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>THIS IS THE WAY
New Services on Optical Networks
Gary Ruddy
Manager Optical Marketing - Academic and Research Centre, ANZ
QUESTnet July 2005
>THIS IS NORTEL
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The New Internet Pioneers

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Internet Pioneers

"Internet2 is focused on enabling leading-edge network capabilities for the U.S. research and education community and working in close collaboration with our international partners such as SURFnet," said Steve Corbató, Internet2 director of network initiatives

CA*net 4 embodies the concept of a "customer-empowered network" which will place dynamic allocation of network resources in the hands of end users and permit a much greater ability for users to innovate in the development of network-based applications.

"We're pleased to be working with world-leading research network operators such as SURFnet and Internet2 to pioneer new network architectures that better support data-intensive research applications," said Philippe Morin, general manager, Optical Networks, Nortel.

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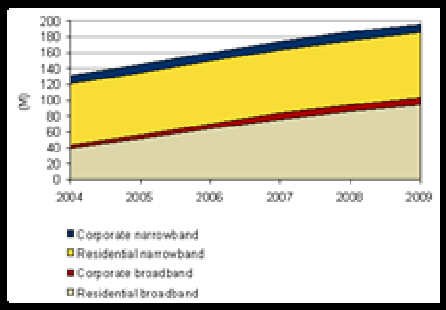
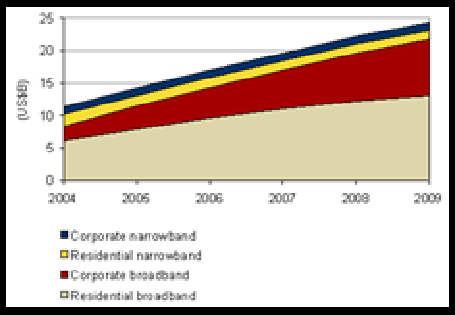
APAC predicted Internet growth

Asia/Pacific (Excluding Japan)
Internet Access Subscribers by Type, 2004?2009



Asia/Pacific (Excluding Japan)
Internet Access Revenue by Type, 2004?2009



Source: IDC Asia/Pacific, 2005

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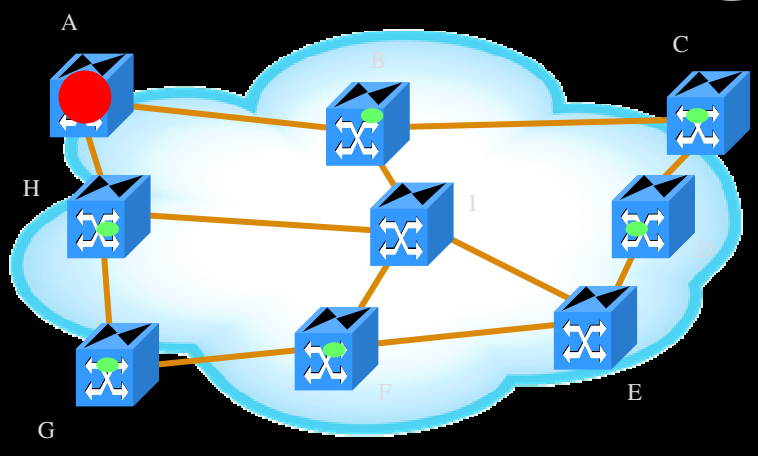
Simplistic view of Internet



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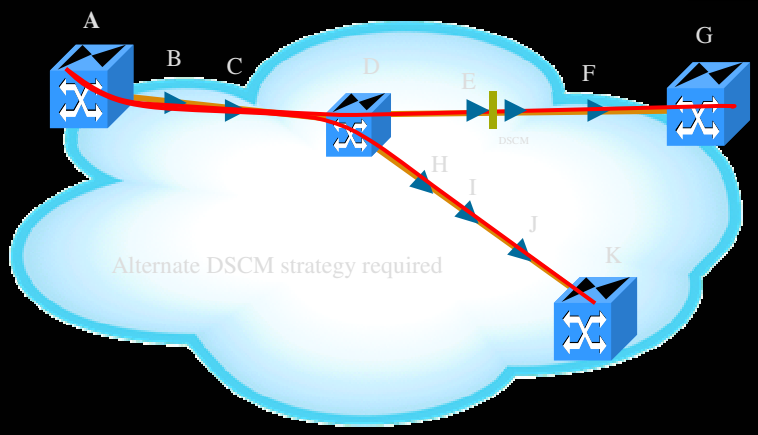
Typical Optical Network



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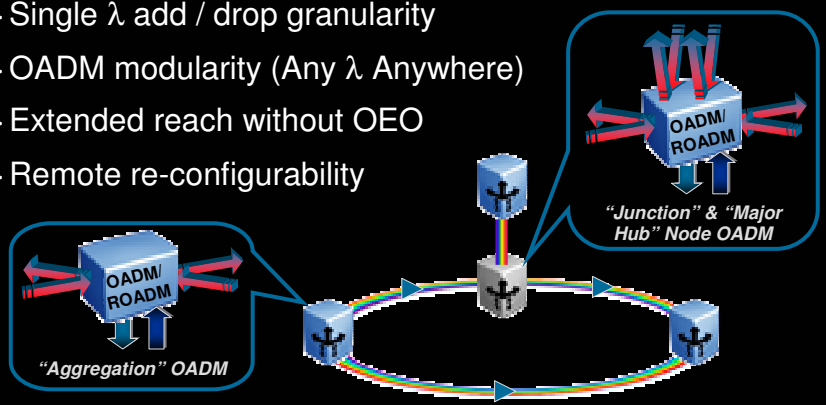
Enhanced ROADM Networking Flexibility

- Optical branching to up to 5 spans with Wavelength Selective Switching (WSS)
- Single λ add / drop granularity
- OADM modularity (Any λ Anywhere)
- Extended reach without OEO
- Remote re-configurability



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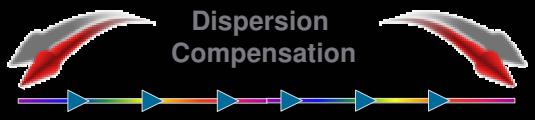
Next Generation modulation
Nortel's eDCO Dispersion Limit Solution



> What are electronic Dynamically Compensating Optics?
  - Optical interfaces which automatically compensate dispersion on a per wavelength basis and enable agility and wavelength re-route

> Elimination of bulk optical dispersion compensators (DSCMs) and their associated cost and loss

> Per wavelength real-time performance optimization

> Compensation support for mixed fiber type applications

> 600 km (regional) and 2000 km (long haul) reach options with enhanced Forward Error Correction (FEC)

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Nortel's Evolving Photonic Solution

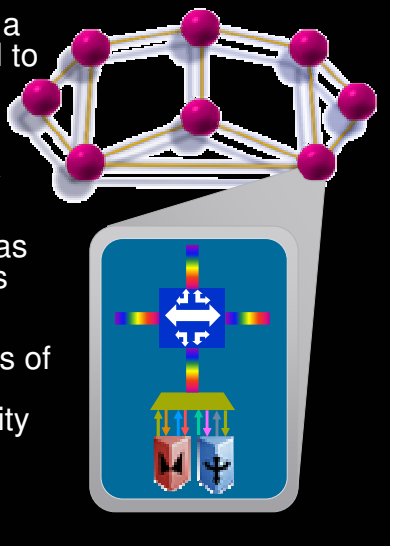
Evolution to Adaptive All Optical Intelligent Networking

> Adaptive – cost effectively operate a network that is readily reconfigured to meet all end to end demands

> All Optical – maximize simplicity & reliability for aggregate demands & minimize OEO costs

> Intelligent – continuously optimize as network paths change and services are provisioned on demand

> Scalable - carry increasing amounts of data and services flexibly while minimizing the operations complexity



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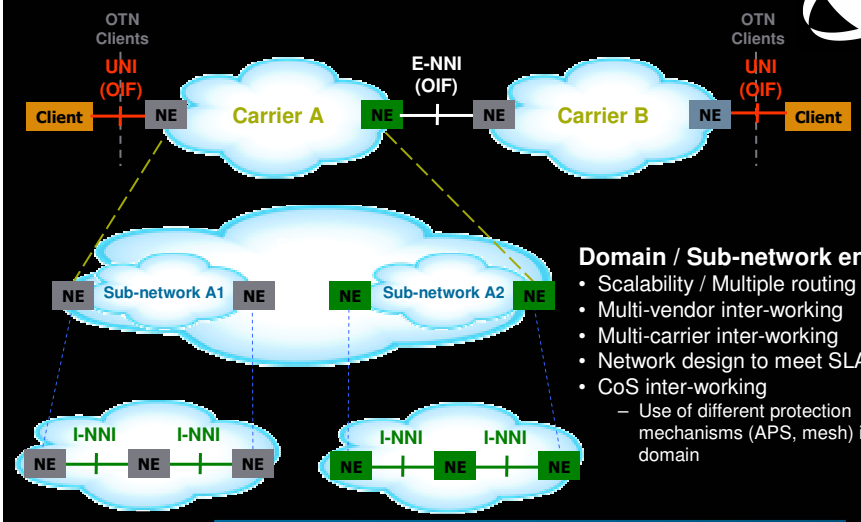
ASON Networks and Reference points (G.8080)



Domain / Sub-network enables:

- Scalability / Multiple routing areas
- Multi-vendor inter-working
- Multi-carrier inter-working
- Network design to meet SLAs
- CoS inter-working
  - Use of different protection mechanisms (APS, mesh) in each domain

- **Supercomm 2001 : OIF UNI 1.0 demo participation**
- **OFC 2003: OIF UNI 1.0 & OIF NNI (ITU-T E-NNI) demo**

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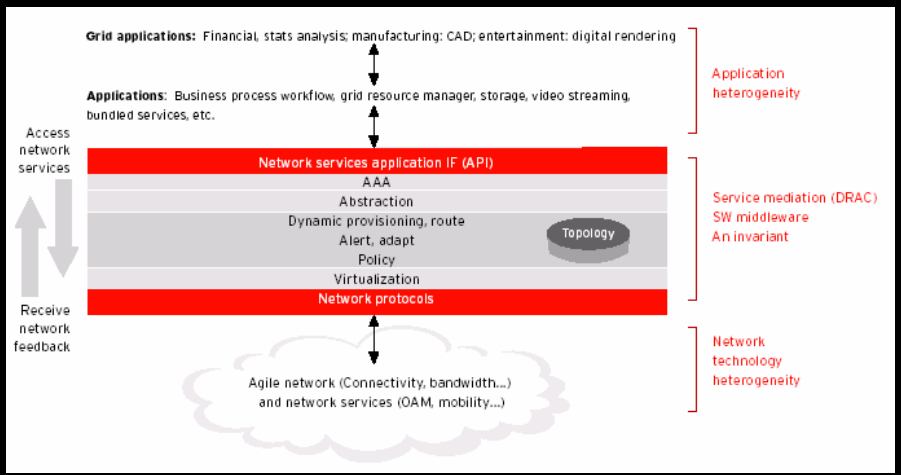
Dynamic Allocation Resource Controller



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Hybrid Optical Internet

The Hybrid Optical and Packet Infrastructure (HOPI) project is examining a hybrid of packet and circuit switched infrastructures and how to combine them into a coherent and scalable architecture for next generation networks. Source – Internet 2 website

As part of the Dutch GigaPort Next Generation Network project, SURFnet is building a hybrid optical and packet switching infrastructure using the latest optical technology from Nortel.

Nortel's highly-integrated solution delivers both IP and optical broadband services over an extremely resilient common infrastructure, on top of SURFnet's own dark fibers, that is suited for and efficient for all traffic types.

With unprecedented levels of intelligence, the hybrid network will use the unique blend of IPv4, IPv6 and optical technology that is best suited for each particular application, thus dynamically allocating the IP and optical bandwidth.

Source – SURFnet website

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