



Intercontinental Connectivity

Overcapacity?
Impact of telecom recession?

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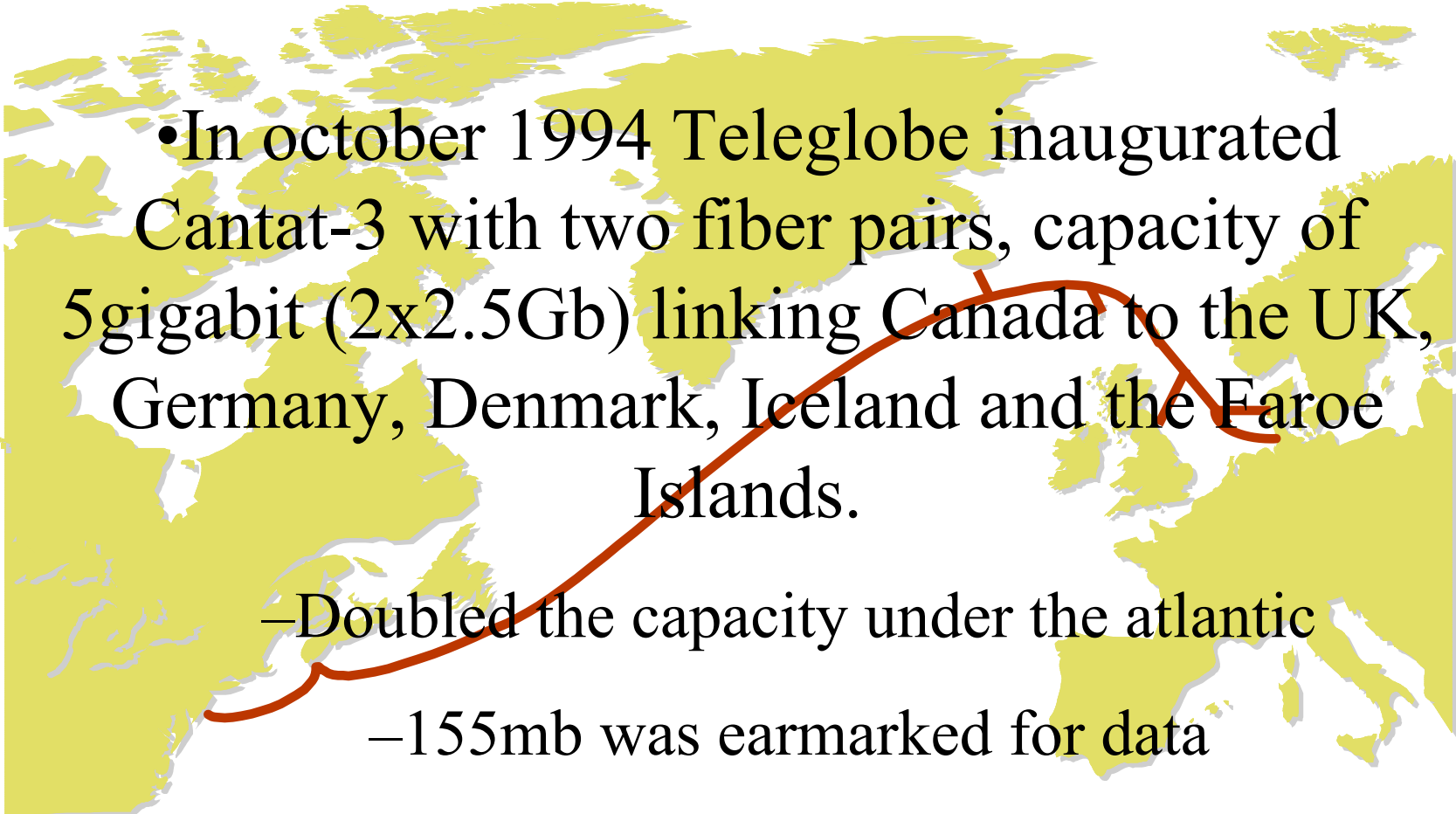


- Agenda

Evolution of Transoceanic internet capacity
demand and supply

Impact of the Telecom recession

• The difficulty of predictions and forecasts

A map of the North Atlantic region, including parts of North America, Europe, and the Faroe Islands. A red line traces the path of the Cantat-3 cable, starting from the coast of Canada, crossing the Atlantic Ocean, and ending in the Faroe Islands. The text is overlaid on the map.

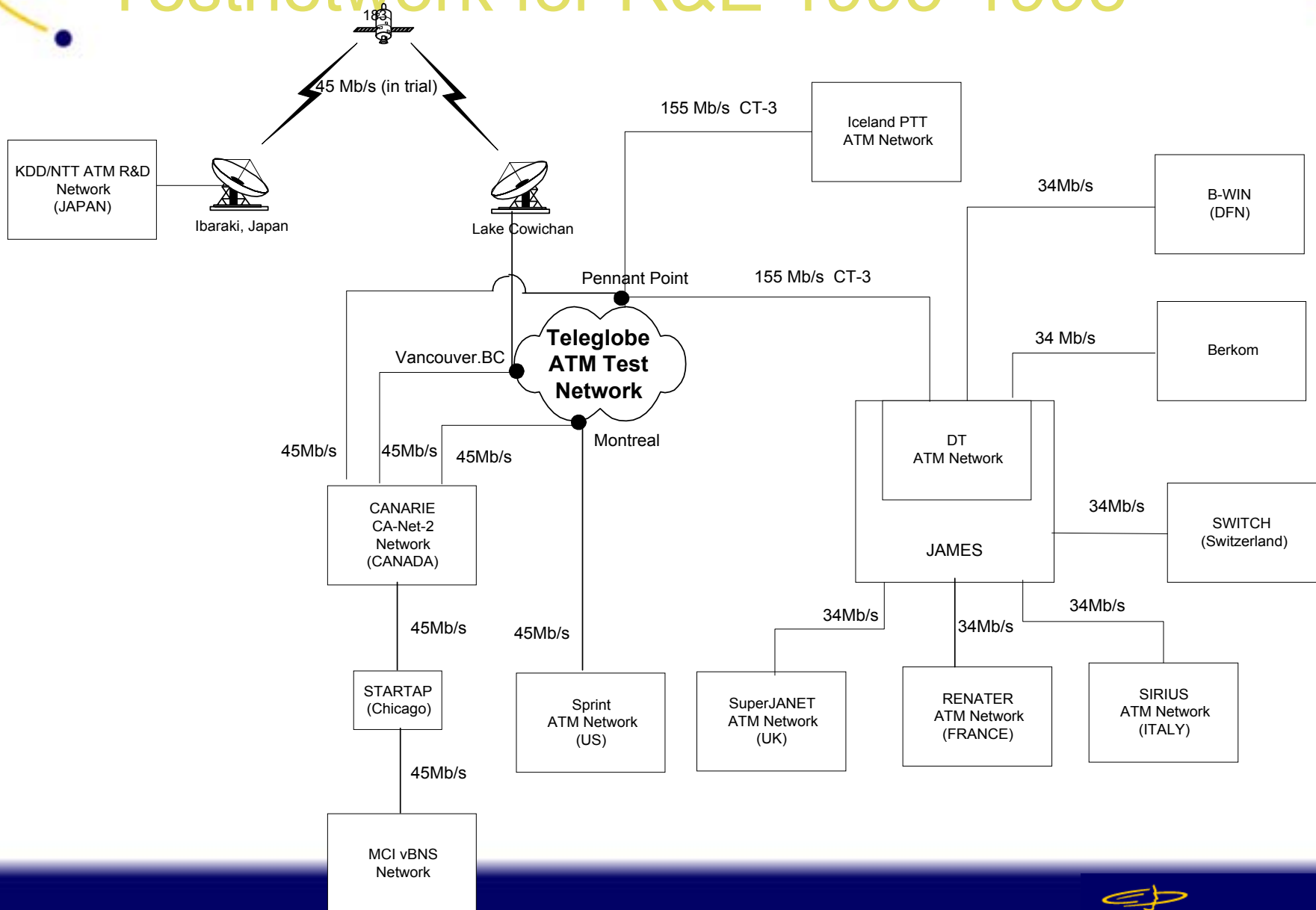
• In October 1994 Teleglobe inaugurated Cantat-3 with two fiber pairs, capacity of 5 gigabit (2x2.5Gb) linking Canada to the UK, Germany, Denmark, Iceland and the Faroe Islands.

– Doubled the capacity under the Atlantic

– 155mb was earmarked for data

– Engineering estimated 17 years to fill the cable

Testnetwork for R&E 1995-1998



• What happened since

The internet tsunami took everybody by surprise.

Cantat-3 was full in less than 3 years.

Five years later cables of 1000 times the capacity of Cantat-3 are being installed.

Deregulation and ease of access to capital created a multitude of new carriers and a cornucopia of transmission capacity.

After a peak in early 2000, overcapacity has led to the current telecom meltdown.

Carriers deployed global networks such as Teleglobe's GlobeSystem.

R&E transatlantic connectivity went from the the meg/s to gig/sec

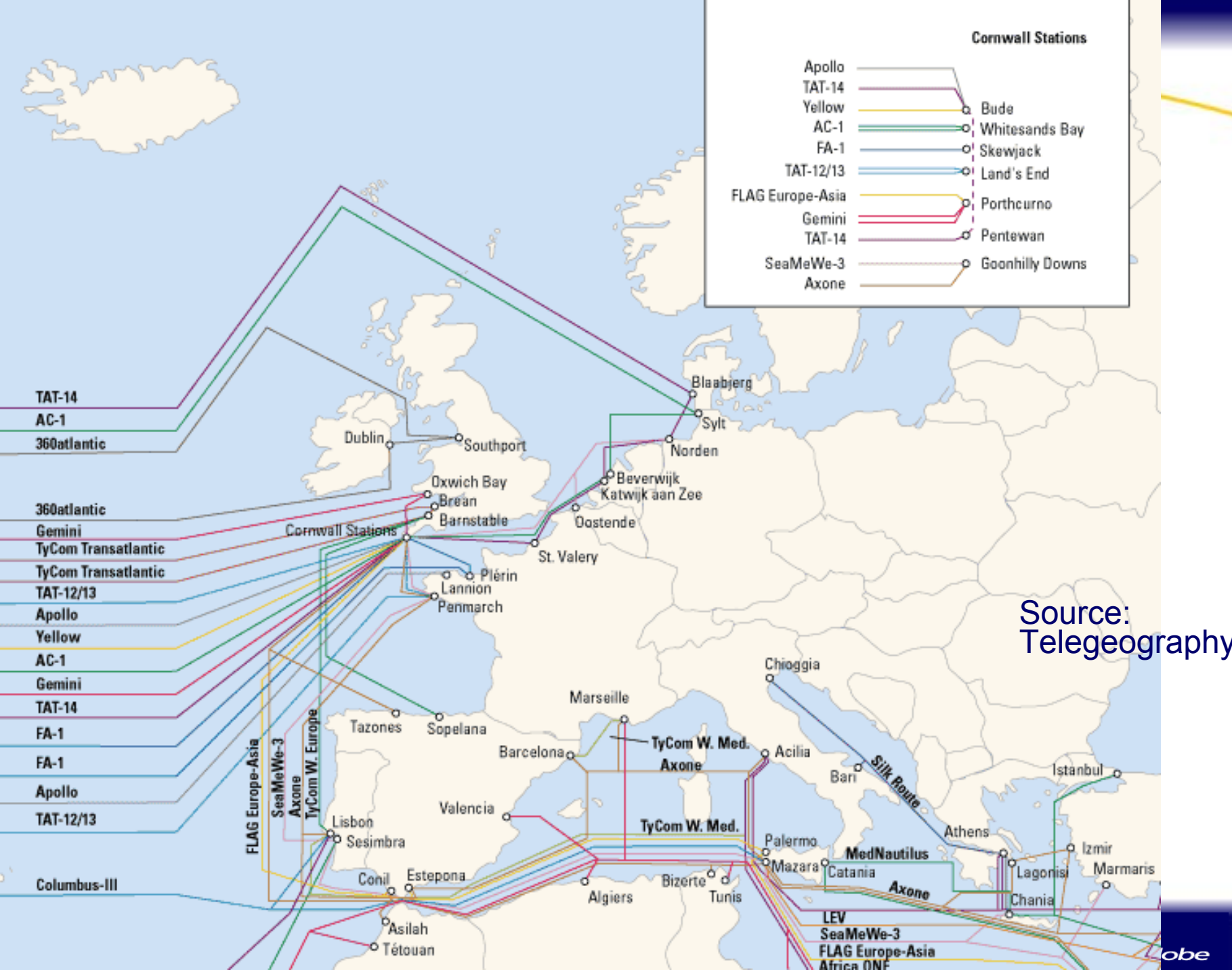
The battle of the Atlantic

Capacity coming online

		Gbps*	RFS
● Level 3/GC (Project Yellow)	320	1,280	sep00
● TAT-14 (Club)	640	640	apr01
● FLAG Atlantic-1 (FLAG/GTS)	160	2,560	sep01
● Hibernia (360networks, Inc.)		1,920	3Q01
● Atlantic Crossing -2 (Global Crossing)		2,560**	1Q01
● TyCom Global Network		2,560	2Q02
● Oxygen		No Go!	-----
● Apollo (C&W)		3,200	4Q02(?)
●	total	12,160	

* = Design capacity

** = Cancelled, AC-2 joining Level 3



Source:
Telegeography

The battle of the Pacific

Capacity coming online

		Gbps*	RFS
● TPC-5 (club)	20	20	dec98
● Southern Cross	60	480	nov00
● China-US (club)	20	80	jan 01
● PC-1 (Global Crossing & Marubeni)	80	640	apr01
● Japan-US (club)	80	640	oct01
● Tycom Pacific	360	7.680**	2Q02**
● FP-1 FLAG Pacific	160	5,120***	2Q02
● 360 Pacific		4,800***	3Q02
● JNAC MoU US-Jp-Ch-Kor-Tw		5,120****	2004?
●		total 9,560	

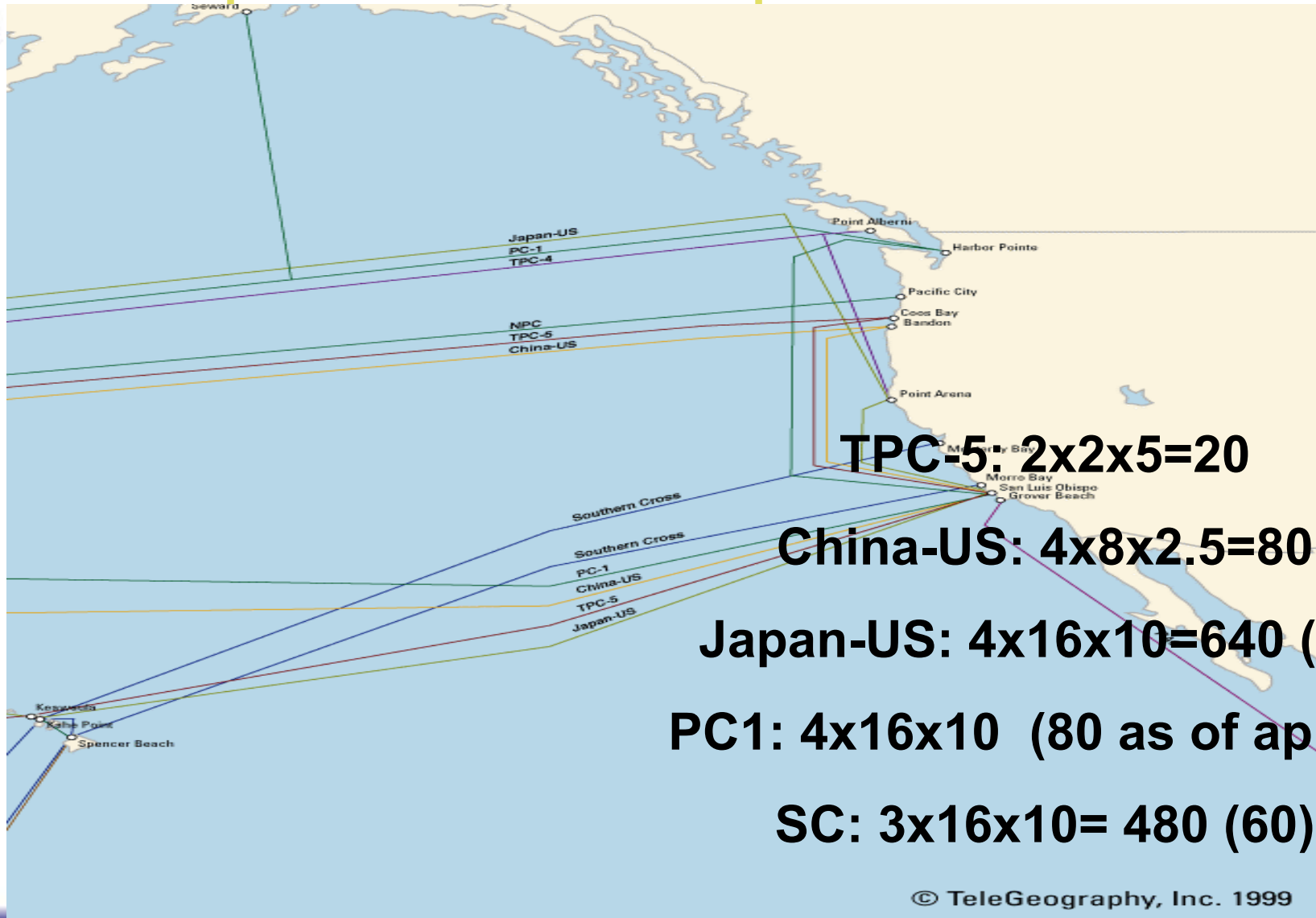
* = Design capacity

** = april: Tycom joins FLAG

aug 8th 01: FLAG withdraws, Tycom continues alone; RFS postponed to 2003

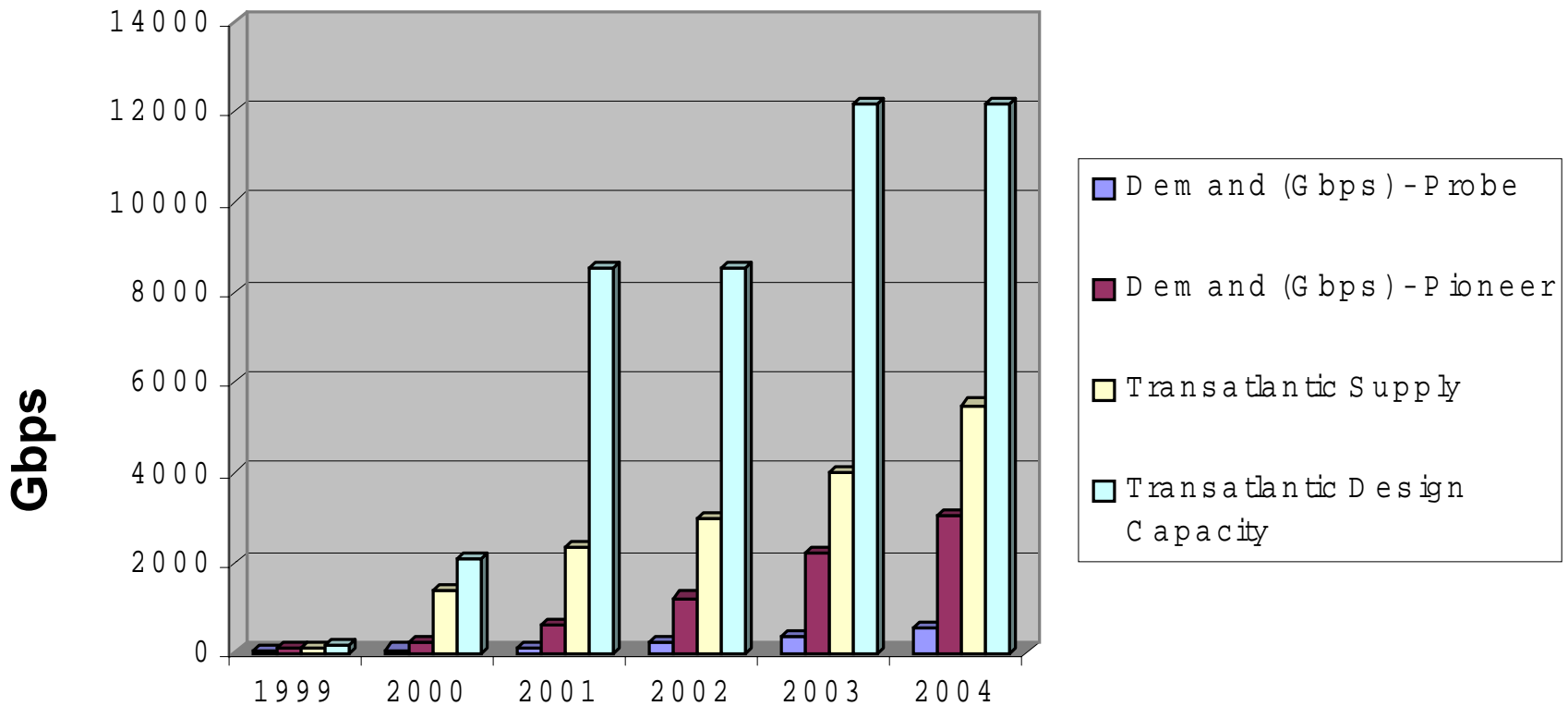
= project dropped *=financing not completed; project mothballed?

Transpacific cables up to end 2001



Could there be oversupply?

Atlantic supply exceeds conventional demand forecasts:
strong downward price pressure !





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• Telecom meltdown?

Telecom debt USA plus Europe :US\$700 billion

More than 100 billion could default or restructure

US comm spending 2000: US\$124 billion; 25% year over year increase from 1996 to 2000; 2001: -15%, Capex of major carriers for 2002 down by 30%. Some forecast another 5% down in 2003.

Teligent, Northpoint, Winstar, Covad, Teligent, PSInet, 360network, At Home, Global Crossing, Yipes, FLAG, Viatel, Carrier1 etc. file for bankruptcy protection.

Massive layoffs at service providers and manufacturers

• Oversupply?

Carriers spent much of the several years tearing up streets and laying down fiber routes as if demand knew no bounds. But now the utilization rate of that vast network is a staggeringly low 2.5% according to Merrill Lynch & Co. Telecom equipment analyst Tom Astle.

Business Week, April 9th 2001

More recent articles put utilization at between 5 and 10%
Some authors even question whether there is oversupply

• How did we get into this predicament?

Deregulation combined with the internet and wireless boom led to wild spending by established telecom carriers and start-ups.

The 1996 US Telecom act and European deregulation promised access to a US\$300 billion market growing at 10% p.a.

Get rich quick model by 1996 purchase of MFS by Worldcom for US\$14billion or 6 times the value of assets put in the ground emulated by lots of start-ups and facilitated by the abundance of equity capital.

• How did we get into this predicament? (2)

Unrealistic expectations of traffic growth

Does internet traffic double every 90 days or every year?
depends on what scale you see it.

Rising multipolarity of the internet was largely ignored in early models : end of the UScentricity of information

Japan : 80% of accessed internet info is local.

Chile: 70% is local

USA: 10 tp 30% of accessed information resides in the region!

Ripple effect on the whole economy?

- My view on May 26th01 (slide made that day)

Tech sector represents much larger share of the economy than before.

DoC (USA): 1stQ GNP growth at 1.3% instead of initial estimate of 2%

Greenspan says that weakness in economy will persist for several more quarters

Rate reductions have maintained consumer demand but how can it rapidly stimulate telecom sector where spending is down 30% to 40%?

Toronto TSE plunged 50.7% before rebounding 11.8% between April 4th and May 26th

- Are we out of the slump?
- Is this an oscillation on a curve with a minimum somewhere mid 2002?

If you know, please tell me.

Ripple effect on the whole economy?

- My view on Nov 4th 01

3thQ shows the USA in a recession.

September 11 events have exacerbated the situation.

Most pundits now see a rebound only by the end of 2002.

Rate reductions have maintained consumer demand but job concerns and general situation dampen effectiveness of further rate reductions.

After the april lows the stockmarkets rebounded but have replunged since with dismal results in most of the tech sector

When will be out of the slump?

- With telecom capital spending plans sharply down for 2002 the year will be tough and will see further consolidation. Spending plans for 2003 could see a sharp upturn with the next phase of intercontinental cable delivery for 2004.
- Other sectors such as airlines, leisure, housing?

Disruptive technologies make predictions difficult, disruptive behaviour make them even more difficult.

And what now?

• My view on March 7th 02

4tQ results show recession ended.

Economists and analysts talk of shallow recession and shallow recovery

Consumers continue to spend and increase debt

Stockmarket yoyo continues; major production indexes up

And in the meantime in telecom:

- Talk of deepfreeze, nuclear winter, tidal wave
- « Enronization » fears and « hollow swaps »
- Some major new generation players in deep trouble
- Traditional players see slowdown in growth of wireless.
- Capex spending cuts maintained for 2002

Some additional major defaults and consolidations likely with oversupply in the long-haul and slow pick-up in high bandwidth demand. Corporate telecom spending remains conservative. IVPN demand grows.

• Anything new between March 7th and today April 16th?

Recession may have ended but:

In the meantime in telecom:

- Huge write-offs : AOL (US\$54 billion!), Qwest (US\$20-30 bill) NTT, FT, DT, GC
- Valuations near 52 week lows for a number of telcos and suppliers.
- Companies such as MFN and NTL joined the endangered list.
- Yipes and now FLAG (on Friday april 12th) announce Chapter11
- Some capex spending cuts could extend into 2003.

Logic demands that the bottom will be reached this summer but who is ready to make predictions?

Consolidation has started.

Pressure on new generation carriers increases:

- Level3 sold its Asian interests to Reach (HK) for a fraction of the value.
- 360networks, Global Crossing, FLAG, Viatel, Carrier1
.....
- Major players such as Qwest and Worldcom are under pressure.
- Tyco break-up? Williams? MFN? Energis?

Who would be the likely buyers?

Telia bought some of the 360networks assets

Reach (HK) buys Level3 Asian assets.

Who will be the beneficiaries?

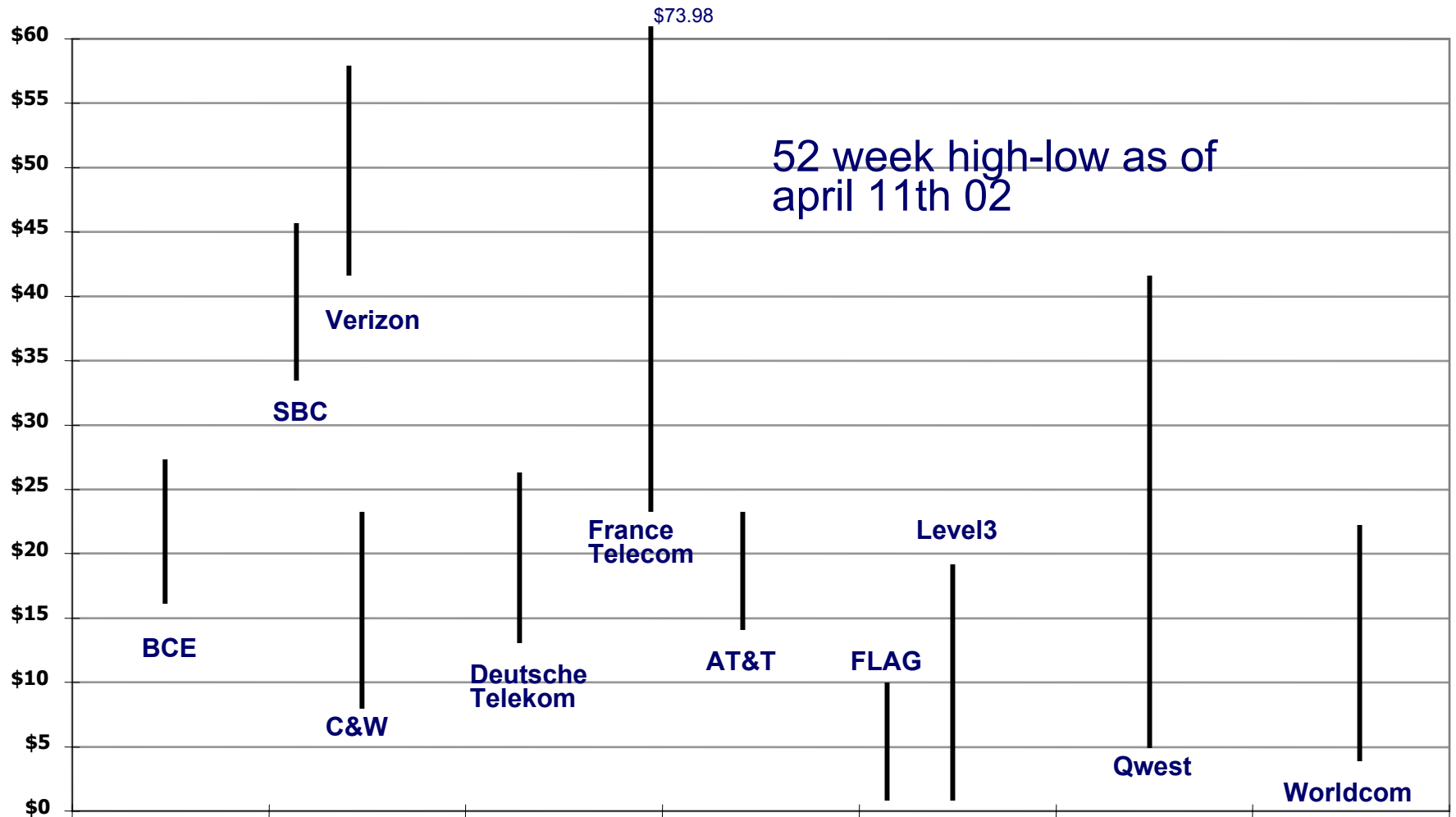
With more consolidation and less capital for start-ups competition on the local access risks disappearing. Even the promise of local access competition from cable TV companies seems to be receding

Local phone companies such as Verizon, SBC, Bellsouth, Bell Canada continue to produce steady financial results with relatively little competition in core local access and capitalize on BB internet and wireless although in wireless too market growth is slowing.

Traditional carriers such as DT, FT, and BT have considerable debt-loads after G3 spectrum auction and acquisitions but have critical mass and captive local markets and will benefit. Smaller ones will consolidate (see Telia-Sonera)

New generation companies such as Level3, Global Crossing, MFN, Flag are saddled with heavy debt loads and are take-over targets after debt restructuring. Same for European fiber Builders such as Viatel, Pangea, Carrier1

1-Year Stock Performance (US\$ NY)



How to extrapolate for the next 5 years?

Will Moore's law and related laws for growth of fiber transmission capacity and internet growth continue to apply? Probably

The laws of gravity still apply, even in the New Economy. Progress alternates between periods of exponential growth and plateaus where the progress is absorbed.

Progress continues unabated:

- Alcatel tested 10Tb over single fiber with 256 channels at 40Gb and demonstrated 3TB over 7300km using wide band EDFA
- Intel announces chipsets for OC192 and 10GbE
- Ciena announces 160 channels at 25GHz spacing
- Lucent soliton technology reportedly in beta phase
- Optical crystals and hollow-core fibers promise another 100fold increase of per fiberstrand capacity in 4-5years.

• How to extrapolate pricing evolution?

Plummeting IRU and private line prices likely to reach a plateau as the weakest players are facing elimination or consolidation.

However : possibility of « double whammy » of new price war after consolidation phase if demand still does not materialize

Per megabit commodity internet price decline has been steep but more controlled; slower declines likely.

With a good reserve of unlit fiber the next price bottleneck is the electronics. Advances in tunable lasers and optical switches could create a next disruptive phase in long-haul.

Will the forecasted wavelength markets absorb the capacity?

Last mile cost will remain an issue. Condominium and community fiber projects might be the answer.

• The optical future is no illusion

Most major carriers are committed to an optical backbone as a cost effective way to meet the increasing bandwidth demands.

R&E, community and condominium fiber projects help accelerate the extension of capillarity all the way to schools, businesses and homes

Optochips will do for telecom what microprocessors have done for computers. They will usher in vast increases in power along with huge savings in cost. (Otis Port in BW May 14th01)

Commitment of heavyweights such as Intel and progress in optical switches, tunable lasers, use of indium-phosphide chips.

Most important: US\$6.4 billion in VC for photonics (71 deals since 96)

IBM announces 110GHz chip aimed at fiber-optic switches (WSJ Feb25th02)

Intel announces Castine chip for 10Gbps (WSJ Feb25th02)

• Next phase in R&E networking optical internet and the Grid

US National Science Foundation (NSF) funds STARlight
optical meet me point at North West U in Chicago

Major NSF initiatives and funding for optical networking
such as the DTF (Distributed Terascale Facility) and
Grid applications in high energy physics, astronomy,
genomics, earthquake simulation.

Canada announces funding for Ca*net4

National optical R&E network and Grid initiatives in
Europe and Asia

- Netherlands have SURFnet5, Japan builds Supersinet,
NSFCNET/CERnet lambda project in China etc.

International collaboration plans accelerate

StarLight and optical R&E network goals: 2002 to 2005 timeframe

Full Production GigE and later 10GigE

Optical switching of 2.5GB and later 10Gb lambda's

Interconnected wavelength switching hubs in Europe, NA and Japan.

Facilitate advanced development and experiments such as:

- Optical routing and lambda conversion
- Protocol standardization and testing OBGP, GMPLS, wavelength arbiter, lambda cloud internetworking
- Ultra high-definition video and VR
- Terascale computing
- Petabyte data mining



BCE

Teleglobe