are told that the size of a voice backbone is a closely guarded carrier secret but that it is much larger than the IP data backbone. Let's assume then that voice backbones may occupy anywhere from two lambdas to six or even more lambdas. Consequently carriers needs in lambdas for their own networks may vary from about three to ten 10 gig lambdas per carrier.

Now we can safely assume that with phone network use having peaked there will be little in the way of additional demand there. Assuming that data still doubles every year in North America, you may be able to sell an aggregate of 20 to 25 new lambdas this year to handle carrier data growth. But with fifteen American carriers and six Canadian each with 80 wavelength capable systems you have an easily provisioned supply of more than1600 lambdas perhaps only 150 of which are lit. The problem is that without complete disclosure from each carrier there is no way of knowing exactly what capacity is actually in use. Nevertheless our experts are all in agreement that used capacity is only a tiny fraction of what's available. Whether the amount is 4 percent or 12 percent, under current circumstances, makes little difference. In short we likely have at least a five or six year window with current growth before we fill the capacity of the fibers that have been lit.

On the other hand, prices are getting cheap enough for enterprise networks to consider using lambdas. But right now even the largest enterprise networks are mostly 155 megabits with a very few 2.5 gigabit links here and there. Most enterprises don't have the means of connecting 2.5 gigabits to a campus let along ten. AS Robert Schult pointed out to us from London European E-1s or two megabit lines serve multiple floors of the office tower in which he works. Thus it is unlikely that enterprise sales of light waves will be enough to soak up the source of oversupply in a timely fashion. Level 3 says no problem. It encourages enterprises to outsource their networks to it. It is likely to take ten or more outsourcings to fill even one 10 gig lambda.

If Level 3 is really booking 4 million a month in new revenues, it is hard to see at this point where the bookings are going to come from. Telegeography Analyst Robert Schult finds huge differences in prices of bandwidth so in this sense it is difficult to extrapolate from one sale to another. It is possible however to understand that the business that need to be on net are generally already there and that many new bookings will be those caused by churn from other carriers. Bandwidth demand growth is not large enough when compared to the supply is not enough to keep suppliers solvent given their debt and operating expenses. The business model touted by Level 3 a year ago that it could prosper as the carrier's carrier is dead. Ironically a few of the giants will totter on for a year or longer until they use up multi-billion dollar cash reserves. Meanwhile a fear is growing that if Global Crossing comes out of bankruptcy with its debt wiped out, it will quicken the collapse by slashing its prices in an attempt to gain market share. This will topple the remaining greenfield fiber players in the short term. The more established carriers will remain standing until they to go into chapter eleven or avoid this fate by finding new lines of business.

Bill St Arnaud put it this way: "However, even given that [a rapid growth in data traffic], I think in the long haul it will be another 3 years before we see any new fibers lit, another 10 years before new fibers are blown in existing conduit and another and 15 years before new conduit is trenched in the ground." With the resources at our command we cannot do a definitive census of the carriers. But even with increased resources, it is unlikely that carriers would admit to a highly embarrassing situation. But the effects are there for industry insiders to see. They range from some major industry players that very quietly without public notice have laid off more than half their staff, to a European fiber player who summarily laid off one of its founding executives on February 1, 2002. In a major east coast office of a troubled Greenfield fiber player there is a stack of fold-up cartons in the lobby. Employees know that their end has come when such a carton arrives at their desk and they are told to pack up their personal belongings and are escorted from the building. Increasingly evidence begins to suggest that the industry is nearly dead and that it will not rebound until the financial markets get the picture.

The Industry Is Broken

We are stuck with a conundrum where until the debt is wiped off carrier books or until demand skyrockets you have the entire industry embedded in a continued downward spiral that results in more and more bankruptcies. Demand will not skyrocket until the LEC controlled copper based local loop is by passed and either fiber or multi-megabit per second wireless reaches the vast majority of homes and businesses. Even then the demand may still be too easily filled by capacity on hand, until and unless the Canadians can make it possible to extend a wavelength to every home and business.

The technology has indeed overwhelmed the global infrastructure and its installed economic base and rendered it not economically sustainable. Canada looks to be following a strategy of en-

abling more uses for bandwidth while the United States follows a course of laissez faire in which the market knows best theory is freed to allow the concentration of media and carriers to consolidate an infrastructure duopoly where cable and DSL are the only officially blessed avenues to broadband. The US policy seems likely to be one of handing the market to huge and powerful old technology companies that through monopoly control can keep better technology out of their networks and render it unable to compete.

This approach will also render much of Silicon Valley moribund as companies like Cisco, Lucent, Nortel, Alcatel, Juniper, Ciena, and many many more find that with the carriers dying, and the LECs under siege most of the market for their products has evaporated. Not only evaporated but that the rump that remains will support maybe 10% of the industry that had been created. On the computer side of things, Apple's concept of a digital hub for photos movies and music and peer to peer technologies matches the Canadian policy of enabling demand to fill what technology has made available. Microsoft's dot net strategy on the other hand inserts that company into centralized control where it takes a bit out of every transaction it can get a hand on and does whatever possible to keep technology from moving to the edges of the network and becoming assets owned by users. Microsoft is squarely within the American program that maintains control of a static market on the part of a few giant companies.

Asset based telecom as first articulated by St Arnaud in May 2001 is a more rational view of how to enable the market to use the abundance that has been created. It will fuel growth and development of new markets as it admits and prepares to nurture and support the new reality. Those, who are able to understand and embrace the asset based paradigm, will jump on that train and push as hard as they can, it is to be hoped, if we are not to embed ourselves in a permanent Japanese like recession as Isenberg feared in his Enronization of Telecom essay.

There is a tremendous educational task ahead to get global telecom policy makers to understand what is happening. Right now those who are in control are sitting on a bunch of dirty little secrets as they endeavor to be last man standing as the collapse accelerates. The problem is that no one has enough information to adequately put all the pieces of the picture together. We certainly claim no infallibility, but we think we have enough of the pieces to understand where things are headed.

Contents of "May Half of This Issue

Part six

Describing and Understanding the Overcapacity

Bill St. Arnaud, Andrew Odlyzko and Robert Schult Discuss Details Carrier Networks with Lit Fiber, Prices, and Definitions of IRUs

Highlights, or Exec. Sum

On February 18 Bill St Arnaud sent to Andrew Odlyzko and your editor the following comments on Andrew's essay that appears as part six of this issue.

1. I agree with you in the voice market. I think there will be considerable competition from various players -predominantly wireless and some wired. The voice market may also start to plateau soon - as there are a finite number of humans and they can only talk so much. Wireless mobile data may in fact reduce bandwidth demand on wireless networks. (Unless you believe people are going to watch movies on their cell phone). But maybe (just maybe) carriers will make additional revenues through these new data services.

2. In the data world things are different. I think demand for long haul bandwidth demand will pick up much faster than people expect. National wavelengths are becoming so cheap that now enterprise customers can afford to buy them. I predict traffic utilization will drop dramatically. I think this will parallel memory chip demand. Projecting trend lines for memory demand in the 80s would indicate that a typical PC would only need 64k Meg today (as one famous Bill Gates predicted)

However, even given that, I think in the long haul it will be another 3 years before we see any new fibers lit, another 10 years before new fibers are blown in existing conduit and another and 15 years before new conduit is trenched in the ground. Right now there are at least 15 US carriers and 6 Canadian carriers with 80 x10 Gbps systems. Most of these carriers have lit only 4 - 8 of these wavelengths on each system. So there is a huge latent capacity sitting out there. My listing of a total of 21 coast to coast long haul carriers is not meant to be definite summary of all North American carriers with lit fiber. In fact there may be many more large regional players who may be considered national players.

As to your question about terminology for IRUs:

An IRU can be for any period of time but traditionally have been 20 years. IRUs started with underseas cables about 50 years ago when the cost of a cable was so prohibitive that a number of carriers were required to partner together to build the cable. The IRU was created by accountants and lawyers so that each participant could treat their portion of the cable as an "asset" with all the rights and privileges of other fixed assets like buildings - e.g the right to sell, depreciate, etc

As far as I know there is no formal legal definition of an IRU. As such its use has become bastardized over the past years. In general an IRU implied an upfront capital payment. Leases implied annual or monthly payments - but most importantly title to the bandwidth remained with the leaseholder as opposed to IRUs where title is transferred to the IRU purchaser.

In these crazy times you will see IRUs with monthly payments and leases with 100% upfront payments.

COOK Report (Feb 19): Let me translate my understanding of what you are saying. Of those carriers who have lit one or more fibers some 21 have done so with very expensive equipment that can multiplex EIGHTY streams of ten billion bits per second down a single lit glass thread. Meanwhile perhaps only 5 percent of the fiber laid is lit.

Each strand that is lit is lit for only about 8% of the bandwidth that the equipment attached to it is capable of driving down each thread. For every such lit fiber is attached to a box powered by lasers capable of 80 streams of 10 gigabits per stream. If I understand it correctly to light a stream you put a line card in that box -- with one box on each end of the fiber where each line card carries one stream. The boxes are expensive. The amplifiers between the boxes are expensive. But to light even one stream...ie to make one light wave to sell all this stuff has to be in place. The cards at a few thousand dollars per card are cheap by comparison and with probably 60 to 100 total lit fibers in the 21 carrier networks in North America you have perhaps only about 8% of the wavelengths being carried that could be carried at very cheap incremental cost.

St Arnaud: Your summary is bang on. I think it will be a long time before we new national fiber builds. There will still be some fiber build in the regions which are currently under served

COOK Report: Now when you talk about 'systems' capable of 80 ten gig lambda per strand you are saying that such systems are deployed through out and entire network making L3 and Qwest's separate terrestrial nets fully capable of OC192 lambdas any where on the net? Not just capable between NY and San Francisco for example?

St Arnaud: The DWDM systems are only deployed on backbone i.e. New York to San Franciso.

COOK Report:There is still a market for DWDM in regional aggregation and metro? Now Williams has a separate fiber dig of its own and so does ATT(Velocita and others). Does Sprint have its own separate right of way and fiber or does it share a lot with ATT and WorldCom/MCI?

St Arnaud: When you dig down you

will find that many companies have IRUs on strands of fibers that were installed by other carriers. It is a very complex relationship

COOK Report: In the long haul you have maybe four distinctly geographically separate builds in the USA? Right? And that the 15 carriers have lit fiber along one of those rights of way?

St Arnaud: That would be correct.

The four separate geographic builds are most likely as follows: Williams along gas pipeline AT&Talong their traditional Right of Ways obtained years ago (and probably the most valuable) Qwest, 360 and L3 along rail right of ways. There are number regional builds along interstate highways and other Right of Ways - Telergy, etc RBOCs usually have their own Right of Ways independent of all the above

COOK Report: For each carrier how many strands are lit? Somewhere between two and six?

St Arnaud: Usually they light 4 strands for long haul and another 2 strands for regional aggregation. For example they will use long haul DWDM on 4 strands and metro DWDM on 2 strands to pick up small communities along the route

COOK Report: Any one actually have 5 or 6 lit?

St Arnaud: Sometimes you may have overlapping rings which use separate strands.

COOK Report: When you light a new strand do you have to attach a new set of systems to it?

St Arnaud: For a number of reasons, engineers use 4 strands for these 80 wavelengths. If there is a fiber shortage they may use 2 strands - but this increases laser inventory costs.

Editor: To a question on how many lambdas the carriers need to run their own networks:

Odlyzko: Curiously enough, although carriers are paranoid about keeping secret the volume of traffic their networks carry, they typically do publish network maps, and you can get many of them through Boardwatch magazine, <http://www.boardwatch.com/>.

St Arnaud: A word of caution. These maps usually only show the bandwidth assigned to IP networks. In fact most carriers will have many more wavelengths available for carrier re-sale and private data networking. Carrier re-sale was the big market of the late 90s until the latest meltdown The amount of bandwidth assigned to IP networks is actually quite small in comparison

And on February 21: Even Nortel is moving into the customer ownership space. Bill includes a pointer to Jim Duffy's View from the Edge column in Network World.

"In an effort to create demand where there is none, Nortel is attempting to make metro dense wavelength division multiplexing "ready for prime time" by ruggedizing the technology for shared resource duty. Nortel CEO Frank Dunn recently stated that the company will be hard pressed to meet second-quarter expectations of 10% lower revenue than the first quarter due to lack of carrier spending. As a result, Nortel and its equipment vendor rivals have to create, generate or stimulate demand when there essentially is none.

One way to get carriers to open their pocketbooks, Nortel believes, is to build a stronger business case for metro DWDM. Currently, metro DWDM transport and switching gear is sold to service providers and very large enterprises for private and dedicated optical networks. Nortel believes that by making metro DWDM able to be delivered as a shared resource - i.e., wavelengths for the masses - it can generate service revenue for carriers and thus sell more gear, chiefly its OPTera 3500, 5200 and new 5100 platforms.

[snip] The key to making metro DWDM into a shared resource, where wavelengths become a commodity for the Fortune 10,000, is management, Nortel officials said in Ottawa last week. Service providers want to be able to isolate faults and collect performance monitoring statistics in metro DWDM like they do in SONET today. This will provide the "reduced operational expenditure" (opex) hook to pique service provider demand." [snip]

TeleGeography's Bandwidth Pricing Analyst Weighs in

Robert **Schult**: (Senior Analyst TeleGeography, London UK on February 21, 2002). When a wave is sold it goes for about half the price of its SONET OC48 or OC192 equivalent. From my perspective as measured by the customers I talk to is that no-one outside the carrier market is buying IRUs on waves. Also I think this is when the whole swap business comes into question.

COOK Report: Well who is buying wavelengths? Aren't they simply too much for enterprises to handle at this point?

Schult: Generally yes.

COOK Report: So the only customers left are carriers? And ones of all different sizes.

Schult: Yes. If you talk to carriers in Asia and you ask for a wavelength price, they laugh at you. They say: we can provision it, but we typically do not. Our enterprise customers look for DS3s and below. The market is simply not there. Now if you look at North America, certainly wavelengths are there. But how much does any multinational need? I know of one multinational where their global data network connecting all their data centers has been a set of STM-1s or OC3 equivalents with a single STM 4 (OC48). The expectation that an enterprise can really use 2.5 gigabits at this point is premature.

To get back to your pricing question. If you were to talk about a wavelength New York to Washington DC, you'd be pretty

safe to say 11 to 12 thousand dollars a month. $85 thousand a month for a wavelength from New York to Los Angeles is about market price today. The cost to generate a 2.5 versus a 10 gig lambda is about the same. And it is fairly easy to add to the supply. The question to ask at this point is who needs a ten gig wavelength?

COOK Report: Besides a carrier, no one.

Schult: True.

COOK Report: How many carriers globally can and do use ten gig wavelengths? Twenty? Thirty? Forty at most?

Schult: Probably 20 to 30 global carriers. If your question is whether in those locations where you have fiber lit is enough demand to buy any sizeable number of the available wavelengths? I think not. The thing to ask is what right now would require more wavelengths than customers are using? If you look at small enterprises they run their whole IP requirements off of two meg leased lines.

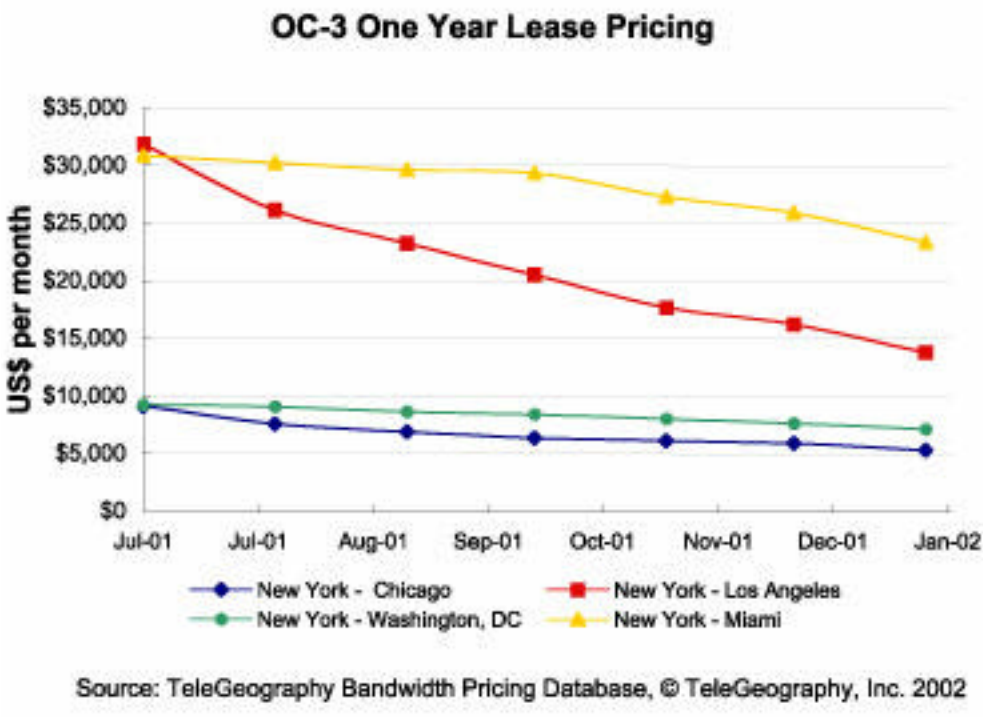
COOK Report Thus the big problem is whether given the amount of fiber and the potential investment of the involved players, $4 million a month in new transport sales for the largest 8 carriers and $2 million a month for those beneath them is enough to keep them from bankruptcy. If you try to extrapolate what information I have acquired down the food chain, the amount of new sales that can be generated under these conditions is limited. Right?

Schult: I agree and there in lies the problem. That is likely one reason for the "creative" accounting issues that have now surfaced.

COOK Report: But this is an intractable problem because given what it takes to keep these companies "fully funded," you cannot support what they are doing for very long on only $4 million a month in new transport sales. Until conditions change in such a way as to increase demand dramatically, the industry will be 'fried.' Effectively on life support?

Schult: Agreed. I would say that there is also certainly concern that companies such as Global Crossing, Viatel, 360Networks, etc may emerge from Ch.11 protection without a debt burden, with a network that is considered for all intensive purposes a sunk cost, and subsequently a much lower unit cost from which they can offer services. The real issue with these companies will be how strong will their balance sheet be when they emerge, how much will their SG&A have been cut (with an implication that delivery of services and troubleshooting of any faults may be effected), and will customers (corporate or otherwise) be willing to deal with them. Currently there are offers on the market for available capacity that some clients will not touch, opting for a higher price from a service provider they are confident in.

In short, the scenario you depict is a real concern. It will however depend on how much new investment the assets will attract, and how much financial credibility can be established.



According to Jason Kowal at Telegeography, a lack of visibility into wholesale bandwidth pricing has fuelled massive price erosion in the leased private line market. The OC3 One Year Lease Pricing graph (lower left), derived from information in TeleGeography's Bandwidth Pricing Database Service, clearly indicates that oversupply and competition continue to drive market prices lower. Additionally, the graph demonstrates a divergence from distance-based pricing that has characterized US domestic long-haul routes

TeleGeography's new Bandwidth Pricing Database Service is Updated monthly, the database contains more than 3200 historical price points from 1999 to 2002, with 500 new data points added per quarter. The Bandwidth Pricing Database contains neutral, unbiased pricing information collected directly from carriers by TeleGeography analysts. TeleGeography supplements the carrier-provided information with data from bandwidth trading activities on Band-X, the leading bandwidth exchange.

Details are available at http://www.telegeography.com, or by calling TeleGeography at +1 202 741 0020.

Part Six-

Odlyzko and St Arnaud Define the Economic Viability of the Newly Constructed Metro and Long Haul Fiber Infrastructure

Highlights, or Exec. Sum

On the Cybertelecom listserv on February 13, **Fred Goldstein** wrote in response to our summary of Roxane Googin's analysis: “Agreed that the balance sheets are screwed up by overlong depreciation. The FCC has gradually reduced depreciation times on ILEC plant, but current numbers still look unrealistically long. On the other hand I do not expect that demand for ordinary POTS will suddenly dry up. Sure, there's little to no per capita wireline growth, and wireless is getting all the action, but Jane Q. Homeowner will still be making ordinary phone calls ten years from now. It's hard to maintain a business on 20-year depreciation cycles when replacement equipment costs are falling so fast.”

When we shared this with Andrew **Odlyzko** he responded on Feb 13: I agree with much of what Fred Goldstein says. Along somewhat similar lines (including need for faster depreciation, and how it might lead to faster revival among supplier than is expected), I enclose below some comments I wrote a couple of weeks ago, whcih were distributed by Steve Milunovich in his weekly Merrill Lynch high-tech advisory bulletin. [**Editor**: With his grant for Ca*Net4 Bill St. Arnaud is in the market to buy lambdas. As a potential customer of the companies we are talking about and Andrew is writing about, Bill is in a position to evaluate Andrew's analysis. Therefore we asked Bill to comment.]

A Long Haul Fiber Glut

Odlyzko: 1. There is a fiber glut in the long-haul area, not just the perception of a fiber glut. This is clear from what is happening to prices for transmission, the bankruptcies of a whole flock of carriers, as well as some simple calculations.

St Arnaud: Agree 100%

Odlyzko: If one looks at the estimates for Internet traffic on Internet backbone capacity, say using the numbers in the Larry Roberts (Caspian Networks) studies, some of which I do question, but which do seem to be of the right order of magnitude, we see that it would take just a few strands to carry all of it from coast to coast using state of the art equipment. Similarly, if we look at the statistics on the number of core router ports sold, we see that they cannot be using more than a small fraction of the fiber capacity. Only a small fraction of the fiber in the ground is lit. I have not seen any reliable statistics on this, but it is pretty clear that expenditures on optical equipment would be far higher other wise.

For another view, with the same conclusion, let us look at the supply and demand factors over the last 4 years, from year-end 1997 to year-end 2001.

St Arnaud: Agree 100%

Odlyzko: (a) At the level of fiber itself, at the end of 1997, there was (according to FCC figures, which appear to have provided pretty good coverage through the end of 1998) around 3.4 million fiber miles in the long distance market (of which under half was lit). By the end of 2001, it appears that someplace between 15 and 20 million fiber miles were in place, growth by a factor of between 4 and 6. Furthermore, DWDM has expanded the capacity of each fiber. Back in 1997, most of the lit fiber was running at at most 1.7 Gb/s.

Today we have a huge variety of systems, but just to be ultra conservative, if we were to install just the 40 wavelegth 2.4 Gb/s systems, (far below state-of-the art today) we would have more than a 50-fold increase in the capacity of each fiber. Thus we have increased the potential capacity of the long-haul system (if it were to be lit with reasonably run-of-the-mill equipment), by a factor of several hundred.

(b) On the other hand, let us consider the sizes of networks that actually are used to carry traffic for customers (thus ignoring dark fiber, as well as the spare capacity in SONET rings, and various other factors). According to the estimates in my 1998 paper with Kerry Coffman, "The size and growth rate of the Internet," at year-end 1997, only about 10% of the network at this level was used for Internet traffic, with about 45% each for voice and for private line.

The tremendous buildout of the last few years was the result of two fundamental mistakes. One was to assume astronomical and unrealistic growth rates for Internet traffic (the mythical "doubling every three or four months"). The other was to compound that mistake by extrapolating this unrealistically high growth rate to the entire network. Yet it was only this 10% Internet piece that was growing really fast, namely about doubling each year. A doubling of the Internet piece every year, plus growth of 10% per year in voice, and around 30-40% in private line (plus ATM and Frame Relay networks, which I am throwing into private line here just for simplicity) means that the network did not have to grow by more than about 4x or so over those 4 years, from year-end 1997 to year-end 2001. (Even today, when Internet traffic has just or is just about to exceed the combined traffic on private line and voice networks, the growth rate of the entire network is probably closer to 50% than 100% per year, even though the Internet itself appears to be on the 100% growth path.)

There are a few other factors to consider, such as distance dependence and redundancy, but they are not likely to be major, and are very technical, so I won't go into

them here. The one thing to note is that utilization of lit fiber is not a useful metric to consider. Lighting fiber costs quite a bit, so it is not done unless there is demand for extra capacity.

The general conclusion is that far more fiber was deployed in the long-haul market than was necessary, too much by a factor of at least 10. (The same conclusion does not apply to the metro area, however.) Thus in principle there is no need to deploy any more fiber in long-haul for 5 or more years. What will actually happen, though, is another issue, as the industry will be trading off deployment of new fiber versus deployment of equipment that can use existing fiber more intensively.

St Arnaud: Agree 100%. **Not only was too much fiber deployed, but seriously too many fibers were lit with DWDM systems.**

Prospects for Next Two Years Uncertain

Odlyzko: 2. **The prospects for the next couple of years are extraordinarily murky. The problem is that we have not just technology trends and the basic growth rate in demand fortransmission (which is still high, approaching the approximate 100% per year that still seems to hold on the Internet) to contend with, but also the huge fiber glut (with smaller gluts of routers, etc.), and the dynamics of the financial markets and bankruptcy courts.** Thus while I was confident a few years ago in predicting disaster, on the basis that demand was not going to materialize for the supply that was being built, I don't feel I can predict how things will play out in the next 2-4 years. There are certainly many interesting possibilities for exploiting the existing fiber glut, especially as more fiber is deployed in the metro.

Here are just some thoughts:

(a) The fiber glut is a done deal, a sunk cost. Since fiber does not deteriorate much with age and use, though, it makes sense to use it. This means that we may see a lot of enterprises leasing dark fiber and lighting it with inexpensive (often second-hand) equipment, say running a single OC12 on a fiber strand that is theoretically capable of carrying 80 OC192s. (I have heard anecdotal evidence that some of this is happening, for example for enterprise database mirroring.) **Thus statistics of lit fiber and the like will be very tricky to obtain and interpret.**

St Arnaud: This may true for short regional hops, but not long haul. The cost of wavelengths is now so cheap, and the incremental cost of adding wavelengths to existing DWDM systems is so small you would be crazy to light your own long haul fiber, no matter what the bandwidth.

Odlyzko: (b) The telecom supplier sector in general may revive sooner than many expect. (This may not apply to the fiber segment, though, because of the long-haul fiber glut.) Many observers look at statistics such as those in

<http://www.lightreading.com/document.asp?site=lightreading&doc_idñ99>

and conclude that the telecom industry is getting back to its traditional pattern of spending around 15% of revenues on capex. The approximately 30% of revenues spent on capex in 2000 was clearly an aberration that is unlikely to see. However, my guess is that capex will be higher than the traditional 15%, because technology is advancing more rapidly. Instead of switches that are good for a decade or two, you have routers that are obsolete in 3 to 5 years. The fact that capex has not collapsed even further over the last year or so, in spite of the glut of fiber and other capital equipment on the market, may mean that the service companies are already unable to resist the pressure to upgrade. In the long run, capex is not going to grow faster than service revenues (which, by historical precedent, are unlikely to grow more than 8 to 10% per year), but there could be a few years of ramping up as capex increases from 15% to 20% of revenues or even a bit higher.

St Arnaud: Routers and enterprise will recover quickly. DWDM will take a long long time except for incremental upgrades to add additional wavelengths.

Odlyzko: A related factor (at least in long-haul, probably much less so in metro, but I would really like to see some data on this) is that **as time goes on, capex is likely to tilt more towards high-tech. Much of the early expenditure was for trenching, putting up huts for regeneration, and so on. Now that this is done, most of the expenditure will likely be for electronic and optical equipment, which is good news for the telecom supplier segment**. (But this is probably not true in metro.)

(c) If the prediction in (b) about increased capex as fraction of revenues is realized, we will see a greater emphasis on simplicity, to lower operational expenses. This would go somewhat counter to the current trend, where to improve their financials, carriers are clamping down on capex and asking for higher utilization rates. **The smart thing to do in the long run is to throw capex at the problem and eliminate labor(as in getting rid of SONET, etc.). This would mean lighting as few fibers as possible, at speeds as high as possible** (which, though, would go against the trend towards wavelength switching).

(d) Point (c) above suggests that demand for fiber might decline. However, there is another factor that goes counter to it. Namely, the fiber glut we have is also accompanied by a conduit glut. Most of the recent fiber deployments involved putting down several empty conduits in addition to the main one (which was sometimes not fully filled, either). This means that if considerably improved fiber becomes available, it could be deployed inexpensively, and pressure to reduce operating expenditures might lead to such moves.

St Arnaud: Agree 100%

Part Seven - A look at a Few of the Carriers

ATT, Sprint, MCI and Global Crossing A Brief Overview

Highlights, or Exec. Sum

What About the IXCs?

As the discussion (Part 2) below points out the IXCs have their own unique vulnerabilities. On Febuary 1, according to MSNBC's Chris Byron http://www.msnbc.com/news/697962.asp?0si=-&cp1=1 [investors] "are now beginning to view the [telecom] space as essentially a write-off, and are increasingly pricing the stocks in it on the basis of little more than the meltdown value of their balance sheets."

AT&T

ITWorld on January 29, 2002 wrote http://www.itworld.com/Net/3970/IW010129hnatt/ AT&T announced on Monday a loss of $1.7 billion -- or 45 cents per share -- including one-time items for the fourth quarter ended Dec. 31, 2000. These results compared to earnings of 36 cents per share in the same quarter last year

[Snip] The telephone and cable television company has faced increasing competition in the long-distance consumer market that affected its bottom line. Its fourth-quarter core consumer revenue fell 14.7 percent to $4.3 billion.

[snip] Faltering profitability and increasing competition caused the company to announce in October a relatively radical realignment of its business plan, splitting Ma Bell up again into four separate companies. AT&T also cut its dividend last month by 83 percent, ending a 100-year unbroken chain of dividends that survived the Great Depression, two World Wars, and the first breakup of the company in the '80s.

[Snip] The company plans to separate its wireless, consumer, business services, and broadband businesses. It predicted declining revenue "in the mid- to high-teens," and earnings declines of 6 percent to 8 percent for the year in its consumer businesses as a result of consumers actively hunting inexpensive long-distance services. AT&T said it expects its business services unit to have flat revenue growth for the year and a slight earnings decline for the first quarter. It expects its broadband unit to experience growth in the mid-teens for the year, and expects to improve earnings margins by about 3 percent through the year."

MCI WorldCom

The news from MCI was also grim. Chris Byron in the column cited above declared "Time is running out for WorldCom -- Sooner or later, company will almost certainly face liquidation." [Snip]

"Over the last 19 years, investors have poured more than $100 billion into this rural Mississippi telephone company, and basically, Worldcom has done nothing with the money except buy other phone companies. As a result, the company now sits, as of Sept. 30, 2001, with worthless goodwill on its balance sheet totaling more than $50 billion — so far as I am aware, the biggest such mountain of fake assets in all of corporate America. Add to that some $30 billion of long-term debt, plus $10 billion of unpaid bills and other short-term obligations, and you've pretty much got the whole WorldCom financial picture.

And here's the really interesting thing: Over the course of the 1990s, this $100 billion Mont Blanc of waste has not been able to generate a single dime of net new cash for the business, with all free cash flow coming from stock sales and debt financings (the "cash Flows From Investing" part of the company's financials). In other words, the second largest telecommunications carrier in the country hasn't actually been a sound business from Day One, but has only seemed to be so because the economy was growing and stock prices were rising."

Feeling leery of evaluating WorldCom on an "opinion piece" we sent the material to Vint Cerf and asked him to comment for this article. Vint replied via email on February 4 "I believe the $30B and the $10B figures are in the right ballpark. I am not sure about the $50B however. The company has $10.5B in current assets and $39B in plant and equipment. And a substantial revenue stream. And a first class employee base that has propelled the company to be one of the largest facilities-based global service provider of voice and data service in the world."

MCI Investor Relations spokesperson Bradford Burns added: "Since we announce earnings this week my hands are tied from responding directly to Chris Byron's piece. But do know that there are many issues/misleading implications in his story. (He conveniently left out some numbers -- e.g. assets, our real cash flow facts, etc -- that certainly undermine his argument). If you would like to get a more complete picture of our finances please join our earnings call www.worldcom.com/investor/ this Thursday at 8:30am Eastern Standard time." Readers are invited to return to and savor Burns' advice after they have finished the Roxane Googin interview.

On February 7 when WoldCom earnings were announced Forbes' Mark Lewis, wrote http://www.forbes.com/2002/02/07/0207worldcom.html

"WorldCom earned 13 cents per share for the fourth quarter, excluding certain items. That was well below the year-ago profit of 20 cents per share and a penny below the consensus estimate as com-

piled by Thomson Financial/First Call.[Snip] WorldCom's consumer long-distance unit, WorldCom MCI Group, swung to a loss from a year-ago profit, so the MCI tracking stock (nasdaq: MCIT) plummeted [**Editor**: closing on February 8 at $7.94 a share down from almost 15 dollars less than two weeks earlier.) even while WorldCom Group shares rose by a similar percentage [**Editor**: these shares have had a similar swoon down from 16 in early January 2002 to as low as 5.93 last week before closing at $8.18 on Friday February 8th]. At least for today, then, Ebbers' much-maligned restructuring plan worked as designed--as investors separated their concerns about the declining long-distance business from their view of WorldCom's core [**Editor**: data and business services] operations.

Finally on February 8 in the Financial Times we have the comment of Richard Waters and Robert Clow reporting from New York: http://globalarchive.ft.com/globalarchive/article.html?id=020208000237

Bernie Ebbers, the maverick businessman who shook the telecommunications world to its roots in the 1990s, has been handed the bill for his audacious wheeling and dealing. The cost, to him personally: nearly Dollars 375m (Pounds 265m) in debts, much of it used to buy shares that are worth a fraction of what they once were. [Snip] That collapse left Mr Ebbers in an awkward position. Not content with the stock he acquired under options given by the company, he borrowed to buy more, taking out loans secured by his WorldCom shares. As the price fell, he faced ever-larger margin calls.

Mr Ebbers sold a small number of shares to meet these payments but eventually relied on his own company to lend him cash and guarantee another loan from Bank of America. Now that WorldCom's stock has crashed again, the company has had to take over all those debts, amounting to Dollars 198.7m. Mr Ebbers said he had borrowed Dollars 141m of another Dollars 165m loan the company had made available, and that WorldCom had supplied a Dollars 35m letter of credit to support other personal obligations. Personal loans like this were "totally inappropriate", said Charles Elson, a US corporate governance expert. "WorldCom is not a bank: this is what banks are for."

Besides risking its shareholders' money, WorldCom created a huge potential conflict of interest, becoming a big creditor of its most important employee, he added. The Ebbers loan exceeds the next-best example of bull market lending hubris when insurer Conseco lent Dollars 162.5m to then chief executive Steven Hilbert to buy its shares.

On Feb. 25 on Nanog we read: "This is an interesting NYT article for all of those of us trying to convince themselves that even if Worldcom goes bankrupt, UUnet will stay up. The example used is Global Crossings. If a company has complex enough finances and gets deeply enough under water, the courts might not be able to figure it out and creditors may just liquidate... whether or not it makes sense for the customers and society as a whole. If the government is not willing to step in for Enron, would they step in for UUnet? http://www.nytimes.com/2002/02/25/technology/25GLOB.html

Sprint

Sprint is also headed down but didn't fare as poorly as its larger competitors. On Feb 4th Sprint announced that "Full year 2001 consolidated revenues were $26.07 billion, a 10 percent increase from $23.61 billion last year." However virtually all other Sprint figures were down.

From http://www3.sprint.com/PR/CDA/PR_CDA_Press_Releases_Detail/1,1579,5241,00.html we learn that "Fourth quarter revenues were $4.01 billion compared to $4.39 billion in the same period a year ago. For the year, revenues were $16.92 billion, a decrease of 4 percent from $17.69 billion in 2000.

FON Group operating income in the quarter decreased 38 percent to $371 million from $598 million a year ago. In the fourth quarter, Sprint announced the discontinuation of ION consumer and business offerings and a corporate restructuring. [Snip] Operating income fell 36 percent in 2001 to $1.81 billion from $2.83 billion in the prior year. [Snip] For the year, EBITDA was $4.26 billion compared to $5.10 billion in 2000. [Snip] Revenue from continuing operations for the year decreased 33 percent to $1.08 billion from $1.61 billion in 2000."

Fourth quarter diluted earnings per share was 27 cents compared to 41 cents a year ago. Capital expenditures were $1.40 billion for the quarter and $5.30 billion for 2001. [Snip] In Sprint's Local Telecommunications Division "Total access lines declined 1 percent during the last 12 months. Voice grade equivalent lines grew 13 percent from a year ago."

Global Crossing 3rd Quarter 2001 Revenues

Revenue	**$ 793**
Costs and Expenses:	
Cost of access and maintenance	**$ 555**
Depreciation and amortization	**$ 376**
Other Operating expenses .	**$ 465**
Restructuring & impairment charges	**$ 294**

Total Costs and Expenses	**$ 1690**

Loss from Operations.	**$ (897)**

[**Editor**: this is the same pattern that we will see in talking with Roxane Googin about the ILECs.]

Conclusions Global Crossing Gone

In the five weeks since we published the March *COOK Report* on January 19 much has happened. Global Crossing has declared bankruptcy. The thrid quarter 10Q for 2001 http://www.sec.gov/Archives/edgar/data/1061322/000095013001505325/0000950130-01-505325.txt said that 3rd quarter operations lost 897 million. See details immdediately below.

The next SEC filing came on January 28, 2002 http://www.sec.gov/Archives/edgar/data/1061322/000089375002000072/0000893750-02-000072.txt and declared the bankruptcy filing. On the same date the Company announced that it had signed a letter of intent with Hutchison Whampoa Limited and Singapore Technologies Telemedia Pte Ltd. for a $750 million cash investment for a majority stake in the Company's equity in connection with a restructuring of the Company's balance sheet. The proposed investment is subject to, among other things, Bankruptcy Court approval and any regulatory or other such approvals asmay be required by law."

Recall that in our Googin interview above we mentioned that the January 30, 2002 disclosure in the Los Angeles Times that Roy Olofson, former Vice President of Finance, "warned the firm's top attorney in August that the company's financial condition was being enhanced with misleading accounting techniques,"

On February 8 Network World Fusion reported that "Global Crossing battles accounting controversy" http://www.nwfusion.com/news/2002/0208globalx.html

According to George Chidi "The company has reported its financial results in accordance with the law and is cooperating with a U.S. Securities and Exchange Commission (SEC) probe triggered by Olofson's allegations and the bankruptcy filing, a spokeswoman said." "She would not comment on a Friday report from USA Today which said the U.S. Federal Bureau of Investigation is also probing Global Crossing's accounting practices, nor would she comment beyond the company's press releases."

"Global Crossing's bankruptcy, declared in January, is the largest of any telecommunication company to date, and the fourth-largest in U.S. history. The $22.4 billion claimed in liabilities in its bankruptcy filings in the U.S. Bankruptcy Court for the Southern District of New York and the Supreme Court of Bermuda dwarf the debts of high-profile meltdowns in the previous year like those from NorthPoint Communications Group, Rhythms NetConnections, and PSINet."

"Carriers sell an IRU to allow another carrier or company the unfettered use of the capacity over a long period of time. Generally accepted accounting principles (GAAP) require companies to record the revenue generated by an IRU over the time of the contract."

"Global Crossing created metrics called "cash revenues" and "adjusted EBITDA" in press releases. Global Crossing's cash revenue measurement was defined as GAAP revenue plus the cash portion of the change in deferred revenue. Like pre-1999 accounting rules, it allowed the company to talk about all the revenue for an IRU up front, according to Olofson's attorneys."

Anthony Palazzo of the *Los Angeles Business Journal* said in a February 12 article: "Accounting has always been an obtuse art and in the case of Global Crossing Ltd., a seemingly simple determination in how to measure cash flows can be interpreted in any number of ways."

"That's the problem. The company, now in Chapter 11 bankruptcy proceedings, claims that so-called cash revenues, used by many telecommunications companies, are a better way to determine cash flows than revenues allowable under generally accepted accounting principles. Critics say that while cash revenues can be useful in measuring a company's performance, they can also be used to inflate the its results" [Snip]

"In response, [to a 1999 SEC required change in their reporting requirements] companies like Global Crossing began to calculate "cash revenues" as a supplemental revenue measurement. Cash revenues include the revenue that could be recognized under GAAP, plus "the change in the cash portion of deferred revenue," according to Global Crossing*s quarterly statements. Essentially, it was a way to continue counting the cash received on IRU leases. GAAP-conforming figures, meanwhile, were de-emphasized."

Blowback from IRU Swaps Puts Further Pressure on Qwest

On February 13, James J Cramer wrote: http://www.siliconinvestor.com/stocktalk/msg.gsp?msgid=17057171 Fear drives Qwest right now -- the fear that it won't be able to get the equity it needs to meet its rigorous debt covenants, outlined in The Wall Street Journal today as 3.75 times EBITDA (earnings before interest, taxes and depreciation). Lots of people think that EBITDA can't lie. But when you look at how EBITDA is tabulated, you can see that it's easy to fudge it. All you have to do is capitalize your expenditures and the expenses drop below the EBITDA line!

That's what Global Crossing did, and that's what some think Qwest did. Qwest needs to raise some cash to be sure it doesn't violate these covenants. But as the stock goes down, the price the company has to pay for more capital grows ever higher until it becomes prohibitive. We are closing in on that prohibitive level. I think that Qwest's backers are so vociferous in their pursuit of Qwest's bashers because they know that as the common stock slides, the odds of a default do increase.

What happens now? I think Qwest has to explain itself, make a clean breast of things -- maybe fire Arthur Andersen, maybe make some changes at the top -- to get that money. Otherwise, here is another stock that fear itself will topple quite quickly in these tough markets.

Part Eight

End of the Global Greenfield Dream

Level 3 Slashes and Burns in a Valiant Effort to Stay Afloat

by Gordon Cook

Highlights, or Exec. Sum

Level 3 Reports In – Viability Uncertain

We decided to tackle Level 3 on our own. Doing so was educational but gave us a first hand lesson in how difficult the accountants make it for technologists to dig meaningful data out of their reports. Here we have new technology sold in ways that can be defined differently from one company to another. There is no FCC providing any kind of regulatory role that insists in uniform measurement of data across carriers in terms of such things as numbers of access lines or minutes of long distance termination use. Consequently, ascertaining the meaning of reported revenues is a difficult and highly frustrating exercise.

In what follows below we give a great deal of emphasis to understanding Level 3's use of cash versus GAAPaccounting revenues. The difference between the two is IRU sales. Given the emphasis on IRUs with the three global fiber players (Qwest, Level 3 and Global Crossing) we have gone into considerable detail in order to ascertain the role that IRU sales is playing in Level 3 revenues now and can be expected to play in the near future.

In doing this we have drilled down into just what dark fiber IRU sales are and the question of whether they will continue to play a major role in Level 3's revenue stream in the future. We conclude that they and the revenues derived from them will decline significantly. This is already happening. Level 3 does not dispute this and maintains that long term reliance on IRU income was never a part of its business plan to begin with. (Robin Gray Vice President Investor Relations For Level 3 said in an interview with us on February 19th: "We have already seen this decline. So hopefully that is factored in to our in large part already reported 2001 results."

Now it turns out that with the arrival of technology that made wavelength (lambda) sales possible in 2000 and the completion of L3's network in 2001 that lambdas (waves) began to be not only leased but also sold as IRUs. While dark fiber IRU sales already made by Level 3 will provide recurring revenue income, leases of light waves and sale of light waves as five year IRU's are now providing the bulk of Level 3 transport revenue.

Meanwhile as we have explained elsewhere in this issue the new IP optical network fiber based business model that was going to sweep the older circuit switched telcos into the proverbial 'dustbin' of history has itself failed and post Enron bought investigations onto the heads of Qwest, Global Crossing and 360 Networks. Investors are finding out that what they don't know assurances aside WILL hurt them.

In short we agree with Seth Libby of the Yankee Group as quoted by Internet News on February 15th: "I think everybody is under the microscope right now, as I think they probably should be. What the telecommunications industry needs right now is clarity." He added, "Anybody who entered the scene in the last five years is going to come under scrutiny. That's not to say there's going to be a lot of problems, but there's going to be a top-down analysis."

From our perspective the most critical issue is whether Level 3 can increase other communications services revenues quickly enough to become viable before it runs out of cash. In conversation with Level 3's Arthur Hodges on Saturday February 16 we learned that L3's communications service revenues break down as follows -- transport (private line and wavelengths); Softswitch (managed modem wholesale dial up access, and voice termination service); voice; IP transit; co location web hosting; and dark fiber. This is helpful because it is a more detailed breakdown than can be found in their quarterly reports. The long term question with Level 3 will be whether it can grow its services revenue fast enough to displace declining dark fiber IRU revenue and pay its operating expenses and interest. If one looks at it's position among the four largest Greenfield players, the other 3 being Qwest, Williams, and Global Crossing, the question is will it emerge as "last man standing"? Certainly the fact that its original management team is still largely intact, whereas those of the others are not, speaks well for it. In this sense the difference between it and Global Crossing could not be any stronger. Currently we believe that its position is the strongest of the four. Consequently, the question is how long into the future can it remain standing? The position of the economy and the industry is so uncertain now (late February 2002) that we have concluded that betting on any of the Greenfield players to survive 2002 without having to restructure would be very risky.

Our first attempt to get a handle of Level 3's fiscal condition failed. As we found out after several days additional work these folk don't make it easy to get a solid reading on the state of their health. At the end of an hour long interview on February 19 we asked Robin Grey Vice President of Investor Relations: Does the information that you have given me on your fiber and wave IRUs exist in your written reports?

Grey: "Some of it but not all of it. In all

our press releases we have always said that dark fiber was sold at 20 year IRUs. Unfortunately for the rest of this you would probably have to look at every single press release and conference call to piece together what I have told you. Sometimes when a customer buys an IRU they will let us put out a press release on the sale but on other occasions other customers demand anonymity. Keep in mind that there are sell side analysts who spend their entire day scrutinizing our press releases. To come up with a revenue model isn't that easy as you have seen. People dedicate their lives to figuring this out."

Here then is a complete revision of the draft we sent to Level 3 CFO Sureel Choksi on February 14.

GAAP vs Cash and Understanding IRUs

On January 29 Level 3 declared a loss of 3.3 billion or $8.54 per share for the fourth quarter of 2001 alone. From http://www.level3.com/us/news/newsreleases/1,1345,2002Jan29-5776,00.html we read "Communications GAAP revenue for 2001 was $1.3 billion, a 52 percent increase from $857 million in 2000. Communications Cash revenue for 2001 was $2.1 billion, a 67 percent increase from $1.26 billion in 2000." [Snip]

"Communications cash revenue is defined as communications revenue plus changes in cash deferred revenue. Communications cash revenue includes upfront cash received for dark fiber and other capacity sales that are recognized as GAAP revenue over the life of the contract, generally ranging from 5 to 20 years." "Communications cash revenue for the fourth quarter was $415 million. Communications GAAP revenue for the fourth quarter 2001 was $269 million, a 24 percent decrease over the same period last year."

COOK Report: The way that communications cash revenue and communications GAAP revenue is described to someone not immersed in this area is confusing. Most of the article in the press still use the accounting jargon – not surprisingly because we are talking about accounting after all. We set out to find out what the difference was. Tim McDonald Telecom Sector Analyst Bank of New York, Bill Klein former Telecom Analyst DKW, Roxane Googin and Arthur Hodges from Level 3 have been our resources for the following. Review of this material with both Hodges and McDonald has taken place on Saturday February 16th. That review was followed by an interview on February 19 with Level 3 Investor Relations VP Robin Grey.

The sale of IRUs (Indefeasible Rights of Utilization) has been a critical part of the business model of the new green field players. According to Arthur Hodges Level 3 sells or leases to customers lightwaves, conduits and fibers. These become assets to the purchaser. Most sales are for dark fiber which, along with a conduit, is something physical that is there regardless of what the provider does. Conduits and fiber are also something physical to which access can be turned over by the seller to the buyer.

A lightwave is a little different in that the seller's ability to provide the light wave to the buyer rests on equipment that the seller owns and must maintain in good operation on a month-to-month basis. It is in this sense less of a hard asset than a fiber or conduit. For this reason light waves would generally be short term leases for a period of five years or less.

Understanding in any level of detail the role played by IRUs in the business models of these companies is not easy. We asked Bill St Arnaud for help. He replied: "An IRU can be for any period of time but traditionally have been 20 years. IRUs started with underseas cables about 50 years ago when the cost of a cable was so prohibitive that a number of carriers were required to partner together to build the cable. The IRU was created by accountants and lawyers so that each participant could treat their portion of the cable as an "asset" with all the rights and privileges of other fixed assets like buildings - e.g the right to sell, depreciate, etc"

"As far as I know there is no formal legal definition of an IRU. As such its use has become bastardized over the past years. In general an IRU implied an upfront capital payment. Leases implied annual or monthly payments - but most importantly title to the bandwidth remained with the leaseholder as opposed to IRUs where title is transferred to the IRU purchaser. In these crazy times you will see IRUs with monthly payments and leases with 100% upfront payments."

While IRU's have been around for more than fifty years, wave based IRU's are a new device. The defining characteristic of an IRU is full payment up front and in full for the right of use for a specified period of time. For a portion of a tangible cable or for a fiber, this made sense. For the delivery of a stream of photons from a fiber in a market where the cost of that stream over time is falling precipitously it makes less sense and would seem to be rather risky. To but a wave based IRU the customer must be willing to bet that the sellers DWDM boxes will still be attached and pumping the bits five years hence. Not to worry Robin Grey assured us on the 19th that the majority of L3's wave sales were in the form of five IRUs that cost on the whole about half of what a five year lease would cost.

Now, if one understands the technology, one also has to understand that to grasp what IRU sales really mean to the future direction of the company and the industry one must know when looking at IRU sales what percentage are for fiber, what percentage for conduit and what for lightwave. IRUs on dark fiber represent a market that has essentially ended – at least for long haul markets. Level 3 wrote off its remaining conduits for the 4th quarter of 2001. No one in his right mind is going to by a conduit via IRU. That leaves wave sales, the majority of which are now executed as IRUs according to Robin.

A further problem with being able to book the full amount of the IRU up front is that, assuming that there is some finite upper limit to the number of customers a company like Level 3 can acquire, the IRU process encourages the company to sell everything up front and by doing so

to deplete reserves of future customers and future revenue.

GAAP versus Cash as IRU Diven Accounting

Let's look at what happens in the sale of a 20 year IRU for fiber. Say the price for one pair was $10 million for the 20 years. When the buyer takes possession of the fiber, he must give the seller full payment for the 20 year use. A ten million dollar IRU for 20 years that closed in 3rd quarter 2001 would become an entry on the company's communications cash revenue for 2001. It would be listed however as only 500,000 dollars in the company's Communications GAAP income for 2001. It would however contribute 500,000 to the company's GAAP income for each of the next nineteen years. 500,000 in 2002, another in 2003 and so on. Because IRU revenue is paid up front, in advance, communications cash revenue (which represents cash flow) will always be more than communications GAAP revenue.

In 2001 the difference with Level 3 for the entire year between cash and GAAP was some $800 million. Standard communications service sales of things like leased lines and lambdas and softswitch minutes on an annual basis would wind up on the books in the same total amount under cash and gap revenues. The difference comes from IRU sales since income from an IRU by definition is normally booked up front ("upfront cash received")

However, IRU sales presumably account for some proportion of the GAAP revenues as well. To illustrate with a hypothetical example. Namely if there were 100 million in 20 year IRUs, you would have 100 million in cash revenues booked and 5 million in GAAPrevenues (5 percent or one 20th of the total.) The difference between the five and 100 is 95. Therefore to get the true figure attributable to IRUs you would need to increase the difference by approximately 5%. In this hypothetical example 50 million in softswitch revenues would appear as 50 million under both cash and GAAP. 50 million in one year wave length, co-lo, or leased line sales would appear as 50 million under both cash and GAAP. Thus the amount of IRU revenue is the difference between cash and GAAP plus the percentage attributable to the yearly rather than life of contract listing. In our example IRUs in 2001 95 million to the cash revenues bottom line. Taking just over 5 percent of the difference and adding it to the 95 million difference would bring the figure to the $100 million.

Therefore fourth quarter 2001 revenues attributable to IRUs would be approximately $153 million or the 146 million difference between 415 million cash and 269 million GAAP plus an estimated 7 million (5%) from IRU sales booked as GAAP.

Now much further down in the report we reach revenue projections for first quarter of 2002. "Level 3 expects communications cash revenue for the first quarter 2002 of $350 million and communications GAAP revenue of $270 million." Revenue projections from IRU's have shrunk to 80 million which is the difference between cash and GAAP. These figures projected forward for the entire year they would mean 1,400 (in millions) cash revenue and 1.080 (in millions) GAAP revenue in 2002.

Extrapolating from Level 3s own figures for sales of IRUs we get a decline by 60% in 2002. Given that we are talking about the sale of assets that require large expenditures to light and use in a market where everyone is glutted with such assets, a decline of only 60% of revenues seems optimistic. How optimistic we can't be sure because Level 3 doesn't tell us is what percentages of its IRUs are coming from metro sales versus long haul. The metro market is stronger than long haul but here too with fierce competition from entities like Metromedia Fiber and with gigabit Ethernet options from Telseon and Yipes the market is glutted. The future is made up of a complex basket of inter related variables. Tying to predict it is a highly uncertain exercise.

Fourth Quarter News of Declining Revenues

Robin Grey did go over these figures in great detail with us in our interview. The results explained differently and in a way that is positive and reassuring for Level 3 investors are found in the interview text that follows. Also included is a table that she provided. In this table she shows that Level 3, after cutting five billion dollars in expense since last summer, is fully funded.

Now this reminds us of Jim Jubak (Senior Markets Editor, MSN MoneyCentral) writing last August 3 on The Street.com: In July 2000 "The company had sold more than $7 billion in debt to help build up $8 billion in cash on its balance sheet. With another $900 million in a credit line, plus shares in several telecommunications start-ups worth $1.2 billion at then-market prices, Level 3 had enough cash to carry it through to EBITDA (earnings before interest payments, taxes, depreciation and amortization) break-even in 2002. It was, in Wall Street terms, fully funded."

"What a difference a year makes. Total cash revenue, which was supposed to come in at better than $3 billion in 2002, now looks as if it will fall closer to $2 billion. Revenue, which was supposed to grow by about 65% in 2002 from the 2001 level, now is likely to remain essentially flat in 2002. The operating loss for 2003 is likely to be more than $1 billion above earlier projections." http://www.thestreet.com/_cnet/funds/jubak/1509370.html [Editor's Note: What a difference four more months made. On December 5, 2001 Tim McDonald Bank of New York telecom bond analyst projected consolidated GAAP revenues for Level 3 of only 1.335 billion.]

The fourth quarter report released on January 29th makes it clear that the revenue generating capability of the company has seriously declined. Level 3 faces two problems here. We don't know enough about Level 3s reported IRU sales to evaluate the likelihood that any reasonably high level of such sales will be maintained. Jim Crowe says the

IRUs booked by Level 3 are not hollow swaps. And indeed it looks as though Level 3 has kept its nose clean. Nevertheless the continuing depressed carrier market is going to make increases in income from wave sales difficult.

Data with a finer level of granularity is available in Level 3's third quarter 10 Q filed with the SEC on November 14. There we read: "Due to the current economic conditions of the telecommunications industry, the Company has experienced a significant increase in the number of customers terminating service in 2001. These terminations will result in slower growth of service revenue for the remainder of the year. The decrease in dark fiber revenue reflects the substantial completion of the intercity network during the second quarter of 2001. [snip] Dark fiber revenue is expected to decline further in the fourth quarter of 2001, as the last remaining segments are delivered to customers."

Note also that for Level 3 there is another risk in being not only a carriers carrier but in selling to the 300 largest enterprise customers. Several of the 21 North American carriers mentioned by Bill St Arnaud as having backbones lit with 80 wavelength capable DWDM systems have themselves backbones that share Level 3's foot print because they ride on dark fiber IRUs purchased from Level 3. If these carriers go broke, then Level 3 looses the GAAP revenue and will loose the continued revenue for collocation of the 80 wavelength systems, the power to run them and the monthy fees for operations. In her interview with us Robin Grey pointed out that between July 1 1999 and December 31 2000 level 3 sold $3billion dollars worth of fiber IRUs and "related services". As a rule of thumb these related services are 50% of the total sales of 1.5 billion. These are recurring revenues on which Level 3 relies to remain fully funded. When a dark fiber IRU purchaser like for example MacLeod goes bankrupt these recurring services revenues go away.

Robin spoke of Level 3's certainty that it would be the last man standing. Perhaps but in this case Level 3's ability to remain standing is based in part on the welfare of its own IRU customers partly on whose shoulders Level 3 stands. If these customers go down, they are likely to drag Level 3 down with them.

The 3rd quarter 10Qcontinues: The communications business generated Cash Revenue of $395 million during the three months ended September 30, 2001. [Snip] Cash Revenue for the nine months ended September 30, 2001 was $1.694 billion, an increase from $777 million for the same period in 2000." [Editor: unfortunately the text version is not page numbered. See the 10Q at

http://www.sec.gov/Archives/edgar/data/794323/000079432301500035/0000794323-01-500035.txt]

From this information and the 4th quarter 2001 data we have compiled thetable show at the bottonm of this page.

What the table shows is the growth plateau and revenue decline that our analysis above would lead us to expect to see. On February 16 Level 3's Arthur Hodges pointed out to us that it is Level 3's position that the future of the company doesn't hang on IRU's and that their model is to move away from reliance on IRUs as rapidly as possible. Their basic business model is to be the lowest cost service provider. "We want companies to outsource their network operations to us,'he said.

The 3rd quarter 10Q goes on to say "The Company currently estimates that the implementation of the business plan from its inception through free cash flow break even will require approximately $13 billion to $14 billion on a cumulative basis." The next sentence says the company thinks it can reach free cash flow breakeven without additional financing. But the report then says market conditions may get worse and if they do, additional financing will be required. So with this contingency in mind "in January 2001 the Company filed a "universal" shelf registration statement for an additional $3 billion of common stock, . . .[Editor: or other financial instruments] This shelf filing, in combination with the remaining availability under a previously existing universal shelf registration statement, will allow Level 3 to offer an aggregate of up to $3.156 billion of additional securities to fund its business plan." "At September 30, 2001 and December 31, 2000, long-term debt was as follows: $7,910 [in millions] $7,318 [in millions]."

So let's look further at interest expense. The 3rd quarter 10Q states: "At September 30, 2001, the Company had $6.5 billion of fixed rate debt bearing a weighted average interest rate of 9.27%. A decline in interest rates in the future will not benefit the Company due to the terms and conditions of the loan agreements require the Company to repurchase the debt at specified premiums." The interest per annum on this would be 602.5 million dollars. We are then informed that "As a result of the Modified Dutch Auction completed on October 22, 2001, the Company was able to reduce its fixed rate debt outstanding to $4.8 billion." Annual interest on that amount would be $445 million. The 10Q notes: Interest expense, net for the first nine months of 2001 was $495 mil-

L3 Cash Revenue	**Growth**		**Plateau**			**Decline**
2000	qtrs 1-3	qtr 4	**2001** qtrs1 –2	3rd qt	4th qt	**2002** 1qt
	777 million	483	1, 299	395	415	350 projected
Per Quarter averaged						
	259 259 259	483	649.5 649.5	395	415	350 –projected

lion as compared to $195 million for the same period in 2000." Projected first quarter revenues in 2002 of 350 million cash and 270 million GAAP will be offset by 111 million in interest expense. At this point however we throw up our hands in despair and refer readers to Robin Grey's table for 2002 projections printed below.

Assessing the Level 3 Future.

Tim McDonald Analyst from Bank of New York Capital Markets was kind enough to send us on February 15 his December 5th 2001 level 3 Investment Analysis

On page 10 is a useful table showing Level 3's Revenue Reproduced as well on the bottom of this page.

McDonald writes also on page 10: "The company has stated that it has been unable to aggressively market transport services to large carrier customers until it was able to offer end-to-end transport on its own network, which it is now able to do. The growth in transport revenues is correlated to the completion of the company's network. By year-end 2001, 100% of the network will be complete and lit. We believe that the company's core transport services will be the key driver for revenue growth in the future. This is the primary service sold to the global communications firms the company is targeting. By the end of 2001, the company will be able to sell and provision transport services utilizing its own global network."

What Assets Do They Have to Sell?

It is clear that Level 3 wants to sell IRUs and lightwaves. It is well positioned to do both. In our opinion the demand this kind of bulk transport is weak.. It is well positioned for web hosting but faces much competition and for softswitch where it faces little competition, But these areas its options are becoming increasingly limited.

Just seven months ago in a series of three interviews Level 3 management was explaining to the COOK Report that their strength was not only in fiber but in conduits --having laid a dozen and filled only one or two. They now admit their conduits have lost them money. The conduits represent 39% of a 3.2 billion dollar 4th quarter asset write off or a 1.248 billion dollar boondoogle. When McDonald's report came out Level 3 had an extensive Asian network. Two weeks later they essentially gave it away. On page 21 we find that they had incurred 500 million in construction cost and 7 million in revenue. Amputating their Asian operation will save them however $300 million in operating expenses. Having spent 1.7 billion on their European build, revenues derived from Europe had been only 128 million on October 1.

Their ability to sell light waves on a global basis is gone with the loss of their Asian operations. While Jim Crowe states that the need for capacity will continue to grow the key question is how fast. No one knows. We think growth will not be rapid. The question is whether Level 3 can ramp up its transport services, broadly defined as above, enough to generate enough revenue before it runs out of cash.

Tim McDonald thinks it can. He projects a steady ramp up in services revenue fueled by an emergence of global telecom from the current doldrums later this year. He projects Communications GAAP revenue of 1127 millions in 2002, 1818 million in 2003, and 2672 millions in 2004. We disagree. The other data in this issue show a weak telecommunications industry in North America. The telecom bubble has bust in the midst of a global recession where Japan is on the verge of a crisis. We would love for the melt down to end but don't see anything to cause it to do so. Elsewhere in this issue Andrew Odlyzko while not as pessimistic as Roxane Googin finds the outlook for the next two years to be "extraordinarily murky."

On page 5 of his report McDonald looks at the company's use of a liquidity cushion of 3.2 billion and even with an increase in GAAP revenues from 1,335 million in 2002 to 2,861 in 2004 finds a beginning liquidity in 2004 of only 205

Level 3	4Q 2000	1Q 2001	2Q 2001	3Q 2001
Communications Services	173	193	230	233
Dark fiber and submarine	165	155	61	60
Reciprocal comp	15	37	40	26
Information services	31	33	31	31

Changing Revenue mix

	1999	2000	2001	
Transport	20% to 30%	35% to 40%	50%	(IRUs wavelengths)
IP and Co-lo	30% to 40%	30% to 35%	30%	(leased lines & web hosting)
Softswitch	40% to 50%	30% to 35%	20%	(aggregation of isp dial up)

From Bank of New York Capital Markets Page 10 Dcemeber 5 2001

million and a negative figure of 300 million by year end. In a February 16th phone conversation he pointed out to us that the disposal of the Asian business will bring Level 3 300 million a year in cost savings. Furthermore Level 3 has an equity interest in Commonwealth Telephone and RCN cable as well as an interest in a private toll road. The company estimates that this equity has a value in excess of 500 million, the disposal of which can provide an additional liquidity cushion. McDonald's liquidity scenario is based on the continued growth of communication services revenues at levels seen over the past 9 months plus the assumption that levels of churn from lower quality credit customers will wind down to a more normalized level equaling approximately one per cent of revenues per month.

The bottom line is that we have billions riding on a volatile mixture of highly unpredictable outcomes. What we may be looking at for Level 3 is an exaggerated version of what may be in store for the ILECS. Namely a collapse in the ability to sustain revenues bringing on a collapse in the ability to pay off debt which had gown to 8 billion dollars by October 1, 2001. As the result of a buy back auction discussed below, total debt now stands at about 6.3 billion. Fiber was supposed to be like gold in the ground. The source of endless revenue derived by the ability to sell more and more IRUs on fresh dark strands. This has not happened and won't. Continued growth in revenue was necessary to make Level 3 profitable as increasing income finally surpassed the fixed costs necessary to keep it in operation. The question is how much can Level 3 earn in every quarter on into the future. Unless it is highly successful at increasing its revenue, it will find it very difficult to avoid bankruptcy by this time next year. If its revenue declines any further, the end will come sooner than that.

Actual 3rd Quarter Events

Lets look at some news stories since the 3rd quarter 10Q to see how these trends are playing out. We have assumed in our discussion above that the L3 figures are "real". Enron and now Global Crossing have cast doubt on the entire industry. If Level 3 wants investor confidence it would be helpful for it to open its books on all its IRU operations over the past few years. One major irony is that with very strong signals of malfeasance coming from Global Crossing, if GC succeeds in sloughing off its debt, it would be free to cut prices in competing with Level 3 – something that L3 could not afford.

As the 10Q pointed out, over the past few months Level 3 started tying to cope with its predicament by undertaking a debt buy back program offering bond holders first stock and the about 40 cents on the dollar. In December it offloaded its Asian operations that had been said to have a value of a billion dollars but had generated only 14 million in revenue. The disparity in these figures is reminiscent of the revenue generated by Enron's bandwidth trading operation. The details follow and begin to make clear some of the reasons for the revenue decline.

According to a *Rocky Mountain News* story of September 25 Level 3 "cut the maximum target of a recently announced debt buyback plan from $1.8 billion to $1.5 billion." In August "Level 3 swapped about 14 million shares of stock for nearly $170 million of debt." http://www.rockymountainnews.com/drmn/business/article/0,1299,DRMN_4_832611,00.html Finally on October 23, 2001 Level 3 . . . agreed to buy back $1.713 billion in debt for $720.6 million. http://www.phoneplusmag.com/hotnews/1ah23161055.html

In December Level 3s next move was to announce a "sale" of its Asian operations. But strangely the sale involved no cash outlay by the purchaser and no assumption of Level 3 debt.

On December 17 *Australian IT* disclosed: "TELSTRA'S 50 per cent owned Hong Kong wholesale voice and data company, Reach, is set to announce its deal to buy undersea cable company, Level 3 Asia, this week - possibly as early as today. The unusual deal, which will see Level 3 Asia sold to Reach at a loss to provide tax losses for the US company, will be done with no cash outlay by Reach and no assumption of any of Level 3's debt. Reach's main obligation will be to pay out $160 million in capital expenditure to complete Level 3 Asia's cable-laying commitments around Asia."

"Hong Kong sources value Level 3's Asian cable assets and licences at $1 billion, although the company has very little revenue coming in and is operating at a loss. Level 3's filings with the US Securities and Exchange Commission show it had revenues of only $14 million in the nine months to the end of September in Asia and made a loss of some $70 million before interest, depreciation and tax in the region." http://australianit.news.com.au/articles/0,7204,3445772%5e15320%5e%5enbv%5e15306,00.html

A week later according to Internet News "Goldman, Sachs & Co. issued a warning Monday (December 24 http://www.internetnews.com/infra/article/0,,10693_945291,00.html) to its clientele that four (two of which are Enron, McLeodUSA) of the carrier's top 10 customers are unlikely to keep up with contractual obligations as executives from those companies worry about their own financial troubles. [snip] Last quarter, Level 3 was forced to write off $80 million in accounts receivable (almost one-quarter of its expected 2001 communications revenues), and analysts expect that loss to grow in the fourth quarter. [Snip] (**Editor**: the article ended with a very different take on Level 3's sale of Level 3 Asia.) The carrier's decision to sell some of its assets to a rival means the end of Level 3's presence in the ever-growing Asian market but will shore up its bottom line for 2002. The short-term loss (a $500 million write off in the fourth quarter) will save the company $300 million in future funding requirements and the expenses needed to keep operations going in the Far East market." [Editor: we must assume that the author was repeating the story as framed by Level 3. Level 3 effectively

wrote off an asset into which it has poured hundreds of millions. It didn't need the write off to avoid US taxes which because of all its other losses it doesn't owe any. As for shoring up operations for 2002 by getting rid of 300 million in funding requirements we have one conclusion. To the extent that Level 3 has 300 million it has far more pressing things to spend it on specially when you consider that Level 3's Asian operations generated only 14 million in revenue in the first nine months of 2001.

As we "go to press" evidence was beginning to emerge that was had attracted Roxane Googin's attention in June 2001 with Enron's bandwidth IRU swaps with Global Crossing and Qwest had been carried on in Europe as well. Richard Waters and Dan Roberts wrote in the Financial Times: http://globalarchive.ft.com/globalarchive/article.html?id=020213001682

"In Europe, the extent of the swapping is only now becoming apparent as the number of different operators shrinks due to bankruptcy and consolidation. On Tuesday, Carrier1 became the latest in a long line of so-called alternative carriers to seek bankruptcy protection in Europe. Carrier1 was forced to abandon debt restructuring plans when many of the networks providing it with capacity lost confidence in its ability to pay. Mike McTighe, Carrier1's chief executive, says a big factor behind this collapse in confidence was concern about how telecoms companies account for revenues."

"The extent to which telecoms companies have been relying on each other for business was also highlighted on Tuesday by KPNQwest, which is usually regarded as one of the stronger European operators. Jack McMaster, chief executive, revealed that 15 per cent of its revenue was from selling capacity to telecom networks that also supplied it with capacity. Mr McMaster insists all such deals were struck at fair market prices, but KPNQwest's ability to book the revenue from such long-term swaps immediately has led analysts to question how long it can continue to show growth when so many "customers" are going into bankruptcy." [Editor: during the week of February 11th, we have learned that a large number of lay offs occurred at KPN Qwest on February 1. Suddenly and with no prior warning.]

Level 3 Vice President of Investor Relations Explains IRU and Revenue Issues in Interview With *COOK Report*

Editor's Note: Robin Grey is Vice president for Investor Relations at Level 3. We interviewed her on February 19, 2002. **Highlights, or Exec. Sum**

COOK Report: I have sent you a long list of questions about your practices in selling IRUs and accounting for those sales. Can you please respond?

Grey: In what you had written you indicated a concern that we may face revenue trouble because we were selling fewer IRUs. Strategically how important is it that we sell IRUs? It is not important to us strategically. We sell what the customer wants. I want to emphasize that we are not building a business that is reliant on the one time IRU sales, this is a recurring revenue business.

Let's talk about IRU's specifically. If a company sold a dark fiber IRU prior to June of 1999 it was required to account for those revenues up front, as the dark fiber was delivered. Pre-July 1, 1999, cash revenue equaled GAAP revenue. Post July 1,1999, FASB Interpretation No. 43 the income for GAAP is recognized over time.

" The vast majority of the dark fiber deals that we have done – more than 90% - are for the term of 20 years. So you could take the total amount of dark fiber that we have sold, divide by 20 years to estimate what is being amortized per year.

Let me give you those numbers. Pre-June 1999 we sold about $500 million of dark fiber. During 2000 and 2001, the company delivered that dark fiber and consequently has already recognized that revenue. There is All pre-6/99 dark fiber sales have been recognized.

When we sell dark fiber, we also sell co-location, power (electricity) as well as operations and maintenance services. From July 1, 1999 through December 31, 2000 we have sold approximately 3 billion of dark fiber and related services. The market for intercity dark fiber, as expected, contracted significantly in 2001. Nevertheless, for that preceding 18 months we sold 3 billion in dark fiber IRUs and the related services such as collocation, power and operating and maintenance fees. Approximately 50% of the total amount sold is for the dark fiber itself, and the other 50% is for related services. While the fiber is paid for upfront, the related services are paid for on a recurring basis.

COOK Report: But the difference between your cash and GAAPpeaked in the first half of 2001 at an amount of 1.3 billion.

Grey: Keep in mind that the difference between cash and GAAP revenue is the net cash change in deferred revenue so this increases with new sales and decreases as IRUs are amortized and recognized in revenue. . But you are right, the sale of intercity dark fiber peaked at the end of 2000 and beginning of 2001.

COOK Report: That then is the reason for booking 1.3 billion in the first half of 2001?

Grey: The majority of our historical IRU sales were dark fiber sales. Beginning in 2001, IRUs are both dark fiber and lit services. We view dark fiber IRUs in an opportunistic way. They were a great way to in effect reduce the cost of our network, but it was never strategic to the company.

Of the 3 billion, about 50% 'other services'. These are services for which we get cash and book, just like a lease. You will see that 'other services' revenue in our colo/IP and transport revenue buckets, billed on a monthly basis. There is no difference between cash and GAAPrevenue for the 1.5 billion other services like colo and transport. Generally, we sell dark fiber via an IRU rather than on a leased basis.

COOK Report: Do you agree with the following definition of the difference between lease and IRU? An IRU paid for up front in full. Lease paid for in installments usually quarterly. With IRU title to the fiber is transferred to the purchaser. With a lease title remains with the seller.

Grey: Yes, except Level 3 does not generally transfer title. ., but I believe there are some companies that do transfer title with IRU sales.

COOK Report: Doesn't not transferring title enable you to account for the cash up-front?

Grey: No. We do not account for the cash up front. We receive the cash up front but account for it over the contract term per GAAP.

COOK Report: Presumably you make it clear in your contract that as long as they pay the monthly service fees., they have the fiber and no one can take it away from them?

Grey: Absolutely. For an IRU, there is a contract whereby the purchases of the IRU on the fiber has the indefeasible right to use the fiber as long as they are not in default under the terms of our agreement.

But back to the issue of deferred revenue. If you take the $1.5 billion and divide by 20 and that gives you $75 million a year that you could guesstimate that would be amortized off and recognized as revenue every year under GAAP. So, based on this math, you could assume that about $18 million of recognized revenue per quarter comes from the amortization of dark fiber IRUs.

We have 3 "buckets" of revenue. The first is transport.. Transport includes the amortization of dark fiber IRUs,; wavelength services, and intericty, local and international private lines, . For example,

recently announced contracts for these types of services include AOL, Cox Communications, AT&T Wireless and Triumph Communications.

The second bucket is softswitch services (voice termination and managed modem). These are sold on a recurring monthly revenue basis.

Now lets talk about the other $1.5 billion noted as 'other services' that we sell in conjunction with dark fiber. They are collocation, which is in our IP/colo bucket and operations and maintenance and power, which is in our Transport bucket. The three buckets are: 1) transport services (private line, waves, dark fiber) 2) softswitch (managed modem and voice termination; 3) IP/colo (IP transit and colocation) So this billion and a half for other service will be split between colo / IP/ and transport and you can assume that cash equals GAAP revenue for these services. Now when you look at dark fiber, there is both long haul and metro. The Metro market for dark fiber is still fairly active, compared to long haul where we have seen demand taper off during the past year. In the metro dark fiber market, MFN (Metromedia Fiber) is the only other important provider of services.

Wave IRUs

When we sell IRUs for lit services the term of the contract is normally anywhere from two to five years.

COOK Report: Are you aware of any that have exceeded five years?

Grey: Not that I am aware of. It really is a matter of economics and the useful life of the underlying asset.. We also sell waves on a leased Basis. At least a majority of wavelengths that we have sold are on an IRU basis, again, as it makes economic sense for the customer.

COOK Report; But if I want bandwidth for five years and want it as an IRU that means I will have to pay for all five years up front I will get it at good savings compared to what it would cost on a leased basis.

Grey: Yes, that is true. There is a crossover point, where, if a customer knows they will need a certain amount of capacity for a period of time, it is beneficial to enter into an IRU. Customers buying waves normally do so as a building block to their existing network, in order to provision additional capacity as their demand warrants, on a circuit by circuit basis. . I need it in ten days, unlike 2 years ago when they were trying to project forward by six months and they were entering into relatively large wavelength deals, today it is more just in time provisioning. We are trying too make the provisioning process a frictionless environment so customers can come to Level 3, order capacity, and have that capacity installed more quickly that they have been able to provision before. Transport services provisioned by our ONTAP service may be acquired as an IRU or as a lease. But generally customers choose an IRU because there is a crossover point where if they know they will need the capacity for more than 2.5 years, they are better off entering into a five year IRU than they are in leasing.

COOK Report: Which means that in a five-year IRU they must get the bandwidth for about half of what they would have to pay for it via a lease.

Grey: Yes. There is a discount as Level 3 clearly receives the cash up front, but we can also pass along operational savings to the customer. . Since Level 3 gets the cash up front so generally pass along the billing savings that we get by not having to send out monthly bills. We absolutely want to make it in the customer's best interests to commit to our network for a period of years. Having said that, we provide excellent customer service, which is the appropriate way to to keep a customer happy with their capacity choice.

COOK Report: I understand that anything at OC48 and above that is lambda speed must be 'tuned' by the provider to make sure that the bandwidth contracted for is indeed delivered.

Grey: With a wavelength, the customer puts on their own protection equipment. For a wavelength is unprotected, point to point capacity.

So this completes a summary of IRUs. Now where some confusion comes in I believe is that some companies who sell IRUs have made the choice to 1. transfer title and 2 to structure the deal in a manner that allows their accountants to let them recognize the revenue up front. You will find some communications companies that do that. Level 3 does not.

Increase in Revenues

You raise the question of whether we can gain enough revenue to become fully funded before we run out of cash. Now we took a series of steps last year to decrease our cost of operations. We reduced our guidance and laid off approx. 40% of our workforce. We think we did this ahead of the curve. By this I mean that based on the demand that we were seeing from our customers, we cut our expense prior to when we actually needed to in order to remain fully funded.

COOK Report: And to put it crudely you amputated Asia.

Grey: We had to prioritize. This last year has been about survival. We intend to be among the last companies standing. We cut in aggregate a total of $5 billion of expenses including capital expenditure from last year through the time when we go free cash flow positive. We did so painfully by exiting Asia, by laying off workforce, by going back to our vendors to revisit pricing, and by maximizing the use of our existing inventory through new processes.. We did this at a point in time when our competitors were stating this "must be a Level 3 specific" problem, and that our business model was flawed. Then later in 2001, we saw some of our competitors turn around and admit that demand was actually slowing. In turn, they almost unanimously reduced and/or missed guidance. Level 3 met or exceeded its revised guidance for Q301 and Q401.

Level 3 looked forward to see the trends of revenue growth over the next couple of quarters. But this is just recapping history. We reduced our debt by $2 billion

dollars . We have as of the end of the fourth quarter $2.1 billion of available cash and liquidity, plus we have about $500 million in potential non-core asset sales , some of which you may see us monetize over the next 12-18 months. Including these potential asset sales, this would give Level 3$2.6 billion in liquidity.

It is relevant to compare this to Level 3's current cash burn. You have the figures in the table we have sent you. **[Editor** which appears on page 50 below.]

When you estimated our cash burn rate you were mixing cash and GAAP. To be meaningful you need to stick to cash. The proxy for cash generated by the business is adjusted EBITDA. That is to say cash generated from the business during the first quarter 2002 is positive $90 million. Now this figure consists of $10 million in cash plus the cash change in deferred revenues of 80 million. Our balance sheet has two deferred revenue items., Short term deferred revenues and long term deferred revenues. All you do is quarter over quarter take the change in those two line items, and subtract the non-cash portion. That will give you a figure that is the total change in cash deferred.

COOK Report: Deferred comes up because of GAAP as opposed to cash?

Grey: Yes. Every time we sell an IRU, , the amount not recognized goes into deferred revenue. The only other source of cash we have coming in during Q202 is approx. $10 million from interest income that is added to the $ $90 million. So there you have a positive $100 million of cash sources in Q202. If the change in deferred is increasing it is it means that new sales are higher than to the amortization from existing, primarily dark fiber and wavelength sales. If the total deferred revenue is increasing on a quarter by quarter basis, it means that we are increasing our cash revenues as all.

In the first quarter there will be approx. $110 MM of interest expense Capital expenditures of $110 million. When you add all this, we have a negative $120 million cash burn rate, excluding working capital. we also intend to pay down our accounts payable by about $100 million. So that takes the 120 to 220. So even if you were to assume that our revenue picture does not improve, if you divide that negative cash burn by $2.1 billion in liquidity, you can see we are funded through free cash flow breakeven.

COOK Report. The figures you have given me include the cost of operating the business?

Grey: Yes. It is part of the $90 million in Adj. EBITDA. So if you estimate cash burn at $170 million , simply based on our first quarter 2002 guidance plus working capital, we have at least 17 quarters before we have used our existing liquidity. Since we did the buy back of debt and made the cuts in our expense almost every analyst out there shows us as fully funded.

We are also projecting that the $10 million in positive EBITDAwill grow quarter over quarter. Revenue is increasing and SG&A (operating expense) is decreasing. We also have the best gross margins in the business. Our 4th quarter gross margins were 63%. This is total revenues minus the cost of goods sold. Our gross margins will improve in both the first quarter and in the second quarter of 2002. We exited 2001 with a gross margin of over 70%. But if you really want to compare apples-to-apples you have to get down to EBITDA which is total revenues, minus cost of goods sold minus SG&A. That number for us is positive for the first time ever for the first quarter of 02.

Now our revenues are growing. When you look at transport, Softswitch and IP/colo growing revenues in some cases have been over shadowed by disconnects. People were complaining that our recurring services revenues were flat and we were therefore not selling anything. The problem is that what we were selling was largely being offset by disconnects. Our sale of network services are and have been running at about four million a month. Our disconnects have decreased to about 2.5 million a month so we are revenue positive here to the point of 1.5 million a month. Stepped out month by month this will give us a net increase in recurring services of nine million in the first quarter of 2001. The reason you see a significant drop from the fourth quarter revenue to first quarter 2002 projections is that fourth quarter included a substantial amount from prior dark fiber IRUs. Those revenues now have run their course.

With 4th quarter revenues of 269 million. If we back out the dark fiber from pre June 1999 that is 12 million. Subtracting it leaves 257. What we also back out is reciprocal compensation which was 31 million for the fourth quarter. That leaves you with 226 million in recurring services for the fourth quarter. If you take 226 and add 9 that gets you to the 35 million that we have issued guidance for the first quarter. The 226 we believe is going to grow by nine million quarter by quarter. It explains what you see for the first quarter 2002 guidance. This how you can reconcile where we were versus where we are going.

Prior to July 19 2001 the company accounted entirely for trans oceanic IRUs up front just like the old dark fiber. Here the SEC logic is you cannot replace undersea as easily as you can terrestrial.. Now in order for such up front accounting to continue - or in other words if you wanted to account for that revenue up front, you have to meet a whole series of criteria including passing title on to the purchaser. We do not give title to the purchaser therefore we do not account for transoceanic IRUs up front.

COOK Report: Does the information that you have given me on your fiber and wave IRUs exist in your written reports?

Grey: Some of it but not all of it. In all our press releases we have always said that dark fiber was sold at 20 year IRUs. Unfortunately for the rest of this you would probably have to look at every single press release and conference call to piece together what I have told you. Sometimes when a customer buys an IRU they will let us put out a press release on the sale but on other occasions other customers demand anonymity. Keep in mind that there are sell side analysts who spend their entire day scrutinizing our press releases. To come up with a revenue model isn't that easy as you have seen. People dedicate their lives to figuring this out.

"Level 3 Communications, Inc. - Communications Revenue 2001 and 1st Quarter 2002 Guidance"

	Total 2001(1)	4Q01(1)	3Q01	2Q01	1Q01
Transport	$441	$124	$114	$114	$89
Softswitch	$211	$54	$56	$55	$46
IP/Colo	$237	$55	$63	$61	$58
Total Recurring Service Revenue	**$889**	**$233**	**$233**	**$230**	**$193**
Recip Comp	$134	$31	$26	$40	$37
Subtotal	**$1,023**	**$264**	**$259**	**$270**	**$230**
Non-Recurring Dark Fiber	$288	$12	$60	$61	$155
Total Communications Revenue	**"$1,311"**	**$276**	**$319**	**$331**	**$385**

(1) Includes Asia

1Q02		Notes
Recurring Service Revenue	**$235**	Guidance provided on 4Q01 Conference Call
Reciprocal Compensation	**$35**	Guidance provided on 4Q01 Conference Call
Communications GAAP Revenue	**$270**	Guidance provided on 4Q01 Conference Call
Other Revenue	**$56**	Based on Q401
Total Revenue	**$326**	
Cost of Goods Sold	**TBD**	Assumptions made by subtracting Communication Gross Margin from Communications GAAPRevenue
Gross Margin	**TBD**	Assumptions made by adding EBITDA and SG&A
Gross Margin %	**TBD**	
SGA	**TBD**	Assumption of decling SG&Aper CFO's comments during 4Q01 Conference Call
EBITDA	**$10**	Guidance provided on 4Q01 Conference Call

Cash Items

Cash Interest Expense	**($110)**	Q401 cash interest expense pro-forma for tender savings
Cash Interest Income	**$10**	Cash and Cash Equivalents as of 12/31/01 at an average interest rate of 3.0%
Capex	**($110)**	Guidance provided on 4Q01 Conference Call
Communications GAAP Revenue	**$270**	
Cash change in deferred revenue	**$80**	Difference between Comm Cash and GAAPRevenue and the difference between Adj EBITDAand EBITDA
Communications Cash Revenue	**$350**	Guidance provided on 4Q01 Conference Call [GAAPplus change in deferred]
EBITDA	**$10**	
Cash change in deferred revenue	**$80**	Difference between Comm Cash and GAAPRevenue and the difference between Adj EBITDAand EBITDA
Adjusted EBITDA	**$90**	Guidance provided on 4Q01 Conference Call (EBITDAplus change in deferred]

Net Cash Outlay excluding working capital	**($120)**	Adj. EBITDAplus Interest income minus Interest Income minus Capex
Net Cash Outlay including working capital	**($220)**	Adj. EBITDAplus Interest income minus Interest Income minus Capex minus expected changes in working capital

"Blue Text: Formal guidance provided by Level 3 Communications, Inc. regarding 1Q02"
"Green Text: Assumptions made based on public information provided by Level 3 Communications, Inc."

Roxane Googin's Predictions and the Telecom World

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Revised version, February 20, 2002.

Highlights, or **Exec. Sum**

1. Introduction

The telecom crash that started in the year 2000 has been brutal to the traditional long distance carriers and devastating to the new carriers, whether in local or long distance segments of the market. The companies that have emerged almost unscathed are the established local carriers, the ILECs, which still have an effective monopoly on "first mile" connectivity. To many, they appear as the undisputed winners of the recent turmoil.

Roxane Googin's interview with Gordon Cook (and her earlier, shorter one with David Isenberg) serves as a useful antidote to any temptation towards complacency on the part of ILEC managers or ILEC investors. She warns that ILECs might collapse, as their expensive infrastructure fails to hold its own in competition with new carriers deploying modern technology.

Roxane Googin is surely right that ILECs are not immune to the pressure for change that new technologies are creating. Telecom business models will have to change, and the eventual winners may include none of the ILECs. Still, the ILEC situation does not appear dire, at least not yet, and there is time for corrective action. The main reason is that the drastic technology changes that some hope for, and others fear, will not occur on "Internet time." In particular, the local ILEC monopoly will take time and huge efforts to erode. The spectacular collapses of carriers such as Iridium, Winstar, Teligent, 360Networks, and Global Crossing were the result of the irrational overinvestment during the Internet bubble in companies that did not have solid business plans. In particular, they did not have a stable customer base, and were in markets with low barriers to entry. Neither of these applies to ILECs.

What follows are some brief comments and speculations on how the telecom industry might evolve. Historical analogies are drawn, especially with the evolution of the computer industry. They do suggest that telecommunications will also be moving towards a horizontal structure. The greatest opportunities for established carriers are likely to be in providing network outsourcing services. The changes required to exploit these opportunities will be major, and it is very likely that there will be huge bankruptcies and writedowns. However, the telecom industry, as measured by revenues, is likely to grow, as it has in the past. There will be greater diversity in available communication services, which should provide for a more resilient infrastructure, even when individual companies restructure.

2. Growth and rates of change

Telecommunications is a growth industry, and has been for centuries, as can be seen in the statistics in the manuscript "The history of communications and its implications for the Internet," <http://www.dtc.umn.edu/~odlyzko/doc/history.communications0.pdf>. The telecom crash was a crash only for the telecom suppliers, the result of an unsustainable explosion in capital expenditures. (That explosion, in turn, was stimulated primarily by the competition unleashed by the Telecommunications Reform Act of 1996 and by unrealistic views of how fast Internet traffic was growing and how quickly new technologies would be adopted, with an extra boost from Y2K spending thrown in.) Total revenues of service providers have been growing all along at rates of 5 to 10% a year for the whole sector, with some companies going out of business, while others boom. That rate of growth is very respectable, and, following historical precedent, faster than the growth rate of the economy as a whole. The crash occurred because even this fast growth rate was simply not sufficient to sustain the boom in capital expenditures.

The growth of the entire telecom pie allows for relatively gentle transformations. In particular, new services can grow without destroying old ones. That has been the historical pattern, and can be seen today. Let us consider some data for the United Kingdom. I am using this example because, unlike in the US, the UK regulator, Oftel, requires carriers to provide detailed statistics on usage of their networks. Here is some data extracted from the reports available at <http://www.oftel.gov.uk/publications/market_info/index.htm>. The quarters listed are calendar quarters (not British government fiscal quarters used in the reports), and the columns are as in the table at the top of the next page.

Basically wireline voice usage has been pretty stable, while Internet access, cell phone usage, and SMS have all been booming. Note in particular that Internet access minutes have gone from 28% of voice minutes in 1999q2 to 94% just two years later. Thus the total wireline usage has increased by 52%. I do expect (and will discuss in more detail later) that voice usage will largely migrate to wireless links. However, by that time Internet access is likely to grow further, so this may not be devastating to wireline telephony.

A basic principle to keep in mind is that new technologies take time to diffuse. As one example, consider the statistics for the number of cell phones in the US (year-end figures, with those for 2001 estimates):

Public Switched Network Usage in United Kingdom

A = millions of minutes of outgoing calls from fixed phones
B = millions of minutes of outgoing voice calls from fixed phones
(i.e., A excluding Internet access)
C = millions of minutes of outgoing cell phone calls
D = millions of SMS messages

	A	B	C	D
1999q2	47220	36979	4956	159
1999q3	50608	37590	5804	297
1999q4	53786	38869	7092	599
2000q1	56728	38806	7848	1306
2000q2	58339	37783	8388	1421
2000q3	62783	38237	9340	1648
2000q4	68289	38536	10525	2215
2001q1	73525	39349	11064	2758
2001q2	71940	37166	10874	2762
2001q3	?	?	11222	3069

(Note: Column B figures are derived from those in Column A by subtracting the volume of "Other" calls, as Oftel calls them. Hence Column B suffers from underestimates because it ignores the voice calls to directory assistance and other categories that are counted in "Other." Column B also suffers from overestimates because probably between 10% and 20% of voice call volume is for fax transmission. Thus the numbers in Column B are only approximations, but the trend they show is probably correct. A final remark is that, based on prior experience, all the figures for 2001q2, which show drops in usage, are likely to be revised upwards.)

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Year	Millions of subscribers
1986	**0.7**
1991	**7.6**
1996	**42.8**
2001	**115**

So here we have something that many people consider indispensable (and for which they are paying, in aggregate, at least twice as much as they are paying for the Internet, in other words, voting with their pocketbooks for mobility over broadband), yet it took over 15 years to reach this stage.

There is much public concern about the slow spread of broadband in the US. Yet, with the number of households with DSL or cable modems about tripling in 2001, that rate is quite fast, certainly by comparison with the spread of cell phones. Some countries (especially South Korea) have experienced much faster broadband penetration (with over half the households in South Korea having cable modems or DSL by the end of 2001), but then their prices have been much lower. For a service that costs $40-50 a month (comparable to the average cell phone bill), the US is not doing too badly in speed of broadband adoption. Lower price would certainly increase US penetration, but this price sensitivity just reinforces the point that the perceived utility of broadband is not all that great, at least not yet. At a low enough price, people will buy just to get a modestly improved performance with email. At the higher price that prevails in the US, consumers have to be convinced that the higher bandwidth and the always-on capability provide real value, and that takes time.

In a 1997 paper entitled "The slow evolution of electronic publishing," <http://www.dtc.umn.edu/~odlyzko/doc/slow.evolution.txt>, I argued that this speed of diffusion is rather typical, that "Internet time" is a myth, and that new technologies still take on the order of a decade to be widely adopted, just as the "grandfather of the Internet," J. C. R. Licklider, had observed. (Ashorter piece on this theme, "The myth of Internet time," <http://www.dtc.umn.edu/~odlyzko/doc/internet.time.myth.txt>, was published in 2001.) That thesis is overwhelmingly supported by available data, as well as by numerous projections for the near future.

For example, the January 2002 Forrester report, "Sizing US consumer telecom," by Charles Golvin with D. M. Cooperstein, G. J. Scaffidi, J. Schaeffer, and A. van Giffen, predicts that by 2006, 20 million circuit lines in the US will be dropped as a result of usage of wireless, broadband, and packet technologies. Yet, because of natural growth, this means that there will still be 116.1 million residential lines in 2006, as opposed to 126.4 million in 2001. While the actual numbers are bound to be different, the magnitude of the shift seems about right. A drop of 8% of the lines in 5 years is not negligible, but not catastrophic. Of course, in a low marginal cost business such as telecommunications, even a drop of 8% is noticeable, and would surely be reflected in stock market valuation of the companies. (It would also likely be followed by much faster deterioration, as a snowball effect

takes hold.) The main issue is whether some compensating sources of revenues can be developed in the meantime.

New technologies, such as wavelength switching, are on the horizon, and will surely transform the industry. However, that will take time. Right now, only a few of the largest ISPs can utilize wavelengths productively. Even very large and sophisticated enterprises, such as universities, typically have at most DS3 (45 Mb/s) or OC3 (155 Mb/s) links to the commercial Internet. Allowing them to direct OC48 to specific destinations is of little use now. Eventually their demands will grow, but not right away. At the moment, though, lambdas are relevant primarily at the carrier level, where they do indeed argue (and have contributed already) to the drastic restructuring in long distance transport.

Roxane Googin is right to point out that debts can bring a carrier down. Leverage is great on the way up, but deadly when a business is contracting. However, we should keep in mind that the ILEC debt burden is not overwhelming. Global Crossing had debts of more than twice their annual revenues. AT&T until recently had debts about equal to its annual revenues. Qwest, a hybrid of a new long distance carrier and an ILEC, has long-term debt about equal to its annual revenues. On the other hand, SBC, to take just one ILEC example, has long-term debts of under 40% of annual revenues. Furthermore, ILEC revenues are largely shielded from the fierce competition that prevails in the long distance segment of the industry. That provides more security and freedom of action. Whether the ILECs will use this well is another question, of course.

3. The Mysterious Economics of Telecoms

The telecommunications industry is extremely complex. What is beyond dispute, though, is that most of the costs are at the edges of the network. Furthermore, technology over the last two decades has been shifting the balance of costs even further towards the edges than before. The main reason the established long distance carriers have been suffering is that their consumer voice business is not viable. When the Bell System was broken up, long distance transport was still expensive. However, for several years now wholesale prices for long distance voice calls in the US have been under a penny a minute (reflecting lower costs). Those costs and a competitive marketplace are not compatible in the long run with consumer prices that are 10 times as high. It was inevitable that for ordinary customers, long distance was eventually going to be provided by their local carriers on a flat rate basis.

The decline in long distance transport costs that doomed consumer long distance voice carriers predated the Internet. However, the Internet helped speed up the transformation we are witnessing by leading to the wild overbuilding of long distance transport and by accelerating technical advances. The costs on the Internet are even more heavily concentrated at the edges, especially if one considers the Internet as just a component of the entire IT infrastructure. (See the papers "The economics of the Internet: Utility, utilization, pricing, and Quality of Service," <http://www.dtc.umn.edu/~odlyzko/doc/internet.economics.pdf> and "Smart and stupid networks: Why the Internet is like Microsoft," <http://www.dtc.umn.edu/~odlyzko/doc/stupid.networks.pdf>.)

The costs on the edges, in contrast to those in long haul, have been decreasing slowly. The electronics (and optics) have been getting less expensive, but the labor has not, and in particular the costs of the final few hundred feet of a connection to the network have been remarkably stable and remarkably high.

Is the "first mile" a natural monopoly? That is what the failure of the CLECs has led many observers to conclude. Yet there are some contrary indicators. After all, most households do have three separate communication systems, the copper-based one from their ILEC, a coax-based one from their cable TV provider, and a cell phone from a wireless carrier. Thus a much deeper look is needed to understand what is going on, far beyond the scope of this note. A key factor, though, is that change is slow but inevitable. Hence a static analysis of technology choices, without taking account how quickly consumer are likely to move, is bound to be inadequate. In particular, whether DSL or cable is better technically is not overwhelmingly important. Both are capable of speeds in the hundreds of megabits per second in both directions over short distances. Further, the relevant distances will be getting smaller as fiber is pulled closer and closer to the home by both cable and DSL carriers. **Eventually fiber will go all the way into the home. Whoever manages to accomplish this, will then likely have a true natural monopoly, with the ability to increase the bandwidth of the connection at low cost**. [Editor's emphasis.] Victory in this race to bring fiber to the home will likely depend mostly on the strategies and tactics of the competing players, and not so much on technology.

The arcane economics of local connectivity can be seen also by considering capital costs and stock market valuations. The cell phone industry has been making capital expenditures of around $1,000 per subscriber, while copper or coax connections (with the associated central office and related facilities) to add additional subscribers run about twice as high. In the financial markets, wireless carriers are valued at about $2,000 per subscriber (adding up stock valuations to debt). ILECs are valued at $2,000 to $3,000 per line, while cable TVnetworks are valued at $4,000 to $5,000 per subscriber.

These valuations, much higher than the cost of replacing the assets of these businesses, all may very well be too high, as Roxane Googin warns. What these valuations do is reflect the inertia in the system, the difficulty of building a competing carrier and attracting customers without destroying the economic basis of the business. (This applies also to general valuations of US businesses, for which the Tobin Q ratio has been above 1 for several years, although it is not as high as it is in telecoms.) Investors may be overestimating this inertia, and the ability of

managers to exploit it profitably, but so far their faith has been justified.

While change has been slow, it is likely to accelerate. The huge glut of fiber in long haul means that long distance transport is becoming easily available at a small cost. This means that one can build viable local carriers. We see increases in the ranks of companies that have been growing slowly, without becoming seduced by the myth of "Internet time" into huge upfront investments that a national footprint requires. Further, there is fast growth in availability of fiber in the metro. It often still takes a year to install a fiber to a commercial building, but it is being done. Also, data transport revenues are growing much faster than those for voice, as they have done for decades, but they are still far smaller, and will take some time to catch up.

4. Competition in local access

In 1996, the US passed the Telecommunications Reform Act that was expected to create vigorous competition in all segments of communications. Six years later, after the telecom boom and bust, the entrenched ILECs appear to be even more securely entrenched, apparently the sole winners to emerge from all the turmoil. The reformers are beginning to concede that the "first mile" is a natural monopoly, and are being driven to consider remedies such as separating the ILECs into monopoly wholesale providers of basic network connectivity and retail service providers that alternative carriers might have a hope of competing with. However, given the long lead times that US legislative and judicial systems operate on, especially where drastic changes are involved, there is very little hope of any such transformation being forced through in less than 5 years, and potentially it could take much longer.

Even without any ILEC separation, though, we are likely to see several serious challenges to the ILEC monopoly emerge in the next half a dozen years. The main challenge is likely to come from diversion of voice traffic to cell phones. As is shown in the UK statistics cited above, wireless phone usage is under a quarter of wired phone usage. (Similar estimates apply in the US, although the data there is not as complete.)

Already a substantial fraction of the population regards cell phones as their primary communication tool, and that fraction is likely to increase. My view is that this increase will become striking as soon as the wireless industry increases the available bandwidth (through deployment of 2.5G and 3G technologies) and gives up its preoccupation with the "mobile Internet," and concentrates on increasing voice usage. (This view is expounded in detail in the paper "Content is not king," published in February 2001 in First Monday, and available at <http://www.dtc.umn.edu/~odlyzko/doc/history.communications2.pdf>, and in a shorter note in *Forbes* in August 2001, entitled "Talk, Talk, Talk: So who needs streaming video on a phone?," available at <http://www.dtc.umn.edu/~odlyzko/doc/3g.accidental.success.txt>.) Policy makers who are interested in promoting competition could help this move along by forcing those ILECs that have not yet done so to completely sever their ties with cellular carriers. This would be a much simpler move, both technically and politically, than the separation of wireline industry that is widely discussed.

Competition from cellular carriers for voice is likely to force ILECs to concentrate on exploiting their natural advantage in bandwidth, and to emphasize Internet access. (Note again the UK statistics, where Internet access traffic on the voice network is fast approaching that of voice itself, especially since the latter figure includes some modem and fax traffic.) This will likely also force them to emphasize broadband, as a way to segment the market, and to create a natural progression path for their customers, towards higher and higher bandwidth.

ILECs will also be forced to emphasize broadband by competition from cable TV companies. So far the cable and phone industries have been coexisting amicably without serious competition. However, that is likely to change. Cable is likely to be the aggressor. The reason is that connectivity is much more important than content (see "Content is not king" for supporting data and arguments), and there is much more money in it. Thus cable has much more to gain. Furthermore, the prices that are being paid for cable networks can only be justified on the assumption that a large bundle of services will be sold to customers. (You can't recover a $4,500 price per subscriber if you only get $45 per month for entertainment, and a third of that has to be spent to buy the content you have to provide.) Thus we are likely to see vigorous competition developing, which will be bringing fiber closer and closer to the home, and eventually into the home.

A third important force threatening the ILECs is fixed and nomadic wireless access. As we have seen with the spread of cordless phones, the combination of low cost with mobility and simplicity is irresistible. For broadband communication, wireless distribution inside the house is especially attractive, given the costs of alternatives. Depending on how issues of scaling and business models are resolved, this approach could extend to a much wider communication network.

So far wireless data communication has been a great disappointment, and 802.11 standards are the first ones that appear to be gaining wide acceptance. As wireless data spreads, and especially as voice transport capability is provided (which is essential, since that is where the money is, and will continue to be for quite a while), we might see it offering serious competition to DSL and cable modem systems. What is especially attractive about wireless communication is that, at least potentially, it scales with the size of the population that is served, and so avoids the huge upfront costs of wireline infrastructure.

In summary, ILEC will be exposed to competition in the residential segment from three sources, cellular, cable, and fixed and nomadic wireless, and in business from those three as well as wireline CLECs. Thus Roxane Googin's warnings should not be taken lightly.

5. Computer and telecom industry evolution

The traditional model for the telecom industry has been that of a carrier that provides all the equipment and systems and sells a service. This model has been fading for a long time, with customers buying their own phone sets, fax machines, and PBXs. We are likely to see a continued shift towards customers owning more and more of the facilities, including fiber (or wavelengths). However, that is not the full story. With ownership comes complexity (see the paper "Smart and stupid networks ..." referenced above), which will likely lead to a different type of service-oriented industry. A comparison with the computer industry is likely to be productive, especially since communication, information, and computation are becoming increasingly interrelated.

The general trend in the modern economy has been away from vertical integration and towards horizontal integration. This trend is consistent with what one would expect in view of Coase's theory of the firm, as improved communication makes it possible to use market mechanisms between different layers, and at the same time makes coordination easier. Among the main advantages of a division into horizontal layers, with separate companies operating in each layer, is that it provides a method handling complexity and rapid change. It is worth noting that such separation was already visible inside the vertically integrated enterprises. For example, in telecommunications, the wireline carriers have for quite a long time had essentially separate divisions handling the optical network and the voice and data networks that rode on top of it and were the only ones visible to most customers.

The computer industry is a prime example of the trend away from vertically integrated enterprises. A standard example of such an enterprise was IBM in the 1960s through much of the 1980s. It developed and produced its own processors, memories, hard disks, operating systems, application software, and so on. The current paradigm is that of horizontal players, in which Micron produces memory chips, Intel microprocessors, Microsoft the operating system and basic applications, Dell assembles the components and sells them, etc. The most successful player in this game is Microsoft. In the computer industry, everybody wants to be Microsoft, but there is only one Microsoft, and there cannot be too many Microsofts. (There simply aren't enough sufficiently large niches in the economy that can be dominated in a similar way and which can yield comparable profits.

Perhaps the most ludicrous aspect of the Internet bubble was that hundreds of the startups were all expected to attain profits on the scale of Microsoft's.) Microsoft has annual revenues approaching $30 billion, after-tax profits approaching $12 billion, $38 billion in cash, and a stock market valuation (as of Feb. 8, 2002) of $330 billion. It has attained this enviable financial position by dominating the desktop software market, and appropriating the lion's share of the profits in PC software. It has been careful to largely stay within a single horizontal layer of the industry, and by being a modest part of it, so that it benefits from the contributions of many other (much less profitable) players.

One pertinent comment is that Microsoft's dominance of the computer industry was not a foregone conclusion. It was predictable (and predicted by many clear thinkers) that PCs were going to dominate. However, it does not seem inevitable that control of the most popular operating system was bound to lead to control of the industry. Some people projected that applications were going to be the dominant layer, and it is possible that Lotus might have been able to build up its 1-2-3 spreadsheet into a suite of products that might have controlled the industry. (If this seems improbable, recall the huge effort Microsoft put into squashing Netscape. Clearly Microsoft viewed the upstart as a serious threat, potentially able to supplant Miscrosoft's dominant platform of the Windows operating system with another one, based on the browser, even at that late stage.) The conclusion from this discussion is that discerning broad technology trends does not necessarily enable one to determine who the winners will be. Much depends on individuals and strategies.

In communications, the trend towards a horizontal structure of the industry also appears inevitable. Who will adopt to it best is uncertain. The natural division would seem to be into providers of physical connectivity, providers of basic data transport, and outsourcers, who manage customer networks. [Editor's emphasis.]The established long distance carriers, with their expertise in serving large enterprise customers, would seem to be best positioned to dominate in basic data transport and outsourcing. On the negative side, they have heavy debt loads and also the (rapidly shrinking) legacy of the consumer long distance business as a burden. The ILECs have the financial resources to attempt moving into outsourcing, but lack the expertise, and would require a wrenching cultural change to adapt. Their natural niche seems to be in providing physical access and basic data transport, although even there, one could have separation into several layers. (The separation that reformers would like to force on the ILECs for the sake of creating competition may be sound business strategy.)

Can anyone duplicate Microsoft's feat and occupy a dominant position? The lofty valuations accorded to many startups during the bubble (both in communications and other areas) seemed to be based on blind and irrational faith that they would all become like Microsoft. That was absurd. There aren't enough opportunities like that seized by Microsoft, and today, when everybody is aware of what such dominance means, there are many fewer opportunities to repeat Microsoft maneuvers. In particular, in communications, there does not seem to be much hope of duplicating Microsoft's feat. Cisco comes closest, but even its position seems to be fragile, in that the network effects in routers are not as strong as in PC software. Juniper showed that Cisco's dominance in the core of the network can be seriously dented, and it would not be a surprise if others started to make inroads at the edges as well.

Some parts of the telecom world appear destined for commoditization, especially long distance transport. The Internet at its core is a "stupid network," as David Isenberg has called it. With technological progress and the fierce competition created by the massive overinvestment in that area, backbone transport is not and will not be all that big a piece of the telecom pie. Now there is nothing wrong with a commodity business (just consider Dell in PCs, or, for that matter, the oil companies). It can be profitable, and Internet backbones are likely to be profitable, once we go through a period of consolidation. However, there will be room for far fewer players than are contending in that market now, and the revenues and profits in this sector are not likely to be large.

Local access is likely to be a large part of the industry. The costs are going to remain high, and economies of scale will limit competition. Hence revenues are going to be large, and profits are likely to be substantial. However, the potential for exorbitant profits will be slim, both because of regulation and growing competition.

The greatest growth opportunities in telecommunications are likely to lie in services. As was mentioned above, the "stupid network" metaphor for the Internet ignores the huge costs at the edges of the network, costs that are often not explicit, since they involve time and aggravation for the customers. This again mirrors what happened in the computer industry. **It again brings up the example of IBM, a company that is in the process of transforming itself from a vertically integrated producer of computer systems to a service company, running other companies' IT operations**. IBM has about three times the revenues of Microsoft, two thirds of the profits, a lower growth rate, and a stock market valuation about 55% that of Microsoft. However, it is regarded as a remarkable success story, and its stock price has not been devastated to the extent that shares of most of the other computer companies have been. IBM apparently sees its future in dominating enterprise software integration, thus operating in a horizontal layer different from that of Microsoft. (It has given up the fight for the desktop with Microsoft that it carried on for a long time with OS/2, but supports Linux, presumably largely to keep Microsoft from exploiting its monopoly. Similarly, continued development of its own hardware serves to keep Intel's dominance in microprocessors in check.)

The IBM story is instructive for several reasons. One is that change has taken a long time. Gerstner, the architect of the evolution, arrived in 1993, and it is only recently that services have started to provide more than half of IBM's revenues. Another is that this strategy is being emulated by other computer companies. In particular, the proposed merger between HP and Compaq is supposed to allow those enterprises to follow in IBM's footsteps better. Finally, the IBM story shows that it is possible for a large company, with a monolithic culture, to transform itself. While there are many enterprises that failed to adapt to a new environment (such as DEC and Wang), IBM shows that required changes are possible.

The conclusion is that the long distance carriers should aim to model themselves after IBM. The most promising area for them is to manage networks that are largely owned by their customers. This will be a huge change, but the IBM example shows that it possible, and also that there is time to do it. The ILECs might be tempted to follow in this same direction, but are less likely to succeed, and may have to resign themselves to operating at lower levels of the networking hierarchy. However, there is likely to be enough opportunity for them even there to thrive.

Acknowledgement: I thank Reed Burkhart and Charlie Sands for their comments on dearlier drafts of this essay.

Editor's Comment: Andrew seems to be recognizing the concept that has been first defined by Bill St Arnaud in May of 2001 - namely asset based telecommunications as opposed to services based. This concept as our conclusion points out seems to us to be the only logical direction for the industry. In describing IBM however he uses the term services as something performed by the telco for it customers. We would prefer slightly different language.

Pre Internet telecom was a service owned operated and controled by the telco from the center of its intelligent network. The customers bought a servicewhich they did and could not control themselves because they did not own the assets used toprovision the service. The technology changes of the last ten years have made it possible for customers to own fiber and provsion their own LANs, that with gigbit ethernet are becomming MANs and WANs. IP gives customer the opportunity to provision at their premises services that run at the higher layers of the protocol stack.

While the carriers have controlled their circuit switched networks from the center with the move to IP and data control and operation of a network is inexorably moving from the carrier to the customer premises. The network is moving from centrally provided services to assets owned at the edge in the same way that 20 years ago IBM provided mainframe services for its customners only to see computing move out of central control and to users desktops with the arrival of personal computers.

Instead of saying that IBM is getting more than 50% of it revenues from services it provides to customers instead of from mainframe sales we would prefer to talk about IBM providing customer owned and controlled services and hardware on customer premises. Telecom becomes assets owned by the customer who may buy help in puting them together from the supplier and who may on occasion plug into what is left of the carriers network.

If not IRUs & Carrier's Carriers…Then What? Asset Based Telecommunications?

Highlights, or Exec. Sum

Until the accountants (Arthur Andersen in almost every case) come clear and we know what was sold when and at what values, there will be no adequate basis on which to judge what an IRU will be worth. It will simply be too risky to even consider. Meanwhile there will be for the foreseeable future many many unused strands from both the Qwest and Level 3 build outs in the US – not to mention other strands that carry critical traffic from US Department of Defense and critical traffic like Swiftwire the banking network.

It looks as though Congress may finally have a chance to oversee what runs on the Qwest and Level 3 fiber builds at least within our borders. It was only a month ago that we were wishing for Congressional wisdom to step in a make a fiber based commons out of the assets of these failed companies. The national security implications of the DoD and banking applications would seem to argue in favor of the establishment of such a national fiber trusteeship. [**Editor's Note**: As of February 16, it looks as though Global Crossing may loose the DoD Contract. Readers will note that Bill Klein in his essay points out that any attempt by Congress to insert itself will be fraught with many difficulties. Nevertheless there are pressures mounting for government assistance. We take a look at some of their implications in the following paragraphs.]

Silicon Valley is certainly desperate for a shot in the arm from the US Treasury. As the New America Foundation pointed out in an announcement on January 31 "TechNet and CSPP, two coalitions of high-tech CEOs, recently asked the government to set an ambitious goal - a National Broadband Policy - to connect 100 million homes and businesses to a next generation Internet 50 to 100 times faster than today's broadband connections." Unfortunately if one knows anything about CA*Net 3 and 4 in Canada, it is difficult to take this goal with its ten-year-long time frame seriously. The announcement continued: "A prototype of the high-performance Internet of the future already exists. . . . Douglas Van Houweling, President and CEO of Internet2 will outline this technology, its advanced network applications, and the infrastructural challenges to broadening its reach." Live Webcast available at: http://www.newamerica.net/frames/fr_events2.cfm?EveID=170

We have reviewed and taped the webcast. The latest problem with American inability to make meaningful policy is that as Van Houwelling himself points out policy makers have no commonly understood definition of broadband beyond "fast." Because of their lack of sophistication it appears to be quite possible that they may be sold a need to use public money to buy commercially available high speed networking in the mistaken belief that doing so will further national technology competitiveness and economic growth. For example, the announcement pointed out that "Networks used by the Internet2 community connect universities and research labs at speeds that can support advanced applications such as tele-medicine and streaming HDTV quality video." In December 1990 when we first met Doug while doing a policy study on NREN for the now defunct US Congress Office of Technology Assessment, these were mentioned as the best case examples of the benefits of high speed networks. Twelve years later, the tune hasn't changed.

A critical problem is that Internet2 has been talking up its high speed applications since 1998. Folk who don't know any better think Internet2 has its own special technology. This is simply not true. Internet2 has been the use of federal funds (funneled through the National Science Foundation) to enable the research and education community that NSF is congressionally mandated to serve to pay for broadband connections to a pair of fibers donated by Qwest and forming what these folk call the Abeline backbone that runs at 2.5 gigabits per second. Internet2 is the use of federal money to pay for commercially available transport technology on which Internet2 universities run "meritorious" applications. Internet2 universities are using commercially available services (expensive ones to be sure) to enable their researchers to experiment with bandwidth hungry applications.

There is nothing in Internet2 that moves fundamental networking technologies forward. Plenty of work needs to be done with IP routing protocols. And with routing and packet switching technologies. If Internet2 were truly interesting in advancing broadband it would be racing against Canarie in an effort to be the first to bring lightwaves to the control of its end users. The telecommunications industry is in trouble because enormous progress has been made in optical networking and in DWDM and related technologies. The industry has been unable to overcome the last mile problem in delivering its bounty cost effectively to the end user. As we explained in our January issue with Ca*Net4 the Canadians have set out to do what is needed to bring a gigabit per second of bandwidth to Canadian home and businesses in less than five years. Van Houwelling's January 31 talk was a plea to the US Congress to underwrite and pay for commercially available technology.

It is possible that we may see efforts at an artfully arranged bailout designed to ensure the preservation of the assets of Qwest and Global Crossing. These are

the very companies whose front office management hype had much to do with the creation of the Internet bubble to begin with. Both are now under SEC and FBI investigation for malfeasance in bandwidth swaps with each other. Swaps, some of which, also had Enron's bandwidth operation in the middle.

Watch out that on Capital Hill we don't have an effort striving to get taxpayer money funneled through NSF and van Houwellings UCAID under the guise of a program to revitalize American technology by solving the bandwidth problem. If this happens, what is being solved will be nothing more than using a federal handout to enable the effort of the telecom industry to postpone the inevitable day of reckoning outlined by our experts elsewhere in this special issue.

Certainly the outlook for the long haul carriers is grim. A few months ago it was assumed that the LECs would buy them. Now this outcome is regarded as doubtful. (Consolidation: Fools Rush In? By Carol Wilson. One analyst explains why a buying burst by the Bells may not be a smart move. http://www.theneteconomy.com/article/0,3658,s=902&a=22926,00.asp) Certainly we have come to believe that carrier equities and bonds are not the instruments to be basing one's retirement hopes on. LEC equities and bonds are stronger but the question is by how much. We have come to agree with Googin that the industry may well be headed for bankruptcy across the board. Until the government or someone clears the decks there will be no hi-tech recovery worthy of the name. For the time being official Washington will steer clear cause official Washington hasn't a clue.

However, if government stays out, the "free market" solution that may well occur is likely to be a long and even more painful unwinding. It will also very likely be tailor made for a cash rich company like Microsoft to buy up a phone company or two. A February 11 article in Internet news http://www.internetnews.com/dev-news/article/0,,10_970851,00.html should give readers pause for thought.

"So what exactly is a web service? Quite simply, it is a fundamentally new approach of developing a software application that can share information through Internet Protocol (IP). What makes all of this so revolutionary is that these newly created systems would be able to interact and exchange information regardless of the platform or environment. [Snip] Next week, Microsoft plans to unveil Visual Studio.NET, the mother of all developer tools for the mother of all platforms. With VS.NET, Microsoft is hoping to convert 7 million licensed developers to upgrade to the .NET platform. In fact, Microsoft is in the unique position of having the ONLY platform that is capable of directly reaching PC consumers."

The Assets Based Business Model

A to be hoped for possible variant on the free market outcome is a new "assets based" business model. David Isenberg suggested that we send the draft of the Roxanne Googin interview to Canarie's Bill St. Arnaud thinking that he might be skeptical of Roxane's analysis. We did and on February 4, St. Arnaud replied

I am not skeptical of Googin's insights. I agree 100% with her comments. But I see this an opportunity to define a new business model. She is absolutely right that the current model for investment is not sustainable.

I have suggested that this lack of sustainability might be the spur to move telecomm to an asset based industry as opposed to a service based industry - much like the computer industry has evolved over the past 20 years. Twenty years ago you never purchased a computer from IBM - it was leased as part of a larger software and systems package. Computer service bureaus were the hot new industry in the 60s and 70s. But the advent of the mini-computer and PC fundamentally changed the economics of computing as service industry into an asset based industry, as Gestner wisely realized. Today you buy computers like cars and other equipment.

So far only the condo dark fiber companies are moving in this direction. For example IMS-EXPERTS-CONSEILS, < http://www.ims-experts.com > Dixon construction < www.dixoncable.com> Ledcor < http://www.ledcor.com> . I have had some indications that a couple of formerly bankrupt telecoms may be going this way as well. The problem for some of the new Greenfield players was one of getting into traditional telecom - and industry that is still largely artificial and not subject to normal rules of the marketplace as it is still sustained through monopoly business practices.

COOK Report: Being aware of 360networks and its recent fate, and using Google we found <http://www.360.net/News---In_The_News_Dec_17.asp > an article titled "Maffei spurs 360networks" There we found that 360networks "started off in 1987 as a sideline for Ledcor Industries, a construction company then based in Edmonton, which got interested after winning contracts to lay fibre optic cable. The Ledcor division evolved into a complete network developer for telephone companies and was spun off as a separate unit, Worldwide Fibre, in 1998. It was renamed 360networks last March, just before going public. Ledcor's owners, brothers David and Clifford Lede, are chairman and vice-chairman of 360networks respectively." Given the association between Ledcor and 360 it seems likely that Ledcor management would be ideally positioned to encourage a pared down 360networks to adopt the new assets based model.

What is going on became more clear on February 8 when Yahoo Canada reported that "Insolvent 360networks Inc. has acquired full control of Urbanlink Holdings Ltd. in a non-cash deal that gives the Vancouver-based company more telecom network systems in Canada. The telecom network builder, which is restructuring under court protection from creditors, said Friday it had bought the stake in Urbanlink that was indirectly held by Ledcor Group, a major 360networks shareholder. In return for the Urbanlink stock and the right to buy back millions of 360network shares, the Vancouver company gave back an $82.3 mil-

lion US note to Ledcor. The company and Ledcor, a privately held company, were joint owners of Urbanlink, which owns and operates fibre optic network assets in Canada." http://ca.news.yahoo.com/020208/6/iph6.html

Now an intriguing example in the United States may be Velocita. They appear to be positioned as an overlay network based on their participation in the AT&T fiber build and swaps with other major fiber owners. Cisco is lighting and routing their network. Indeed the first three segments were lit within the last 30 days. Perhaps they can sell lambdas or even fiber that may be lit with the broad range of Cisco gear including CWDM 10 Gig and gig Ethernet and bring Cisco expertise to customers in their geographic area. Velocita's Bob Collet from his Teleglobe days was intimately familiar with Canadian model. Collet is an outstanding salesman and could be expected to see how this approach of giving the customer maximum ability to control his telecom assets would make Velocita into a player very different from a Level 3 or a Qwest. Keeping expenses as low as possible permits Velocita to build up one hand held customer at a time.

We said to Bill St Arnaud the whole model of being a carriers carrier by selling dark fiber for others to light is history. It is gone. Dead. Is it not?

He replied: "Yes and no. Yes - the carriers carrier model is dead.

But there are companies with fiber resources who are now going into the market of designing and building for customers both condominium and wavelength approaches to the fiber market. In the design and build market a company practicing this business model will light up a dark fiber and take on responsibility of all maintenance etc on behalf of another carrier. The contract says that as the provider (fiber owner) adds additional wavelengths for other carriers to the same lit strand, the price will be reduced over time for the original customers. Also some equipment manufacturer's are moving into this space as well – some announcements pending."

COOK Report: What we have then is a kind of vertical disintegration of the carrier's carrier model which says that you build and light a global behemoth that provisions every kind of imaginable telecom bit service to every kind of customer anywhere in the world. The fiber owner may become an entity similar to a mortgage holding company. This kind of restructured company would maintain the physical resource, and enable others to gain access and to light strands that were contracted for. It would run an accounting operation that would book new customers and send out bills. It would cooperate with engineers and planners in a given area who wanted to work with it in bringing in their own groups of new customers for projects that they defined and sold. It might even have its own small team that when it found its own customers could light a few strands directly. Companies specializing in various aspects of network design could partner with the resource holder and then go their separate ways when assets were delivered to the customer.

Is this a telecom phoenix that could rise from the current ashes? Certainly we are in the midst of unprecedented chaos where we could benefit from an enlightened approach to attempting a balance between the chaos of the free market and the equally unpleasant world of government ownership.

We intend to examine wireless in our next symposium and asset based telecom in the one after.

Gordon Cook, Editor and Publisher

ICANN, Admitting Failure, Nevertheless Trys to Slither Forward into "Reform"

Froomkin Comments that Describing What these People Do is Difficult Given How They Have "Debased the Language"

Exec. Sum

Just a few vignettes of the latest ICANN deceptions.

Your editor hurredly notes that the oligarchs of ICANN are slithering forward to sell out the Internet. The first meeting of 2002 will occur in a few days in Accra, Ghana. Yellow fever inoculations required to attend. And just to make sure their first meeting after eliminating at large directors did not reach any direct internet ears, we learned on February 12 from "boy genius" Ben Edelman that the Berkman Center will not webcast ICANN's Accra meetings. These so called leaders of the Internet are slithering into the deepest recesses of Africa to do their business. As an astute observer put it. "Because they don't want anyone watching. Get it through your heads, people. There will be no at-large. There will be no NCDNHC. There will be no avenues for Joe Domain Registrant to have any input into the mechanism by which his domain name is governed. There is no need for anyone outside of the chosen few to know what is going on, or to wake up Karl." For the follow on meeting the IBM led oligarch of ICANN have chosen Bucharest Rumania the Kabul of Europe in another effort to make sure outsiders sat away.

Roberts' Morbid Sophistry

Listen to Mike Roberts "view" of the maneuvers as published to BWG by Judith Oppenheimer of ICB Toll Free News:

“If you go back and trace the roots of the current, and probably final, decision about At Large, it really started with the negative reaction to the publication of the Green Paper at the end of 1997. The general view of many participants in that process, especially the traditional research/education Internet community, was that the proposed private sector organization was too business and government focused and ignored both the tradition and the capacity of the Internet community to deal with the various issues that had arisen around the DNS on its own.”

So the White Paper proposed a much more open and community centered model. This wasn't much of stretch for Ira or the Clinton staffers, who have quite liberal political instincts. But it definitely was a stretch for a lot of people in and out of government(s) and other DNS stakeholder groups, who thought it was time to put this sort of activity - which after Sept 11 we now call critical infrastructure - under much closer control than was proposed.

So we have had going on four years of struggle between the short leash and the long leash advocates and are no closer to getting them to compromise than we were in 1998. One of the reasons why DOC has been extending the MOU is because this impasse is a significant source of potential instability, and even before 9/11 governments were not about to put up with that.

While I was CEO, I tried to navigate this minefield, with very limited success as is evident for everyone to see.

Over the past six months, visible evidence of a commitment to form a viable and responsible ALSO has been minimal. Participation in the ALSC meetings, forums, lists, studies, etc has been far short of the level that governments and others with significant leverage on ICANN consider necessary.

In Marina del Rey, my understanding of the Board's private discussions - I was not there so this is hearsay information - is that the Board members were unable to reach consensus on the ALSC recommendations, and consequently passed what can only be called a placeholder resolution to buy some time to decide what to do. In the interim, they re-chartered the ALSC to see what further support and feasible implementation plans it could come up with.

The same low level of responsible support continues. Pindar and I have been attempting to see if we could frame the dilemma and get something going on the ALSC list, with not much of a positive result thus far. You are a sophisticated observer of these types of politically charged organizational debates and I'm sure you can draw correct conclusions about the range of options confronting the Board at this point and the stakeholder interests behind them.

You wouldn’t know that this opportunist lived on the same planet as the rest of us. We share Ted Byfield’s view of Roberts as expressed on ICANNWatch:

“As ICANN Watchers may know by now, this writer has a special place in his heart for ICANN Big Man emeritus Mike Roberts's peculiar brand of morbid sophistry. His abuse of the World Trade Center attacks to dismiss civil society advocates as a foil for "terrorists" was creepy enough to earn him a lead role in Quake 4. He's back again -- this time mangling the memory of recently deceased Common Cause founder John W. Gardner into a justification for taking the At Large out back and shooting it -- unless it pays up.

Disposing of Roberts's arguments is a tiresome task, because they aren't in fact arguments. He whines about how anoth-

er election would be expensive, and presumes that the burden of covering those costs should fall on the At Large itself, or at least on its advocates. He kvetches that there's "no leadership," and that the ratio of active contributors to lurkers in the At Large Study Committee forum "is not popular democracy." And he announces, on the grounds that "[t]here is no statute for ICANN to enforce ... no legislation ... no governmentally imposed taxes," that "the legitimacy argument comes up short, way short."

ICANN's critics have been through these issues so many times, and in such numbing detail, that Roberts's tiresome repetition is quickly devolving into the rhetorical equivalent of a denial-of-services attack. In order:

Expense: Where there's a will, there's a way; but when it comes to elections, ICANN staff have no will aside from the will to whinge about how there's no way. If ICANN's staff wanted to find the money, they could (for starters) rein in Jones Day Reavis and Pogue's fantasmagorical legal bills, impose cost controls on "reimbursements" to gravytrain-squatting boardmembers, forgo hiring their croneys at $80-130K a pop, and be a little more appropriately finnicky about the sponsorships they accept (hint: skip the rubbishy "gala" receptions and get the Getty to pony up some cash).

Leadership: Mr. Roberts knows very well that under his "leadership," ICANN staff engaged in the purest form of divide-and-conquer by vigorously obstructing any and every proposed method for At Large members to contact each other. Now he grouses that there's "no leadership." Venal or stupid? You decide.

Not popular democracy: And the alternative to an At Large is democratic? When it comes to the At Large, Roberts champions fundy democracy; but when it comes to the At Large-free alternative, his criteria suddenly shift, three-card-monte-style, to pure pragmatics:

ICANN doesn't need a self-organized, self-sustaining worldwide At Large organization to do its job. Names will get registered, root entries will get made, new DNS technology will be deployed - all without the participation of an individual users organization. As the ALSC and others have said, the existence of an ALSO makes process for ICANN harder, not easier. It would be noisy and it takes time and energy and dollars to separate signal from noise and balance it against other stakeholder interests.

Legitimacy: If At Large advocates fall "way short" when it comes to legitimacy, At Large antagonists fall way nano -- nay, pico. If there's nothing more than "a four year old cabinet agency policy paper" at the root of this all, then ICANN dangles from a slender thread indeed. Effective and open public input, as opposed to pay-to-play interest-mongering, would provide ICANN with a more substantial reason to exist.

But the scum de la scum is to be found in Roberts's perverse pimping of John Gardner's sad death:

Roberts writes: John Gardner died this weekend on the Stanford campus just over the hill from me. He was an idol to young Americans like my wife and myself in the idealistic '60s. He got us into public sector organizations to help make democracy work, and some of us stayed there the rest of our careers. He wrote books like "Excellence" and "Self-Renewal" that energized students and adults alike. He had an eye and an ear for the art of the possible. He was the author of the famous phrase that a society without plumbers is a society that won't work. When he thought that the political process was becoming corrupt, he founded Common Cause, which has 200,000 dues paying members who care about effective democracy and are willing to pay to help make it happen.

Byfield: Somehow, I doubt that Mr. Gardner would be pleased to learn that his lifetime of work is being invoked as a sanctimonious bludgeon to score a cheap point about paying dues. But don't take my word for it -- let's take a look at Gardner's obituary in the New York Times [snip] See http://www.icannwatch.org/article.php?sidU5&mode=thread&order=0 ll version and appropriate links.

Inviting Foreign Governments

Meanwhile on Feb 19: According to a participant Richard Delmas from the European Commission (Department for Information Society). Joe Sims was today in Brussel for some kind of a closed door meeting with Chrisopher Wilkinson and some other people of the European Commission (Richard did not attend the meeting).

Sims presented plans for a complete restructuring of the ICANN board, without the at large, if understood correct with governmental representatives in the board and with complete different set of ASO, PSO and parts of the DNSO.

I just reached Christopher Wilkinson on the phone who seemed astonished about my knowledge on _that_ Sims had been there. I asked for details of what Sims presented and only got the sentence from Wilkinson, that "he is not shure if Sims presented this as a position of the board or his own."

To his understanding, this will be presented to the board at Saturday and he told me, that he would be more happy if I could get the details from the board. In short: he told me to piss off and not disturb the conspiracy.

Sims' trip to Brussels is not only a strategic move. ICANN staff wants to get rid of the At Large, even more so of the nightmare of direct elections, and ICANN is looking for new funding sources. Staff seems to be tired of tiresome negotiations with the ccTLDs. As Andy put it, Sims offers to governments board seats for money.

Someone asked: Isn't there something in the bylaws that says they can't have government wonks on the board?

A long time observer responded: They've changed the bylaws 12 times already, including just last week. He then went on

to say: I had already heard that given the reluctance of European ccTLDs to enter contract negotiations with ICANN the associated governments would soon be enlisted to bring pressure on the TLD managers to participate in and fund ICANN. This may be part of that ploy: either pressure your ccTLDs to sign contracts and have them pay us or pay us directly yourselves, but enough with sitting by quietly while the TLD managers delay. The more I think about it, the more I suspect that the piece of the Sims message that leaked out to Board Member x was just one part of what was said. I'll bet ccTLD relations were the central part of that meeting.

On Feb 20 an observer said sometimes I get some good stuff forwarded to me. There's an interesting discussion paper on ICANN restructuring linked at

http://www.lextext.com/icann/2002/02/20.html

Editor: The paper referenced above was a series of talking points for a meeting at the Aspen Institutes Washington Offices held on February 20 just before ICANN's Feb 22 –23 weekend Board Retreat in Washington.

Wondering about Esther Dyson someone pointed out that http://www.cnn.com/TECH/computing/9907/13/icann.idg/

Which says “Dyson was formally asked to head the panel by Joe Sims, an antitrust attorney working for the late Jon Postel, who headed the Internet Assigned Numbers Authority. The IANA was ICANN's small-scale, government-funded predecessor. But Dyson says the possibility she might be on the panel had been raised earlier both by White House advisor Ira Magaziner and by Roger Cochetti, the program director for IBM's Internet division in Washington, D.C. George Conrades, another interim board member, was approached by John Patrick, head of IBM's Internet Division in Washington.”

An Aspen institute attendee said: The folks who were there: David Johnson & Susan Crawford (the organizers), Becky Burr, Alan Davidson (CDT), Esther Dyson, Charles Firestone (Aspen), Nuala O'Connor Kelly (DoC, Office of the Secretary), Eliot Maxwell (only part of the meeting), Steve Metalitz (ditto), David Post, Rita Rodin, Joe Sims, me. The options paper Bret got was David and Susan's work, prepared in advance.

All participants agreed to confidentiality as to what was said during the session, so I'm not going to get into that. What motivated David Johnson to organize the gabfest, though, was his perception that ICANN's desire to get a solid financial base and cred with governments was causing it to be interested in some sort of reboot/restructuring that would get it those things, and that made now a critical time for folks to be thinking and talking about what should be in such a package. The session was set up before the news leaked that Joe Sims was going around proposing new Board structures.

COOK Report: To anonymous - can you explain why you would participate in a meeting like this? Seriously. Please help me to understand.

Anonymous responded: one of the reasons I went was indeed because I thought it would be educational (for me). Another reason was that a DoC honcho (a new Bush appointee) was going to be there, and I thought it might be a chance for me to affect her thinking about the ICANN mess. I respect Stef enormously, but I think we've agreed to disagree on how to think about ICANN: Stef thinks that it's a good thing for ICANN to get ever more antidemocratic, closed, and authoritarian, b/c that will hasten its inevitable collapse. I think ICANN's collapse is not especially likely, and that therefore the consequences of ICANN getting more antidemocratic, closed and authoritarian are bad, not good. So if I get the chance to affect that, I will. Problem is, I'm not so vain as to think that my presence at a meeting like this is going to markedly change the result; I know I'm not that talented.

Snakes do Shed Their Skins and so, When Convenient, Does ICANN

On Feb 24 Stuart Lynn informed a reporter that the newly restructured ICANN would have:

5 seats for government representatives, appointed by the GAC
5 seats for commercial operators (ccTLDs, gTLDs, registrars)
4 seats for technical visionaries/policy people
President/CEO

Or in INCAAN Speak: 1. 15 member Board of Trustees

a) 10 At Large Trustees
(1) Five nominated by governments and confirmed by Board of Trustees
(2) Five nominated by open Nominating Committee process and confirmed by Board of Trustees
b) Five Ex Officio Trustees
(1) Chairs (or designees) of three Policy Councils and Technical Advisory Committee (see below)
(2) CEO

http://www.icann.org/general/lynn-reform-proposal-24feb02.htm

Yes, all nightmares seem to become true. Watching the minimal amount of discussion for the major changes Stuart wants (complete restructuring of ICANN) I have to agree with another board member (just sitting with him at the airport here) that most of the board members seemed to be pre-informed.

I urged the board to realize, that the output of publishing such a paper from the CEO already does two things:

- give the at-large community / the users the feeling that they are not welcome in the process, the alm to be killed

- give the governments the feeling that they´re invited to take a major part in ICANN´s future policy making

Of course, while this weekend there has no decision been made and still in theory, all this ideas from Stuart can stay unaccepted. I worry, that even if nothing of this should be accepted, the damage is still there, cause people will still have the feeling to be unwelcomed, and governments still will have the feeling they could take over control if they just wanted and be pushy.

I asked about the concrete impact on the at-large decision and got not only the answer, but also the feeling that this means, that in Ghana there´s going to be the decision to not make any kind of voting/electing and only go on with discussing the structural changes.

Watching the way this game works - Joe Sims and Stuart working it out, where it can be guessed that Vint is part of that conspiracy - this really feels like in yet another chapter of "wag the dog".

I´ll send a longer report and pictures of the meetings and diagrams Andrew McLaughlin and others drew at the meeting in about 20 hours.

Editor: Says Stewart Lynn at a salary of $250,000 a year. “ICANN is overburdened with process, and at the same time underfunded and understaffed.” My god! The brazenness of these people know no bounds.

So Lynn continues: “If ICANN is to succeed, this reform must replace ICANN's unstable institutional foundations with an effective public-private partnership, rooted in the private sector but with the active backing and participation of national governments.”

“In short, ICANN is at a crossroads. The process of relocating functions from the US Government to ICANN is stalled. For a variety of reasons described in this document, I believe that ICANN's ability to make further progress is blocked by its structural weaknesses. To put it bluntly: On its present course, ICANN cannot accomplish its assigned mission. A new path – a new and reformed structure – is required.”

Editor: When these people start spouting public private partnership, watch out. It is an excuse to use corporate power to trash any interests that get in their way while being able to point to government sponsor and say ‘what’s the problem. They said I could do it.’

Thank god for a small handful of people like Michael Froomkin: http://www.icannwatch.org/article.php?sidV3

Froomkin: I will try do something thoughtful in the next day or two. It's hard given that ICANN has so debased the language. Of course we want an "open and transparent" process. It's just that when they say stuff like that, it's got to be read in the shadow of how they have implemented those same slogans for 3 years. Similarly when they promise a consultative nomcon. Yah, heard that before too. It's really a 1984 situation when it comes to language. You can quote me on the above.

I thought I would save everyone a bit of time by translating the URL, paragraph by paragraph, into what it really means.

ICANN has failed -- Mikki Barry Says it Best

Feb. 24 I thought I would save everyone a bit of time by translating the paper, paragraph by paragraph, into what it really means.

ICANN has failed. We wanted everyone to fall into line voluntarily, but they aren't doing so, despite all of the threats of governmental takeover starting from Ira Magaziner during the IFWPand continuing almost weekly ever since.

After three years, the ccTLDs still won't give us money, the RIRs basically ignore us, and most others already understand that we are largely irrelevant unless we're going beyond our mandate to make policies that they like.

So, without doing what we threatened to do (government takeover), because you guys refused to get along with each other (yes, this is all YOUR fault), we are going to do what we threatened to do (government takeover) only worse. We are turning this over to governments AND staff.

We measure success based upon whether or not we can pay our Jones Day bills. Although many companies who thought they could get special favors from us (and in fact did) now they have realized that we can't do much more for them since Congress and the DOC are breathing down our necks. They got their UDRP so now they aren't giving us any more money.

In addition, the USG bashed Verisign over the head until they signed a contract with us. The Australians forced us to deal with the GAC, by providing funding which we count as a plus for ICANN even though we've always said that the GAC wasn't really a part of ICANN at all and just advisory (wink wink). Japan, Canada and the EU have put up with us, but that's just not enough.

So, ICANN has fallen short of expectations. We made certain to disallow those pesky users we were required to allow to participate under the White Paper, while simultaneously complaining we didn't get enough participation. Of course, the real lack of participation we were requiring is the ccTLDs (and their money). I must also complain in the same paragraph, about ICANN's pre-occupation with "process and participation." Those horrible distractions to our true mission caused us to actually spend money we could have given to Jones Day on such things as the MAC and the ALSC reports. The "big guys" won't give us any money because we still allow people to speak their minds. This distraction must be eliminated so we can really get things done.

So, like I said, without doing what we've been threatening (government takeover) we will implement government takeover.

The rest of the paper was taken up with every possible excuse besides "Blame Canada." Like a corrupt French Ice Skating Judge, the excuse changes with the target of the minute. However, there have been absolutely hilarious charges

made, specifically that ICANN had "too much process." Simultaneously, not enough process was claimed regarding governmental participation. While complaining about the complicated organizational structure, Stuart then goes on to say that ICANN needs to build government-like institutional foundations." Correct me if I'm wrong, but aren't "government-like institutional foundations" the most fraught with Byzantine organizational structures, even greater than what ICANN is right now?

Sims, I mean Stuart Lynn goes on to say that if the people he's appointed can't find a consensus, none exists. Interesting to say while completely disregarding all previous consensus points that HAD been agreed upon prior even to the creation of ICANN. However, that notwithstanding, the at-large must be squashed so that they can focus on the "real work" that can likely only take place in secret without those pesky users and squabbling public policy types.

Astoundingly enough, Lynn "believes strongly in ICANN's core values of openness and participation" after just saying that the At Large must be crushed. Then he attacks that highly annoying reconsideration process as yet another distraction. The requests were "frivolous," the Review Panel adds to the "waste."

Lynn complains loudly about those horrible ccTLDs not wishing to pay the "appropriate share of the burden." The ccTLDs are likely the ONLY entities who truly understand that ICANN is irrelevant to their business models or their technical needs. Their example is one that should be followed. It is astounding that Lynn can be so blatantly blind to perhaps the truest reason for ICANN's financial shortfalls - namely bills from Jones Day. A close second is the cost of the ICANN world tours, at insanely expensive venues whose lack of facilities are then blamed as good reasons for further eliminating participation even via webcasts. Closely third are the expenses for Andrew McLto jet to foreign countries as ICANN spokesmodel. All travel, of course, is business class, all hotels five star, all meals highly expensive, etc,. It is obscenely ludicrous that they would then complain that the At Large is just too expensive. Imagine, a public benefit corporation funded partially by our tax dollars (because they are a tax exempt corporation) that excludes the public at every possible turn.

Another quite interesting claim is that that pesky US Government and those pesky Americans will interfere with "long-term global stability." How ironic. Taiwan didn't decide to run their own root because of US Government participation. They did so because they did not wish to deal with ICANN's nonsensical regulations and rantings. The ccTLDs are not refusing to "play ball" with ICANN because of US Government participation, but instead because of ICANN's policies and desires for huge amounts of funding to pay Jones Day and ICANN's travel agents.

But again, the most ridiculous and laughable claim for the necessity of ICANN's "restructuring" to eliminate all of those pesky people and ideas is once again the boogieman of "alternate roots" and collapse of "essential infrastructure" with a weak ICANN. The very thought that non-technical bureaucrats are protecting the infrastructure of the Internet made me laugh so loudly that my dog became alarmed. The only technically inclined individuals who have even the semblance of a clue within ICANN are Karl Auerbach and Andrew Mueller-Maguhn (both ironically elected from that pesky At Large) and Vint Cerf who is wholly owned and operated by ISOC and Worldcom. Their new technical employee, Kent Crispin is the architect of the fatally flawed interface to the voting structure that is now blamed for improper results. Yet another fairy tale ending.

So to fix the part that is not broken and break the part that needs fixing, that government intervention we were all threatened with is now supposed to save the day. For only governments can really decide best who should be on the ICANN board. Amazing that it only took three years to figure this all out. And don't forget....never forget....that this is all (including the directive from Stuart Lynn) "bottom up" consensus (oh, except of course we must always remember that Jon Postel's process creation was not open or transparent... But that's not important right now except to justify ICANN's newly found closed, I mean open, opaque, I mean transparent method of springing ideas fully formed on all but the initiated and special (and definitely not pesky) Board members like some sort of Athena on acid.As I paraphrase Tony Rutkowski, let's pull the life support, kiss them on the forehead, and watch ICANN expire with appropriate DNR orders. After all, anything else might be too "pesky."

Froomkin Slash Dots

http://slashdot.org/article.pl?sid=02/02/25/035254 ICANN CEO Stuart Lynn today released a plan for a "strong" ICANN that would have 5 of 15 Board members selected directly by governments and the rest by registrars, registries, plus a few Board-squatter-like ringers chosen by the ICANN Board or staff. The main justifications offered for this shift are that in order to be "strong" ICANN needs more money, more support, and less "process". Of course, promises Lynn, ICANN's "core values of openness and broad participation" should be "preserved". (Don't laugh. It's not funny.) "Meaningful participation" will be achieved by cutting out any direct representation for end-users. Oh yes, ICANN wants a much bigger budget, and to be independent of the US Dept. of Commerce, and to get direct control of the root server operators too, all so as to ensure that ICANN has unimpeded ability to execute its (undefined, growing) "mission". ICANN was supposed to save the Internet from governments; since major interest groups such as the ccTLDs and RIRs won't do what ICANN wants, and won't pay it, ICANN now turns to governments to save it from the Internet. See the Press Release here, and then look at entire plan, then visit ICANNWatch.org for updates and commentary." Yep. The proposal would eliminate any pretense of At-Large involvement in running ICANN - it would be solely a governmental and corporate body. - Michael Froomkin And on Feb25 a scathing note from Randy Bush (former ICANN supporter http://www.interesting-people.org/archives/interesting-people/200202/msg00242.html

Interview and Article Highlights

Introduction Summary, Full Article

The most critical insight to result from our efforts at problem definition is Roxane Googin's assertion that there is a combination of economic and technology forces eating away at the ILECs that will bankrupt them. While the same combination of forces will play out differently with the old line IXCs, their future (especially that of AT&T and MCI WorldCom) is also grim. Between 1985 and 1995 the legacy telco networks were structured for the digital delivery of circuit-switched voice with the purchase of a very expensive SONET based infrastructure. With data representing a small but growing share of traffic their business model seemed to permit them adequate time to convert their networks and financing to cope with a data dominant future. [snip]

Who will speak the painful truth? Two years ago the commonly accepted wisdom said that the net heads would take their IP, fiber and stupid networks and sweep the old line phone companies aside. But even then there were some cracks in such an assessment. Andrew Odlyzko three years ago began to explain why the foundation of bandwidth doubling every 90 days on which both the dot com craze and fiber builds of 1996 – 1999 were based was not reality but a myth.

In a similar vein Roxane Googin for about two years has been explaining why the much feared re-integration of telcos into an ILEC led monopoly won't happen either. If Odlyzko delivered the first piece of bad news by telling us we had geared up for a demand that wasn't there, Googin has a her own dose of harsh reality to present. The new technology although itself not yet built into viable companies is eroding the base on which the circuit switched telcos operate rendering their balance sheets unsustainable as well. It is our contention that if we grasp both of them and understand how one flows from the other we will begin to be able to address industry's problems. It is our objective to do just this in this issue of the COOK Report.

Googin Interview, pp. 3 - 14 Summary, Full Article

COOK Report: Why are you so pessimistic and pessimistic especially with regard to the local phone companies?

Googin: Because one of the largest single industries in the world is, as currently structured, no longer viable. We have a series of problems arising from the law of unintended consequences. [snip]

I have been saying all this for a year now. But what has been obvious to me for a very long time is hard for other people to hear. Let me just ask how you can possibly understand that the IXCs are in trouble and not understand that the local guys are in the same boat? There is no natural boundary separating the two. They are using the same technology. They both have the same cost disadvantages. The difference of course is that competition is easier to manifest itself the long distance arena. Consequently, the problems got a head start here. As a result they are easier to see.

What I am suggesting is that we must start by looking at the problem and get people to accept that there is a problem. Do this by studying the manifestations of the problem. And then look for solutions. People are confusing the problem and its manifestations with solutions because they can't stand the tension of not knowing what will happen. But its only after you sit with the uncertainty for a while can you come up with a good solution. Knee jerk solutions based on inadequate understanding won't help.

SBC

Here is how the competition will manifest itself in the local market. Networks are loosing minutes of use. Email replaces a lot of voice. Instead of calling SBC and asking them to send you their financials, you just download them from the SBC web site. Behavior is changing at the expense of voice telephone traffic. What you get via email and the web in most instances is far more useful than what you can get via voice. [snip]

The Telecom problem is certainly not isolated to the newcomers. To me the fact that people seem to think it is isolated to the newcomers is a bad sign. Because the real Telecom problem is with the incumbents. This makes things even messier because the new green field companies that we were counting on to implement the new technology are themselves damaged. We are in danger of finding ourselves in a situation where the attackers are unable to succeed and where the older players with nonproductive technologies are seen as unable to fail. The attackers are running out of cash before they can get big enough for their operations to scale and pay their operating expenses.

One of the reasons that they are in trouble is that prices for bandwidth fell more rapidly than anyone had predicted. Demand has been less than we had assumed. Huge capacity was built. And, with the bust of the dot coms and other events, demand to fill the capacity did not arrive and prices for bandwidth plummeted. [snip]

What will happen is that their revenues will no longer be sufficient to enable the operation of their networks much less pay for the corporate overhead, the SG and A, or the interest. Well simply this is what you're seeing now. If you read the financial statements of all the RBOCs for 2002 what is the first thing that

they're saying? That they will cut capital expenditures.

Why are they talking about cutting capital expenditures? Because they all understand that their revenues are coming in below projections. Therefore they have less to spend and must adjust expenditures. But you can only adjust capital expenditures so far. As prices in minutes of use a fall toward the levels that can be delivered by the new technology, you will find that, capital expenditures aside, they cannot cover operating expenses much less their debt payments. [Snip]

Look at SBC's VGEs (Voice Grade Equivalents). These are 64 kilobit measures for equating higher speed data lines with numbers of voice lines. The problem with these numbers is that they are going up while revenues per line derived from them are going down. Therefore the price of the bandwidth represented is declining. The problem for them is that this is happening more rapidly than they can cut their cost of operations. They probably manage to cut their cost of operation by about one percent a year. There operations costs are really head count of employees. Their equipment costs are fixed.

Their access minutes of use are down Access minutes are down by only a tiny amount in the third quarter and by 1.4% in the fourth quarter. Their total access minutes of use had never declined before June of 2001. But now it is declining for all of them.

[**Editor's Note**: Access Minutes measure the minutes of long distance calls that the LECs terminate for the carriers. They do not measure minutes of use of the local voice network where no tolls are charged. We simply do not have accurate statistics on total minutes if use of the local voice network. However on page 54 below Andrew Odlyzko points out a fascinating statistic from the United Kingdom - namely that minutes of use of the local network in the form of dial up internet access are more than 50% of the total as of July 2001.]

BellSouth

Now if you look at their third quarter 2001 earnings compared to their third quarter earnings in 2000, you will see that the total has declined by 4.1% and that their EBITDAhas likewise declined by 400 basis points which in this case is 4%. In a scenario like this, this is what you would expect. As their income-producing voice traffic declines and their fixed cost of operations does not decline, they will earn less. The EBITDAmargin is a percentage of the difference between their operating income and expenses. EBIDTA margin is the EBITDAabsolute number divided by the revenue absolute number.

Verizon

For the 4th quarter of 2001 operating income declined from 3.379 billion a year earlier to 447 million down 86.8 %. On top of this they added a loss in equity of 1.736 billion and interest expense of 742 million. With some miscellaneous figures thrown in the operating revenue of 447 million disappeared completely and became a 2.037 BILLION dollar loss. Earnings went from 70 cents per share in the 4th quarter of 2000 to a loss of 75 cents per share in 4th quarter 2001. Earnings for the year declined from 4.31 per share in 2000 to 14 cents per share in 2001. And yet on the next page (page 9) they show ADJUSTED earnings of 77 cents per share in the 4th quarter of 2000 and 2001 and earnings for the full year 2001 are $3.00 per share and $2.91 in 2000.

Googin: The difference here is outlined at the middle of page 3. There the reported expenses include $4.1billion of "one time" charges including: Severance costs for about 10,000 people, investment markdowns including Genuity, restructuring at CTI, sales or exits from non strategic businesses and Other asset impairments. One may debate which of these items is one time, but no details are given. The adjusted income numbers are on page 9, which are supposed to reflect ongoing operations. Here operating income falls 2.1% from $3.71b to $3.63b. While after Global Crossing words like "adjusted net income" may cause problems, we lack more data as to what costs are one time and what costs are recurring. Auditors used to be expected to figure that out, but apparently not these days.

COOK Report: On page 3 we read: "Reported results incorporate the net after-tax effect of gains and charges. For the fourth quarter 2001, Verizon reported a consolidated loss of $2.0 billion, or 75 cents per diluted share, compared to net income of $1.9 billion, or 70 cents per share, in the fourth quarter 2000. Results for the fourth quarter 2001 include charges totaling $4.1 billion, or $1.52 per diluted share. These charges relate to a variety of items, including severance costs for the reduction of approximately 10,000 employees, primarily through the fourth-quarter voluntary program; charges reflecting the current market values of investments, including Genuity; a restructuring of CTI, the company's wireless affiliate in Argentina, as a result of recent economic events in that country; charges for the sales or exit of non-strategic businesses and other asset impairments; and merger transition costs. Reported net income for year-end 2001 was $0.4 billion, or 14 cents per diluted share, compared to $11.8 billion, or $4.31 per share, for 2000."

What is going on? Is this a grand sweeping write off of investments gone sour?

Googin: Yes. And they don't even have to say what they are doing!

COOK Report: Here is the largest phone company in the US reporting a 4th quarter decline of revenue of 207.1% and annual decline of net income of 96.8%! Yet page one reassures investors "Verizon Communications reports solid results for fourth quarter . . . company posts adjusted earnings per share of 77 cents."

Googin: This is supposed to reflect ongoing operations, but only their auditor knows for sure. We are supposed to just accept this. What matters is the size of the hit, equal to half a quarter's operating expense, and the fact that they keep laying people off despite having this great

"growth" business in data. If your business is growing, you should add people not get rid of them. This behavior tells me their profits are falling and they have no choice.

Qwest

COOK Report: To return to their quarterly report, note that it brags: "As a result of this expansion and the acquisition of some additional international fiber-optic assets, Qwest has completed its network expansion and now has a global network totaling more than 190,000 route miles, with broadband facilities to six continents." Given the problems facing the other ILECs it seems that one would not want one's phone service dependent on a local exchange carrier that is burdened with the additional weakness of being a global fiber provider.

Googin: Part of the point you are making is illustrated by Qwest's loss of $2.41 per share when the reported profits for the other LECs are a few dollars per share. [snip]

COOK Report: Form 10Q says: The increase in commercial services revenues for the nine months ended September 30, 2001 as compared to the same period last year was $1.139 billion or 16.6%, and was primarily attributable to growth in our data services and IP (DSL, DIA, VPN, professional services, web hosting and dial Internet access) and optical capacity asset sales. During the three-and nine-month periods ended September 30, 2001, we recognized $133 million and $989 million, respectively, in revenues from optical capacity asset sales under indefeasible right of use ("IRU") agreements versus $232 million and $648 million, respectively, for the comparable periods in 2000.

2000 IRU sales		**2001 IRU sales**
3rd quarter	232	133
1st 9 months	648	989

From the figures above it looks as though IRU sale income for Qwest ramped up in the last half of 2000, and went way up in the first two quarters of 2001 (an average of 425 million per quarter in the first half of 2001 only to fall by two thirds in the third quarter of 2001). Qwest has booked some hundreds of millions in commercial sales of IRUs — income that it is not likely to see again any time soon.

Indeed in the 4th quarter results released on January 29, 2002 Qwest's commercial income plunged by 14% or $396 million compared to a year ago. For the full year it had a gain of $700 million or 6.7%. We are now seeing a dramatic deterioration in Qwest commrcial income which before had been growing slightly. [snip]

COOK Report: I am left with the impression that; given the shrinking of the voice markets you have spot lighted, combined with the twenty two billion dollar bankruptcy of Global Crossing; the exposure of Enron's bandwidth trading as built on air or fraudulent depending on your point of view; Wlliams Communications January 29 announcement that it was delaying reporting quarterly earnings; and Level 3's January 29 statement http://www.totaltele.com/view.asp?ArticleID=48208&pub=tt&categoryid=0 that "it might not meet some of its financial obligations this year," we have a situation where a lot of debt dominoes are beginning to fall. Furthermore, that collapses in some areas will lead to collapses in others. WorldCom shares have just hit a 7 and a half year low with rumors of down grade on bonds to junk status. AT&T revenues are down.

At what point does this snowball beyond the ability of the US government to do anything?

Googin: Probably this year.

COOK Report: What you are saying is that it is a real possibility?

Googin: No it's inevitable. The only uncertainty is the precise timing. They will restructure. It will be ugly. People will loose money. But we will live through it.[snip]

This is no mystery. It has happened so many times before in the history of our economy. No one disagrees that the new architecture can operate at one tenth the cost of the old. Or that it will do voice one of these days or that voice will be subsumed into a rich media mix. This has all been talked about for years but no one has been asking the obvious follow on question: what happens under these circumstances to the voice infrastructure? We are now about to find out.

Odlyzko Klein Discussion, pp. 15 -20

Summary, Full Article

Googin: Everyone has been playing a little game which now is ending because of IP. Everyone is saying IP will drive prices down by a factor of ten. What people have forgotten about asking is what happens when you own that great big house that you have mortgaged to the moon and all of a sudden your income goes down by 90%.

Odlyzko: Not "[e]veryone is saying IP will drive prices down by a factor of ten." As I pointed out 4 years ago in "The economics of the Internet," at that time it cost most corporations more to send a large file over their IP Intranet (if we allocate costs by volume of transfer) than it would have to send it using a modem over the long distance voice network in the US. That may not be true any longer, but much of the common wisdom in this area is wrong. Those huge declines in costs (and it is not by any fixed factor, like 10, but by increasing factors as time goes on) are true in a sense, but (i) are largely confined to the core of the network, and (ii) are caused more by technical advances, economies of scale, and so on. The big advantage of IP that made it take over the world was not lower cost, but greater flexibility.

Googin Rsponds, pp. 21 -23

Summary, Full Article

However, the issue at hand is so massive, I doubt it can be understood by reductionist, incremental, thinking that I see in Andrew's critique. While this use of bottoms-up logic forms the well-proven basis of the scientific method, it does not

address radical change well. I am therefore approaching the problem from a top-down, holistic viewpoint. I am basically asking what happens when the irresistible force (optical/IP pricing) meets the immovable object (legacy Telco infrastructure, debt, headcount, equipment, copper, and all).

While holistic hand-waving with no basis in operational reality is certainly of no value, I believe in a practice of matching massively divergent "boundary conditions" within which the local telcos must operate with the incremental physical reality of their operation. The results of matching should be "non-linear", in that you cannot get an answer that makes sense. We are trying to understand a problem here. We are not yet trying to solve anything. Declaring whether or not the RBOCs can pull out of this is not a relevant point, because it is pure conjecture. I am concerned here with deterministic trends only. Answers will come in due course.[snip]

For instance, we can try to solve for this divergence mathematically (scary, for a BS-EE arguing with a math PhD). What we know is that about 20% of RBOC "Communications" revenue comes from data, with the rest coming from voice. We also know that EBITDA margins for the best run companies approaches 50%. While this number is for the company overall, it is the best proxy we have for their base communications operations. I have also determined that over the past two quarters for all three RBOCs on a very consistent basis, implied revenue per " data VGE" is about 25% of that for a "voice VGE". Trying to reduce this to an equation with one variable and one unknown, to solve for voice margins per revenue dollar per "voice VGE" I get the following: 0.2*(.25x) + 0.8x = 0.50 This solves to x = 0.588, which implies that voice costs per "Voice VGE dollar" input is 41.2%. Next, I use Andrew's rule of thumb that says to provide 4x the data bandwidth costs 2.5 times the cost of voice bandwidth, which is to me the same as saying that the dollar cost per bandwidth unit of data is 62.5% as much as voice (2.5 divided by 4.0). Applying that to the "voice VGE cost" of 41.2% yields an implied data VGE cost of 25.7% per dollar "voice VGE".

This boils down to my saying that using the sketchy information available, phone companies are about breaking even on their data revenues on an EBITDAbasis, as they recieve about 25% of "voice VGE" dollars in on a product that costs about 25% of "voice VGE" dollar to provide. Since EBITDAmeans earnings BEFORE interest, taxes, depreciation and amortization, this means we have a growing problem if you hold the bonds, or want to sell them any gear. To my best guess, this scenario says that the declining (voice) business has to pay ALL interest, cap-ex and debt principal payments. This would explain the recent RBOC behavior in terms of cap-ex and headcount cuts, with continued declines in margins. [snip]

We can ask all day how fast prices will decline, how fast traffic will move, or what regulators will do, but that hinges individual human behavior, which is inherently non-deterministic. Here, one person's guess is as good as another's.

What is of use to ask is "What happens to a leveraged, legacy, infrastructure when a "killer" technology that costs 1/10th as much to own and operate comes along?" One might say, "it will drive down prices and profits". Then, you start looking for declining prices and profits, which is exactly what we are seeing now. I report what I see, not what I think people will do.

The RBOCs are not healthy today. They are losing their all-valuable access lines, and those pricey access minutes. They are cutting cap-ex and headcount, and are still struggling to meet reduced expectations. I am an analyst's analyst, the one professionals call in to see whether their own analysts are giving them the straight poop. I am paid to know clearly what Wall Street thinks. From this vantage point I can state categorically that these companies are not cutting cap-ex to keep analysts happy, they are cutting it (and their people too) because the base profitability of their business is declining. They are worried not about Wall Street analysts, but about their debt ratings (as well they should be). Note how this quarter they all spoke about their solid debt ratings and balance sheets on their conference calls. They only do that when they are worried about those issues.

Their growth businesses are all of low (or no) margin. Even in their own words, their future lies in "LD, wireless and data". Well, two of the three are cash-flow negative, offering questionable long-term margin stability. LD is a nice diversion, but their constant discussion of what voice bundle is going to be attractive to small business, while faced with these pressing issues, amounts to re-arranging deck-chairs on the Titanic. Whether the bow goes before the stern does not change the outcome.

Andrew made some comments on debt manageability. Let me provide some specific figures. For the non analyst types among your readers PPE stands for "Plant, Property and Equipment", or the working assets of the telcos. Gross PPE is the sum of all dollars spent to date, at the time of purchase. Net PPE takes into account depreciation and amortization, which basically accounts for usage and aging of the gear. You could theoretically sell the used equipment for close to the Net PPE amount, while Gross PPE is more like replacement cost. Current debt is bad, as the principal is due within 12 months. Long term debt can be bad also, but at least it is not due until later.

For those interested in debt and PPE statistics, (basically assets versus liabilities) some follow.

SBC has $26.166B in debt outstanding, consisting of $9.033B in current debt and $17.133B in long-term debt. PPE consists of $127.524B gross investment, and $49.827B on a depreciated basis. Verizon has $64.326B in debt outstanding, consisting of $18.669B in current debt and $45.657B in long term debt. Their PPE consists of $169.586B in gross investment, versus $74.419B in depreciated value. BellSouth has $20.21B in debt outstanding, consisting of $4.611B in current debt and $15.599B in long-term debt. The depreciated PPE on the books

is $24.943B. In terms of access lines served, SBC has 59M, BellSouth has 25.4M and Verizon has 61.5M. [Editor: see the table from thes figures on page 23 above.]

David Isenberg: Enronization of Telecom. pp. 24-25

Summary, Full Article

The Precursor piece ends ominously: "Policymakers throughout the Government remain largely oblivious to both the magnitude and economic implications of the telecom-tech meltdown and the destructive role government competition policy has played in helping precipitate this market debacle." [For more info see http://www.precursorgroup.com]

Roxane Googin, following from her interview in SMART Letter #64, has given a longer, more in-depth interview for the next issue of the Cook Report on Internet. Gordon Cook has a Ph.D. in Russian history and a nose for behind-the-scenes shenanigans, so 'in depth' is pretty deep. Googin and Cook cite chapter, verse, row, and column (and provide URL pointers to ILEC annual reports) to show exactly where incumbent telcos are losing lines, minutes, revenues. They deconstruct the Annual Report as a literary form -- for example, "Over the years, the voice, or core business, part of the income statement appears later and later as the bad news is buried ever closer toward the rear." And -- surprise! -- Googin and Cook find places among the reports where it is impossible for even an Arthur Andersen accountant to infer what is going on. Fall into the GAAP. [snip]

I've been thinking about Googin's plaint for a year and a half, off and on. I'm coming to the view that she's seeing two loosely coupled, separable phenomena. The first thing she's seeing is the general malaise in the telecom sector, aggravated by bubble-busting, debt-hiding, other accounting tricks, and not-very-radical technology substitution (e.g., cell phones for land lines, email for phone calls). The second phenomenon, the stranding of network assets because they're rendered obsolete by radically cheaper, fundamentally simpler networks, is potentially much more powerful, but is a longer-term phenomenon that has not yet hit the local telco's fan.

Klein: Strategic Future of Wireline, pp. 26 - 30

Summary, Full Article

For argument's sake, let's accept Roxane's premise that many (if not all) today's carriers are dead. The question should be, what do we as a country do to save a very significant portion of our national infrastructure? Would it be acceptable to both end users and the taxpayers (often one and the same) for the federal government to declare the current installed network a national asset? Alternatively, would it be better to let the markets decide who should be the winners and losers, even if it meant that at the end of the day we would probably have some extreme cases of monopoly power? Carrying this point further, foreign ownership of domestic assets is highly likely, which would introduce an entirely new set of variables. In my opinion, there is no comfortable compromise between these alternatives.

Those, who argue for the nationalization of telco assets, point to the example of other countries or some of the more forward-thinking localities domestically, where the carriers take space on the government's network in order to offer voice and data services. The appeal would be that the carriers could focus on advanced voice and data applications, as well as strong customer service and support. Capital expenditures, as well as maintenance expenses, would be far below what it is today, implying that the debt loads of the carriers could be better met than it is today, and paid down over time. Transport would be purchased most likely in the form of lambdas, however the nationalized network would have the right to determine what is best for both the taxpayer (as a replacement for the debt and equity holder, in the form of an ROI), as well as for the competitive market for application services.

Where I personally have a problem with this solution is in its politics. What is preventing either the executive or legislative branches of the federal government from tinkering with a national asset, much as they have with Amtrak and other so-called national assets!?. Should, for instance, some powerful politician/agency decide, for instance, that it is absolutely critical that every home in Bismarck, South Dakota have 100 megabit access, who is policing the spending or the rationale for this action? The taxpayers are put at great risk, as they are the ultimate source of funding for what could be absolute boondoggles at the whims of career politicians or bureaucrats – very much like what we have seen since our Great Society spending binge over 30 years ago. I will not attempt to address the problems of political lobbying, as the telcos are among the largest contributors to politicians today, but I do believe that the efforts of the lobbyists would be even more nefarious should our communications infrastructure be declared a national asset (campaign finance reform issues aside).

Moving beyond our national boundaries, one should ask what role would subsea cabling play in the nationalization of the communications infrastructure? Would we have the right to declare that cabling between the US and other countries becomes US government property (very much like the real estate where we have embassies), landing points and all?

Caught in a Glut with No Way Out, pp. 31 -33

Summary, Full Article

Essentially, when you look at the networks that have been built since 1995 you have a situation where not more than about 5 or 6 percent of the long haul inter city fiber installed has been lit or will be lit in the foreseeable future. Of the fiber that is lit by 80 wavelength capable boxes only about 8% of what these boxes are capable of is in use. Each incremental wavelength used costs only a few thousand dollars per line card per a couple of dozen boxes to install. Adding ten gigabits to a backbone is relatively trivial and compared to the original cost of building and lighting the incremental cost of doing so is very small. Currently

only about four to eight wavelengths per carrier are lit.

Consider demand. Just as the demand for dark fiber IRUs has peaked and fallen off, the demand for wavelengths may now be peaking. Until the fiber owners start publishing verifiable numbers every quarter on how many wavelengths they have "sold" via IRU and via lease there is no credible way to judge changing trends in supply and demand. We can however extrapolate a few things. For example, the size of the Sprint IP data backbone and that of ATT is currently about ten gigbits or one lambda per backbone. If we assume that, given carrier statistics, voice and data traffic are now roughly equal, then a voice backbone for each major carrier would fill another lambda. We are told that the size of a voice backbone is a closely guarded carrier secret but that it is much larger than the IP data backbone. Let's assume then that voice backbones may occupy anywhere from two lambdas to six or even more lambdas. Consequently carriers needs in lambdas for their own networks may vary from about three to ten 10 gig lambdas per carrier.

Now we can safely assume that with phone network use having peaked there will be little in the way of additional demand there. Assuming that data still doubles every year in North America, you may be able to sell an aggregate of 20 to 25 new lambdas this year to handle carrier data growth. But with fifteen American carriers and six Canadian each with 80 wavelength capable systems you have an easily provisioned supply of more than1600 lambdas perhaps only 150 of which are lit. The problem is that without complete disclosure from each carrier there is no way of knowing exactly what capacity is actually in use. Nevertheless our experts are all in agreement that used capacity is only a tiny fraction of what's available. Whether the amount is 4 percent or 12 percent, under current circumstances, makes little difference. In short we likely have at least a five or six year window with current growth before we fill the capacity of the fibers that have been lit.

On the other hand, prices are getting cheap enough for enterprise networks to consider using lambdas. But right now even the largest enterprise networks are mostly 155 megabits with a very few 2.5 gigabit links here and there. Most enterprises don't have the means of connecting 2.5 gigabits to a campus let along ten. [snip]

If Level 3 is really booking 4 million a month in new revenues, it is hard to see at this point where the bookings are going to come from. [snip]

Bill St Arnaud put it this way: "However, even given that [a rapid growth in data traffic], I think in the long haul it will be another 3 years before we see any new fibers lit, another 10 years before new fibers are blown in existing conduit and another and 15 years before new conduit is trenched in the ground." With the resources at our command we cannot do a definitive census of the carriers. But even with increased resources, it is unlikely that carriers would admit to a highly embarrassing situation. [snip]

We are stuck with a conundrum where until the debt is wiped off carrier books or until demand skyrockets you have the entire industry embedded in a continued downward spiral that results in more and more bankruptcies. Demand will not skyrocket until the LEC controlled copper based local loop is by passed and either fiber or multi-megabit per second wireless reaches the vast majority of homes and businesses. Even then the demand may still be too easily filled by capacity on hand, until and unless the Canadians can make it possible to extend a wavelength to every home and business.

The technology has indeed overwhelmed the global infrastructure and its installed economic base and rendered it not economically sustainable. Canada looks to be following a strategy of enabling more uses for bandwidth while the United States follows a course of laissez faire in which the market knows best theory is freed to allow the concentration of media and carriers to consolidate an infrastructure duopoly where cable and DSL are the only officially blessed avenues to broadband. The US policy seems likely to be one of handing the market to huge and powerful old technology companies that through monopoly control can keep better technology out of their networks and render it unable to compete.

Overcapcity & IRUs, Some Technical Detail, pp. 34-36 Summary, Full Article

St. Arnaud: An IRU can be for any period of time but traditionally have been 20 years. IRUs started with underseas cables about 50 years ago when the cost of a cable was so prohibitive that a number of carriers were required to partner together to build the cable. The IRU was created by accountants and lawyers so that each participant could treat their portion of the cable as an "asset" with all the rights and privileges of other fixed assets like buildings - e.g the right to sell, depreciate, etc

As far as I know there is no formal legal definition of an IRU. As such its use has become bastardized over the past years. In general an IRU implied an upfront capital payment. Leases implied annual or monthly payments - but most importantly title to the bandwidth remained with the leaseholder as opposed to IRUs where title is transferred to the IRU purchaser.

In these crazy times you will see IRUs with monthly payments and leases with 100% upfront payments.

COOK Report (Feb 19): Let me translate my understanding of what you are saying. Of those carriers who have lit one or more fibers some 21 have done so with very expensive equipment that can multiplex EIGHTY streams of ten billion bits per second down a single lit glass thread. Meanwhile perhaps only 5 percent of the fiber laid is lit.

Each strand that is lit is lit for only about 8% of the bandwidth that the equipment attached to it is capable of driving down each thread. For every such lit fiber is attached to a box powered by lasers capa-

ble of 80 streams of 10 gigabits per stream. If I understand it correctly to light a stream you put a line card in that box -- with one box on each end of the fiber where each line card carries one stream. The boxes are expensive. The amplifiers between the boxes are expensive. But to light even one stream...ie to make one light wave to sell all this stuff has to be in place. The cards at a few thousand dollars per card are cheap by comparison and with probably 60 to 100 total lit fibers in the 21 carrier networks in North America you have perhaps only about 8% of the wavelengths being carried that could be carried at very cheap incremental cost.

St Arnaud: Your summary is bang on. I think it will be a long time before we new national fiber builds. There will still be some fiber build in the regions which are currently under served. [snip]

Does Sprint have its own separate right of way and fiber or does it share a lot with ATT and WorldCom/MCI?

St Arnaud: When you dig down you will find that many companies have IRUs on strands of fibers that were installed by other carriers. It is a very complex relationship

COOK Report: In the long haul you have maybe four distinctly geographically separate builds in the USA? Right? And that the 15 carriers have lit fiber along one of those rights of way?

St Arnaud: That would be correct. The four separate geographic builds are most likely as follows: Williams along gas pipeline AT&T along their traditional Right of Ways obtained years ago (and probably the most valuable) Qwest, 360 and L3 along rail right of ways. There are number regional builds along interstate highways and other Right of Ways - Telergy, etc RBOCs usually have their own Right of Ways independent of all the above

COOK Report: For each carrier how many strands are lit? Somewhere between two and six?

St Arnaud: Usually they light 4 strands for long haul and another 2 strands for regional aggregation. For example they will use long haul DWDM on 4 strands and metro DWDM on 2 strands to pick up small communities along the route

COOK Report: How many carriers globally can and do use ten gig wavelengths? Twenty? Thirty? Forty at most?

Schult: Probably 20 to 30 global carriers. If your question is whether in those locations where you have fiber lit is enough demand to buy any sizeable number of the available wavelengths? I think not. The thing to ask is what right now would require more wavelengths than customers are using? If you look at small enterprises they run their whole IP requirements off of two meg leased lines.

COOK Report Thus the big problem is whether given the amount of fiber and the potential investment of the involved players, $4 million a month in new transport sales for the largest 8 carriers and $2 million a month for those beneath them is enough to keep them from bankruptcy. If you try to extrapolate what information I have acquired down the food chain, the amount of new sales that can be generated under these conditions is limited. Right?

Schult: I agree and there in lies the problem. That is likely one reason for the "creative" accounting issues that have now surfaced.

Odlyzko Capacity Issues, pp. 37-38

Summary, Full Article

The general conclusion is that far more fiber was deployed in the long-haul market than was necessary, too much by a factor of at least 10. (The same conclusion does not apply to the metro area, however.) Thus in principle there is no need to deploy any more fiber in long-haul for 5 or more years. What will actually happen, though, is another issue, as the industry will be trading off deployment of new fiber versus deployment of equipment that can use existing fiber more intensively.

St Arnaud: Agree 100%. Not only was too much fiber deployed, but seriously too many fibers were lit with DWDM systems.

Odlyzko: 2. The prospects for the next couple of years are extraordinarily murky. The problem is that we have not just technology trends and the basic growth rate in demand for transmission (which is still high, approaching the approximate 100% per year that still seems to hold on the Internet) to contend with, but also the huge fiber glut (with smaller gluts of routers, etc.), and the dynamics of the financial markets and bankruptcy courts. [snip]

In the long run, capex is not going to grow faster than service revenues (which, by historical precedent, are unlikely to grow more than 8 to 10% per year), but there could be a few years of ramping up as capex increases from 15% to 20% of revenues or even a bit higher.

St Arnaud: Routers and enterpise will recover quickly. DWDM will take a long long time except for incremental upgrades to add additinal wavelengths.

Odlyzko: A related factor (at least in long-haul, probably much less so in metro, but I would really like to see some data on this) is that as time goes on, capex is likely to tilt more towards high-tech. Much of the early expenditure was for trenching, putting up huts for regeneration, and so on. Now that this is done, most of the expenditure will likely be for electronic and optical equipment, which is good news for the telecom supplier segment. (But this is probably not true in metro.)

(c) If the prediction in (b) about increased capex as fraction of revenues is realized, we will see a greater emphasis on simplicity, to lower operational expenses. This would go somewhat counter to the current trend, where to improve their financials, carriers are clamping down on capex and asking for higher utilization rates. The smart thing to do in the long run is to throw capex at the problem and eliminate labor (as in getting rid of SONET, etc.). This would

mean lighting as few fibers as possible, **at speeds as** high as possible (which, though, would go against the trend towards wavelength switching).

The Carrier's, pp. 39-41

Summary, Full Article

[snip] **MCI**

Chris Byron in the column cited above declared "Time is running out for WorldCom -- Sooner or later, company will almost certainly face liquidation." [Snip]

"Over the last 19 years, investors have poured more than $100 billion into this rural Mississippi telephone company, and basically, Worldcom has done nothing with the money except buy other phone companies. As a result, the company now sits, as of Sept. 30, 2001, with worthless goodwill on its balance sheet totaling more than $50 billion — so far as I am aware, the biggest such mountain of fake assets in all of corporate America. Add to that some $30 billion of long-term debt, plus $10 billion of unpaid bills and other short-term obligations, and you've pretty much got the whole WorldCom financial picture.

And here's the really interesting thing: Over the course of the 1990s, this $100 billion Mont Blanc of waste has not been able to generate a single dime of net new cash for the business, with all free cash flow coming from stock sales and debt financings (the "Cash Flows From Investing" part of the company's financials). In other words, the second largest telecommunications carrier in the country hasn't actually been a sound business from Day One, but has only seemed to be so because the economy was growing and stock prices were rising." [snip]

Mr Ebbers sold a small number of shares to meet these payments but eventually relied on his own company to lend him cash and guarantee another loan from Bank of America. Now that WorldCom's stock has crashed again, the company has had to take over all those debts, amounting to Dollars 198.7m. Mr Ebbers said he had borrowed Dollars 141m of another Dollars 165m loan the company had made available, and that WorldCom had supplied a Dollars 35m letter of credit to support other personal obligations. Personal loans like this were "totally inappropriate", said Charles Elson, a US corporate governance expert. "WorldCom is not a bank: this is what banks are for."

Besides risking its shareholders' money, WorldCom created a huge potential conflict of interest, becoming a big creditor of its most important employee, he added. The Ebbers loan exceeds the next-best example of bull market lending hubris when insurer Conseco lent Dollars 162.5m to then chief executive Steven Hilbert to buy its shares. [snip]

Global Crossing

"Carriers sell an IRU to allow another carrier or company the unfettered use of the capacity over a long period of time. Generally accepted accounting principles (GAAP) require companies to record the revenue generated by an IRU over the time of the contract."

"Global Crossing created metrics called "cash revenues" and "adjusted EBITDA" in press releases. Global Crossing's cash revenue measurement was defined as GAAP revenue plus the cash portion of the change in deferred revenue. Like pre-1999 accounting rules, it allowed the company to talk about all the revenue for an IRU up front, according to Olofson's attorneys."

Anthony Palazzo of the *Los Angeles Business Journal* said in a February 12 article: "Accounting has always been an obtuse art and in the case of Global Crossing Ltd., a seemingly simple determination in how to measure cash flows can be interpreted in any number of ways."

"That's the problem. The company, now in Chapter 11 bankruptcy proceedings, claims that so-called cash revenues, used by many telecommunications companies, are a better way to determine cash flows than revenues allowable under generally accepted accounting principles. Critics say that while cash revenues can be useful in measuring a company's performance, they can also be used to inflate the its results" [Snip]

Level 3, pp. 42- 48

Summary, Full Article

In doing this we have drilled down into just what dark fiber IRU sales are and the question of whether they will continue to play a major role in Level 3's revenue stream in the future. We conclude that they and the revenues derived from them will decline significantly. This is already happening. Level 3 does not dispute this and maintains that long term reliance on IRU income was never a part of its business plan to begin with. (Robin Gray Vice President Investor Relations For Level 3 said in an interview with us on February 19th: "We have already seen this decline. So hopefully that is factored in to our in large part already reported 2001 results."

Now it turns out that with the arrival of technology that made wavelength (lambda) sales possible in 2000 and the completion of L3's network in 2001 that lambdas (waves) began to be not only leased but also sold as IRUs. While dark fiber IRU sales already made by Level 3 will provide recurring revenue income, leases of light waves and sale of light waves as five year IRU's are now providing the bulk of Level 3 transport revenue.

Meanwhile as we have explained elsewhere in this issue the new IP optical network fiber based business model that was going to sweep the older circuit switched telcos into the proverbial 'dustbin' of history has itself failed and post Enron bought investigations onto the heads of Qwest, Global Crossing and 360 Networks. Investors are finding out that what they don't know assurances aside WILL hurt them.

In short we agree with Seth Libby of the Yankee Group as quoted by Internet News on February 15th: "I think everybody is under the microscope right now, as I think they probably should be. What the telecommunications industry needs right now is clarity." He added, "Anybody who entered the scene in the last

five years is going to come under scrutiny. That's not to say there's going to be a lot of problems, but there's going to be a top-down analysis."

From our perspective the most critical issue is whether Level 3 can increase other communications services revenues quickly enough to become viable before it runs out of cash. [snip]

Fiber was supposed to be like gold in the ground. The source of endless revenue derived by the ability to sell more and more IRUs on fresh dark strands. This has not happened and won't. Continued growth in revenue was necessary to make Level 3 profitable as increasing income finally surpassed the fixed costs necessary to keep it in operation. The question is how much can Level 3 earn in every quarter on into the future. Unless it is highly successful at increasing its revenue, it will find it very difficult to avoid bankruptcy by this time next year. If its revenue declines any further, the end will come sooner than that.

Level 3 Robin Grey Speaks, pp. 49-52

Summary, Full Article

" The vast majority of the dark fiber deals that we have done – more than 90% - are for the term of 20 years. So you could take the total amount of dark fiber that we have sold, divide by 20 years to estimate what is being amortized per year.

Let me give you those numbers. Pre-June 1999 we sold about $500 million of dark fiber. During 2000 and 2001, the company delivered that dark fiber and consequently has already recognized that revenue. There is All pre-6/99 dark fiber sales have been recognized.

When we sell dark fiber, we also sell co-location, power (electricity) as well as operations and maintenance services. From July 1, 1999 through December 31, 2000 we have sold approximately 3 billion of dark fiber and related services. The market for intercity dark fiber, as expected, contracted significantly in 2001. Nevertheless, for that preceding 18 months we sold 3 billion in dark fiber IRUs and the related services such as collocation, power and operating and maintenance fees. Approximately 50% of the total amount sold is for the dark fiber itself, and the other 50% is for related services. While the fiber is paid for upfront, the related services are paid for on a recurring basis.

COOK Report: But the difference between your cash and GAAP peaked in the first half of 2001 at an amount of 1.3 billion.

Grey: Keep in mind that the difference between cash and GAAP revenue is the net cash change in deferred revenue so this increases with new sales and decreases as IRUs are amortized and recognized in revenue. . But you are right, the sale of intercity dark fiber peaked at the end of 2000 and beginning of 2001.

COOK Report: That then is the reason for booking 1.3 billion in the first half of 2001?

Grey: The majority of our historical IRU sales were dark fiber sales. Beginning in 2001, IRUs are both dark fiber and lit services. We view dark fiber IRUs in an opportunistic way. They were a great way to in effect reduce the cost of our network, but it was never strategic to the company.

Of the 3 billion, about 50% 'other services'. These are services for which we get cash and book, just like a lease. You will see that 'other services' revenue in our colo/IP and transport revenue buckets, billed on a monthly basis. There is no difference between cash and GAAP revenue for the 1.5 billion other services like co-lo and transport. Generally, we sell dark fiber via an IRU rather than on a leased basis.

Odlyko on Googan and Industry Fate, pp. 53 - 59

Summary, Full Article

Roxane Googin is right to point out that debts can bring a carrier down. Leverage is great on the way up, but deadly when a business is contracting. However, we should keep in mind that the ILEC debt burden is not overwhelming. Global Crossing had debts of more than twice their annual revenues. AT&T until recently had debts about equal to its annual revenues. Qwest, a hybrid of a new long distance carrier and an ILEC, has long-term debt about equal to its annual revenues. On the other hand, SBC, to take just one ILEC example, has long-term debts of under 40% of annual revenues. Furthermore, ILEC revenues are largely shielded from the fierce competition that prevails in the long distance segment of the industry. That provides more security and freedom of action. Whether the ILECs will use this well is another question, of course. [snip]

Further, the relevant distances will be getting smaller as fiber is pulled closer and closer to the home by both cable and DSLcarriers. Eventually fiber will go all the way into the home. Whoever manages to accomplish this, will then likely have a true natural monopoly, with the ability to increase the bandwidth of the connection at low cost. Victory in this race to bring fiber to the home will likely depend mostly on the strategies and tactics of the competing players, and not so much on technology. [snip]

In communications, the trend towards a horizontal structure of the industry also appears inevitable. Who will adopt to it best is uncertain. The natural division would seem to be into providers of physical connectivity, providers of basic data transport, and outsourcers, who manage customer networks. The established long distance carriers, with their expertise in serving large enterprise customers, would seem to be best positioned to dominate in basic data transport and outsourcing. On the negative side, they have heavy debt loads and also the (rapidly shrinking) legacy of the consumer long distance business as a burden. The ILECs have the financial resources to attempt moving into outsourcing, but lack the expertise, and would require a wrenching cultural change to adapt. Their natural niche seems to be in providing physical access and basic data transport, although even there, one could have separation into several layers. (The separation that

reformers would like to force on the ILECs for the sake of creating competition may be sound business strategy.) [snip]

The greatest growth opportunities in telecommunications are likely to lie in services. As was mentioned above, the "stupid network" metaphor for the Internet ignores the huge costs at the edges of the network, costs that are often not explicit, since they involve time and aggravation for the customers. This again mirrors what happened in the computer industry. It again brings up the example of IBM, a company that is in the process of transforming itself from a vertically integrated producer of computer systems to a service company, running other companies' IT operations. IBM has about three times the revenues of Microsoft, two thirds of the profits, a lower growth rate, and a stock market valuation about 55% that of Microsoft. However, it is regarded as a remarkable success story, and its stock price has not been devastated to the extent that shares of most of the other computer companies have been. IBM apparently sees its future in dominating enterprise software integration, thus operating in a horizontal layer different from that of Microsoft. (It has given up the fight for the desktop with Microsoft that it carried on for a long time with OS/2, but supports Linux, presumably largely to keep Microsoft from exploiting its monopoly. Similarly, continued development of its own hardware serves to keep Intel's dominance in microprocessors in check.) [snip]

The conclusion is that the long distance carriers should aim to model themselves after IBM. The most promising area for them is to manage networks that are largely owned by their customers. This will be a huge change, but the IBM example shows that it possible, and also that there is time to do it. The ILECs might be tempted to follow in this same direction, but are less likely to succeed, and may have to resign themselves to operating at lower levels of the networking hierarchy. However, there is likely to be enough opportunity for them even there to thrive.

Conclusion, pp. 59 -61

Summary, Full Article

Certainly the outlook for the long haul carriers is grim. A few months ago it was assumed that the LECs would buy them. Now this outcome is regarded as doubtful. (Consolidation: Fools Rush In? By Carol Wilson. One analyst explains why a buying burst by the Bells may not be a smart move. http://www.theneteconomy.com/article/0,3658,s=902&a=22926,00.asp) Certainly we have come to believe that carrier equities and bonds are not the instruments to be basing one's retirement hopes on. LEC equities and bonds are stronger but the question is by how much. We have come to agree with Googin that the industry may well be headed for bankruptcy across the board. Until the government or someone clears the decks there will be no hi-tech recovery worthy of the name. For the time being official Washington will steer clear cause official Washington hasn't a clue.

However, if government stays out, the "free market" solution that may well occur is likely to be a long and even more painful unwinding. It will also very likely be tailor made for a cash rich company like Microsoft to buy up a phone company or two. A February 11 article in Internet news http://www.internetnews.com/dev-news/article/0,,10_970851,00.html should give readers pause for thought.

"So what exactly is a web service? Quite simply, it is a fundamentally new approach of developing a software application that can share information through Internet Protocol (IP). What makes all of this so revolutionary is that these newly created systems would be able to interact and exchange information regardless of the platform or environment. [Snip] Next week, Microsoft plans to unveil Visual Studio.NET, the mother of all developer tools for the mother of all platforms. With VS.NET, Microsoft is hoping to convert 7 million licensed developers to upgrade to the .NET platform. In fact, Microsoft is in the unique position of having the ONLY platform that is capable of directly reaching PC consumers."

But Bill St Arnaud suggests a different course saying Googin is absolutely right that the current model for investment is not sustainable. I have suggested that this lack of sustainability might be the spur to move telecomm to an asset based industry as opposed to a service based industry - much like the computer industry has evolved over the past 20 years. There are companies with fiber resources who are now going into the market of designing and building for customers both condominium and wavelength approaches to the fiber market. In the design and build market a company practicing this business model will light up a dark fiber and take on responsibility of all maintenance etc on behalf of another carrier. The contract says that as the provider (fiber owner) adds additional wavelengths for other carriers to the same lit strand, the price will be reduced over time for the original customers. Also some equipment manufacturer's are moving into this space as well – some announcements pending."

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Executive Summary:

Why the Economy of Telecom is Broken

This combined April May Special issue of the *COOK Report on Internet* takes an exhaustive look at the train wreck produced by the collision of ten years growth of IP and optical data networks with the circuit switched world. In preparing the second half of this issue we have taken a hard look at the world of fiber, IRUs both dark and lambda sale and, bandwidth over capacity. What we have found tells us that the telecom industry carnage is likely to continue until it burns itself out.

It is immune to attempts at rational policy making and perhaps even to informed judgements by the economic markets because we simply do not have good data broken down by carrier on bandwidth capacity and sales. We have been able to compile some data on our own. The picture this data presents is discouraging because in not knowing what the carriers are selling we simply do not have a fix on bandwidth demand and return to carriers for their huge investment in optical technology. Individual companies may understand the industry's problems but they can hardly afford to be publicly vocal out of fear of depressing their share prices even further.

Looking at how we got into the current mess we find that between 1985 and 1995 the legacy telco networks were structured for the digital delivery of circuit-switched voice with the purchase of a very expensive SONET based infrastructure. With data representing a small but growing share of traffic their business model seemed to permit them adequate time to convert their networks and financing to cope with a data dominant future.

Meanwhile, new players with newer networks, therefore lower cost bases, are able to offer less costly transport and connectivity services, which further erode the revenue base of the incumbents. Notwithstanding, these new players have not grown fast enough to reach economic viability. Most are bankrupt or tottering on the brink. Legacy ILEC operating expenses are not to going to be able to be rapidly reduced. In the past, as long as operating income was growing, the difference between revenues and expense in the form of earnings would permit the ILECs to try switch to a newer and more cost-effective infrastructure. But today, the difficulty of carrying out such a switch is increasingly obvious.

Andrew Odlyzko three years ago began to explain why the foundation of bandwidth doubling every 90 days on which both the dot com craze and fiber builds of 1996 – 1999 were based was not reality but a myth.

In a similar vein Roxane Googin for about two years has been explaining why the much feared re-integration of telcos into an ILEC led monopoly won't happen either. If Odlyzko delivered the first piece of bad news by telling us we had geared up for a demand that wasn't there, Googin has a her own dose of harsh reality to present. The new technology although itself not yet built into viable companies is eroding the base on which the circuit switched telcos operate rendering their balance sheets unsustainable as well. It is our contention that if we grasp both of them and understand how one flows from the other we will begin to be able to address industry's problems. It is our objective to do just this in this issue of the *COOK Repor*t.

The shape and economics of telecommunication and the Internet is on the verge of continued massive change despite appearances of consolidation. Unless we become unbelievably stupid in attempting to legislate the re-establish a centrally controlled monopoly, there are too many new pieces of peer to peer and wireless technology to enable success.

We shall have centralized legacy structures lumbering on for sure. But you will also have technologies that put music photos and video at users fingers tips and with the tools by which to share them an opportunity to use plentiful band width should it be delivered. We see some big picture changes on the way. Asset based telecom will deconstruct the industry into hundreds of thousands of loosely coupled miniature telecom companies.

In parallel users of 802.11b nets and peer to peer technologies will weave an independent spheres of telecommunications as the centralized corporatized giants are restructured, we must hope in more benign and viable forms.

We may not have seen the last of the new technologies either. Just as the web emerged from no where, the creation of peer to peer like "trust" technologies from Safevote http://safevote.com and NMA, http://nma.com not to mention the newly emerging field of "web services", may well add new demand for services both at the edges of the telecom system and from more centralized services that also communicate with vast user communities at the edge.

Roxane Googin Interview, pp. 3 - 14

Highlights, or Full Article

What I am suggesting is that we must start by looking at the problem and get people to accept that there is a problem. Do this by studying the manifestations of the problem. And then look for solutions. People are confusing the problem and its manifestations with solutions because they can't stand the tension of not knowing what will happen. But its only after you sit with the uncertainty for a while can you come up with a good solution. Knee jerk solutions based on inadequate understanding won't help.

The Telecom problem is certainly not isolated to the newcomers. To me the fact that people seem to think it is isolated to the newcomers is a bad sign. Why? Because the real Telecom problem is with

the incumbents. This makes things even messier because the new green field companies that we were counting on to implement the new technology are themselves damaged. We are in danger of finding ourselves in a situation where the attackers are unable to succeed and where the older players with nonproductive technologies are seen as unable to fail. The attackers are running out of cash before they can get big enough for their operations to scale and pay their operating expenses.

The LECs voice operations on which they depend for their profits have stopped growing and with respect to access lines and minutes of long distance calls terminated to subscribers are shrinking. The LECs tout data growth but income from data services is not enough to offset that lost from more expensive and profitable voice. We simply do not have accurate statistics on total minutes if use of the local voice network. However on page 54 above Andrew Odlyzko points out a fascinating statistic from the United Kingdom - namely that minutes of use of the local network in the form of dial up internet access are more than 50% of the total as of July 2001.]

Given the shrinking of the LEC voice markets, combined with the twenty two billion dollar bankruptcy of Global Crossing; the exposure of Enron's bandwidth trading as built on air or fraudulent depending on your point of view; Wlliams Communications January 29 announcement that it was delaying reporting quarterly earnings; and Level 3's January 29 statement that "it might not meet some of its financial obligations this year," we have a situation where a lot of debt dominoes are beginning to fall. Furthermore, that collapses in some areas will lead to collapses in others. WorldCom shares have just hit a 7 and a half year low with rumors of down grade on bonds to junk status. AT&T revenues are down.

A key question to ask is At what point does this snowball beyond the ability of the US government to do anything?

Googin thinks probably this year. It's inevitabl, she says. The only uncertainty is the precise timing. They will restructure. It will be ugly. People will loose money. But we will live through it.[snip]

Odlyzko Klein Discussion, pp. 15 -20

Highlights, or **Full Article**

Googin: Everyone has been playing a little game which now is ending because of IP. Everyone is saying IP will drive prices down by a factor of ten. What people have forgotten about asking is what happens when you own that great big house that you have mortgaged to the moon and all of a sudden your income goes down by 90%.

Odlyzko: Not "[e]veryone is saying IP will drive prices down by a factor of ten."

Googin Response, pp. 21-23 Highlights, or Full Article

Roxane thanks Andrew Odlyzko for elucidation of technical detail that could mitigate against the percipitous decline of the LECs. She then says: "However, the issue at hand is so massive, I doubt it can be understood by reductionist, incremental, thinking that I see in Andrew's critique. While this use of bottoms-up logic forms the well-proven basis of the scientific method, it does not address radical change well. I am therefore approaching the problem from a top-down, holistic viewpoint. I am basically asking what happens when the irresistible force (optical/IP pricing) meets the immovable object (legacy Telco infrastructure, debt, headcount, equipment, copper, and all)".

The points I am making about data boil down to my saying that using the sketchy information available, phone companies are about breaking even on their data revenues on an EBITDA basis, as they recieve about 25% of "voice VGE" dollars in on a product that costs about 25% of "voice VGE" dollar to provide. Since EBITDAmeans earnings BEFORE interest, taxes, depreciation and amortization, this means we have a growing problem if you hold the bonds, or want to sell them any gear. To my best guess, this scenario says that the declining (voice) business has to pay ALL interest, cap-ex and debt principal payments. This would explain the recent RBOC behavior in terms of cap-ex and headcount cuts, with continued declines in margins. [snip]

We can ask all day how fast prices will decline, how fast traffic will move, or what regulators will do, but that hinges individual human behavior, which is inherently non-deterministic. Here, one person's guess is as good as another's.

What is of use to ask is "What happens to a leveraged, legacy, infrastructure when a "killer" technology that costs 1/10th as much to own and operate comes along?" One might say, "it will drive down prices and profits". Then, you start looking for declining prices and profits, which is exactly what we are seeing now. I report what I see, not what I think people will do.

The RBOCs are not healthy today. They are losing their all-valuable access lines, and those pricey access minutes. They are cutting cap-ex and headcount, and are still struggling to meet reduced expectations. I am an analyst's analyst, the one professionals call in to see whether their own analysts are giving them the straight poop. I am paid to know clearly what Wall Street thinks. From this vantage point I can state categorically that these companies are not cutting cap-ex to keep analysts happy, they are cutting it (and their people too) because the base profitability of their business is declining.

David Isenberg: Enronization of Telecom. pp. 24-25

Highlights, or **Full Article**

I've been thinking about Googin's plaint for a year and a half, off and on. I'm coming to the view that she's seeing two loosely coupled, separable phenomena. The first thing she's seeing is the general malaise in the telecom sector, aggravated by bubble-busting, debt-hiding, other accounting tricks, and not-very-radical technology substitution (e.g., cell phones for land lines, email for phone calls). The

second phenomenon, the stranding of network assets because they're rendered obsolete by radically cheaper, fundamentally simpler networks, is potentially much more powerful, but is a longer-term phenomenon that has not yet hit the local telco's fan.

William Klein, pp. 26 -30
Highlights, or Full Article

Kelin states: The RBOCs may also face difficulties building a national business customer base. Businesses in general have widely accepted the RBOCs for local voice service, and in some instances for long distance voice service. However for data services, the RBOCs have yet to prove that they are capable of offering much beyond high speed DSL as broadband access in certain metro markets. What they are doing is well behind the progress of either the incumbent long haul providers or the next generation service providers. Even if the RBOCs are able to offer national data services, it may be some time before they are competitive either on a pricing basis or in developing a comprehensive suite of service offerings.

Of the long haul incumbents, the greatest question remains AT&T which for reasons unknown to me, is bent on building an IP overbuild network. This, in my opinion, is madness, given their financial flexibility and suite of service offerings today. How they have managed to hang on to their customer base frankly baffles me. Obviously, Armstrong's strategy (for both the consumer and enterprise markets) has failed miserably, causing investors great pains over the past few years. It would be far better for AT&Tto bite the bullet and outsource its transport service, as IBM did when it transformed itself from "big iron" towards services. There is absolutely no reason, in my opinion, why AT&T could not buy lambdas from Level 3, Qwest, Williams and others for transport, and focus its capital expenditures on such important areas as innovative applications/services, as well as customer service/retention

Klein also presents an interesting argument against government involvement on behalf of failed networks.

Caught in a Glut, pp. 31 -33 Highlights, or Full Article

We are trapped between the jaws of huge ununsed capacity and content owners protection of intellectual property at any cost. The politics and economics of our slavish obedience to the "free market" is constricting the availability of bandwidth by placing marketing and policy in the hands of those who expect pay per use demand that lives in a walled garden to define and drive the development of broadband services.

Only about 5 or 6 percent of the long haul inter city fiber installed has been lit or will be lit in the foreseeable future. Of the fiber that is lit by 80 wavelength capable boxes only about 8% of what these boxes are capable of is in use. Each incremental wavelength used costs only a few thousand dollars per line card per a couple of dozen boxes to install. Adding ten gigabits to a backbone is relatively trivial and compared to the original cost of building and lighting the incremental cost of doing so is very small. Currently only about four to eight wavelengths per carrier are lit.

Consider demand. Just as the demand for dark fiber IRUs has peaked and fallen off, the demand for wavelengths may now be peaking. Until the fiber owners start publishing verifiable numbers every quarter on how many wavelengths they have "sold" via IRU and via lease there is no credible way to judge changing trends in supply and demand.

Now we can safely assume that with phone network use having peaked there will be little in the way of additional demand there. Assuming that data still doubles every year in North America, you may be able to sell an aggregate of 20 to 25 new lambdas this year to handle carrier data growth. But with fifteen American carriers and six Canadian each with 80 wavelength capable systems you have an easily provisioned supply of more than 1600 lambdas perhaps only 150 of which are lit. The problem is that without complete disclosure from each carrier there is no way of knowing exactly what capacity is actually in use.

Nevertheless our experts are all in agreement that used capacity is only a tiny fraction of what's available. Whether the amount is 4 percent or 12 percent, under current circumstances, makes little difference. In short we likely have at least a five or six year window with current growth before, with the addition of new lambdas, we fill the capacity of the fibers that have been lit. sales of dark fiber IRUs have basically ended leaving long haul growth dependent on lambdas sales.

But who will buy? Prices are getting cheap enough for enterprise networks to consider using lambdas. But right now even the largest enterprise networks are mostly 155 megabits with a very few 2.5 gigabit links here and there. Most enterprises don't have the means of connecting 2.5 gigabits to a campus let along ten.
This leaves other carriers who have a fraction of the capital they once did and whose need for new capacity has slackened.

Bill St Arnaud put it this way: "However, even given that [a rapid growth in data traffic], I think in the long haul it will be another 3 years before we see any new fibers lit, another 10 years before new fibers are blown in existing conduit and another and 15 years before new conduit is trenched in the ground." The situation seems dire and will determine the fate of many carriers. Policy makers and financial markets are being called on to make judgements but neither policy makers nor financial markets can see the carriers resources. With the small resources at our command we cannot do a definitive census of the carriers. But even with increased resources, it is unlikely that carriers would admit to a highly embarrassing situation.

We are stuck with a conundrum where until the debt is wiped off carrier books or until demand skyrockets you have the entire industry embedded in a continued downward spiral that results in more and

more bankruptcies. Demand will not skyrocket until the LEC controlled copper based local loop is by passed and either fiber or multi-megabit per second wireless reaches the vast majority of homes and businesses. Even then the demand may still be too easily filled by capacity on hand, until and unless the Canadians can make it possible to extend a wavelength to every home and business.

The technology has indeed overwhelmed the global infrastructure and its installed economic base and rendered it not economically sustainable. Canada looks to be following a strategy of enabling more uses for bandwidth while the United States follows a course of laissez faire in which the market knows best theory is freed to allow the concentration of media and carriers to consolidate an infrastructure duopoly where cable and DSL are the only officially blessed avenues to broadband. The US policy seems likely to be one of handing the market to huge and powerful old technology companies. the funny thing is that if Googin is right those companies will fail.

Overcapcity & IRUs, Some Technical Detail, pp. 34-36 Highlights, or Full Article

A further difficulty in doing anything other than flying blind in this new wild and wooly telecom market that we were assured needed no regulation is that we don't even have standard trminology.

Consider for example the all important IRU. We asked St arnaud for help. he told us. An IRU can be for any period of time but traditionally have been 20 years. IRUs started with underseas cables about 50 years ago when the cost of a cable was so prohibitive that a number of carriers were required to partner together to build the cable. The IRU was created by accountants and lawyers so that each participant could treat their portion of the cable as an "asset" with all the rights and privileges of other fixed assets like buildings - e.g the right to sell, depreciate, etc

As far as I know there is no formal legal definition of an IRU today. As such its use has become bastardized over the past years. In general an IRU implied an upfront capital payment. Leases implied annual or monthly payments - but most importantly title to the bandwidth remained with the leaseholder as opposed to IRUs where title is transferred to the IRU purchaser. In these crazy times you will see IRUs with monthly payments and leases with 100% upfront payments.

COOK Report Thus the big problem is whether given the amount of fiber and the potential investment of the involved players, $4 million a month in new transport sales for the largest 8 carriers and $2 million a month for those beneath them is enough to keep them from bankruptcy. If you try to extrapolate what information I have acquired down the food chain, the amount of new sales that can be generated under these conditions is limited. Right?

Schult (Telegeography): I agree and there in lies the problem. That is likely one reason for the "creative" accounting issues that have now surfaced.

Odlyzko Capacity Issues, pp. 37-38

Highlights, or Full Article

The general conclusion is that far more fiber was deployed in the long-haul market than was necessary, too much by a factor of at least 10. (The same conclusion does not apply to the metro area, however.) Thus in principle there is no need to deploy any more fiber in long-haul for 5 or more years. What will actually happen, though, is another issue, as the industry will be trading off deployment of new fiber versus deployment of equipment that can use existing fiber more intensively.

St Arnaud: Agree 100%. Not only was too much fiber deployed, but seriously too many fibers were lit with DWDM systems.

Odlyzko: 2. The prospects for the next couple of years are extraordinarily murky. The problem is that we have not just technology trends and the basic growth rate in demand for transmission (which is still high, approaching the approximate 100% per year that still seems to hold on the Internet) to contend with, but also the huge fiber glut (with smaller gluts of routers, etc.), and the dynamics of the financial markets and bankruptcy courts.

The Carrier's, pp. 39-41

Highlights, or Full Article

Chris Byron in the column cited above declared "Time is running out for WorldCom -- Sooner or later, company will almost certainly face liquidation."

"Over the last 19 years, investors have poured more than $100 billion into this rural Mississippi telephone company, and basically, Worldcom has done nothing with the money except buy other phone companies. As a result, the company now sits, as of Sept. 30, 2001, with worthless goodwill on its balance sheet totaling more than $50 billion — so far as I am aware, the biggest such mountain of fake assets in all of corporate America. Add to that some $30 billion of long-term debt, plus $10 billion of unpaid bills and other short-term obligations, and you've pretty much got the whole WorldCom financial picture.

And here's the really interesting thing: Over the course of the 1990s, this $100 billion Mont Blanc of waste has not been able to generate a single dime of net new cash for the business, with all free cash flow coming from stock sales and debt financings (the "Cash Flows From Investing" part of the company's financials). In other words, the second largest telecommunications carrier in the country hasn't actually been a sound business from Day One, but has only seemed to be so because the economy was growing and stock prices were rising."

Level 3, pp. 42- 48

Highlights, or Full Article

In doing this we have drilled down into just what dark fiber IRU sales are and

the question of whether they will continue to play a major role in Level 3's revenue stream in the future. We conclude that they and the revenues derived from them will decline significantly. This is already happening. Level 3 does not dispute this and maintains that long term reliance on IRU income was never a part of its business plan to begin with. (Robin Gray Vice President Investor Relations For Level 3 said in an interview with us on February 19th: "We have already seen this decline. So hopefully that is factored in to our in large part already reported 2001 results."

Now it turns out that with the arrival of technology that made wavelength (lambda) sales possible in 2000 and the completion of L3's network in 2001 that lambdas (waves) began to be not only leased but also sold as IRUs. While dark fiber IRU sales already made by Level 3 will provide recurring revenue income, leases of light waves and sale of light waves as five year IRU's are now providing the bulk of Level 3 transport revenue.

Meanwhile as we have explained elsewhere in this issue the new IPoptical network fiber based business model that was going to sweep the older circuit switched telcos into the proverbial 'dustbin' of history has itself failed and post Enron bought investigations onto the heads of Qwest, Global Crossing and 360 Networks. Investors are finding out that what they don't know assurances aside WILL hurt them.

Level 3's Robin Grey Speaks, pp. 49-52

Highlights, or Full Article

Grey: The majority of our historical IRU sales were dark fiber sales. Beginning in 2001, IRUs are both dark fiber and lit services. We view dark fiber IRUs in an opportunistic way. They were a great way to in effect reduce the cost of our network, but it was never strategic to the company.

Odlyko on Googan and Industry Fate, pp. 53 - 59

Highlights, or Full Article

Roxane Googin is right to point out that debts can bring a carrier down. Leverage is great on the way up, but deadly when a business is contracting. However, we should keep in mind that the ILEC debt burden is not overwhelming. Global Crossing had debts of more than twice their annual revenues. AT&T until recently had debts about equal to its annual revenues. Qwest, a hybrid of a new long distance carrier and an ILEC, has long-term debt about equal to its annual revenues. On the other hand, SBC, to take just one ILEC example, has long-term debts of under 40% of annual revenues. Furthermore, ILEC revenues are largely shielded from the fierce competition that prevails in the long distance segment of the industry. That provides more security and freedom of action. Whether the ILECs will use this well is another question, of course.

The conclusion is that the long distance carriers should aim to model themselves after IBM. The most promising area for them is to manage networks that are largely owned by their customers. This will be a huge change, but the IBM example shows that it possible, and also that there is time to do it. The ILECs might be tempted to follow in this same direction, but are less likely to succeed, and may have to resign themselves to operating at lower levels of the networking hierarchy. However, there is likely to be enough opportunity for them even there to thrive.

Conclusion, pp. 59 -61

Highlights, or Full Article

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with the resource holder and then go their separate ways when assets were delivered to the customer.

ICANN Admits Failure but Slithers Forward pp. 62 -66 Full Article

Mikki Barry writes:" ICANN has failed. We wanted everyone to fall into line voluntarily, but they aren't doing so, despite all of the threats of governmental takeover starting from Ira Magaziner during the IFWP and continuing almost weekly ever since. After three years, the ccTLDs still won't give us money, the RIRs basically ignore us, and most others already understand that we are largely irrelevant unless we're going beyond our mandate to make policies that they like."

http://slashdot.org/article.pl?sid=02/02/25/035254

ICANN CEO Stuart Lynn today released a plan for a "strong" ICANN that would have 5 of 15 Board members selected directly by governments and the rest by registrars, registries, plus a few Board-squatter-like ringers chosen by the ICANN Board or staff. The main justifications offered for this shift are that in order to be "strong" ICANN needs more money, more support, and less "process". Of course, promises Lynn, ICANN's "core values of openness and broad participation" should be "preserved". (Don't laugh. It's not funny.) "Meaningful participation" will be achieved by cutting out any direct representation for end-users. Oh yes, ICANN wants a much bigger budget, and to be independent of the US Dept. of Commerce, and to get direct control of the root server operators too, all so as to ensure that ICANN has unimpeded ability to execute its (undefined, growing) "mission". ICANN was supposed to save the Internet from governments; since major interest groups such as the ccTLDs and RIRs won't do what ICANN wants, and won't pay it, ICANN now turns to governments to save it from the Internet. See the Press Release here, and then look at entire plan, then visit ICANNWatch.org for updates and commentary." Yep. The proposal would eliminate any pretense of At-Large involvement in running ICANN - it would be solely a governmental and corporate body. - Michael Froomkin

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