



Demand: Moving Up and to the Edges

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Demand Landscape

**Applications
6-7**

**Switching
3-4-5**

**Physical
0-1-2**

**Enterprise
Switching**

**Local
Access**

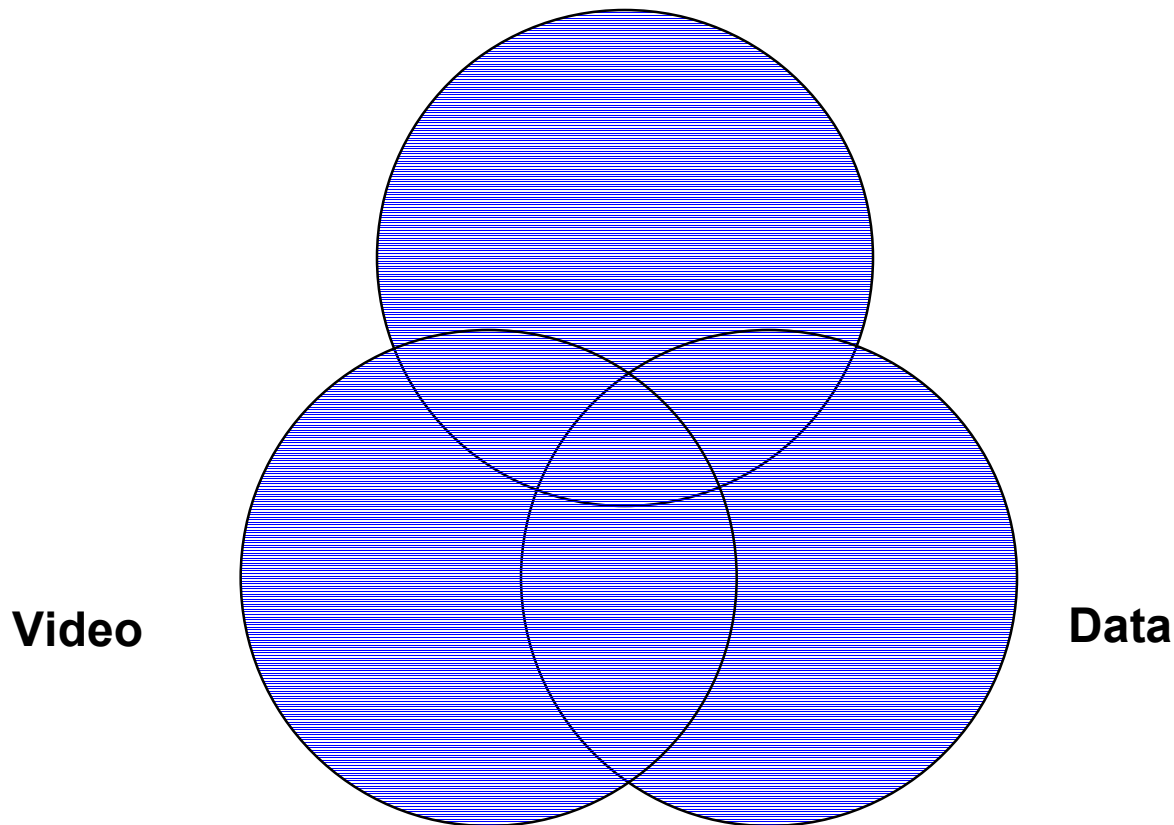
End-Office

Transport

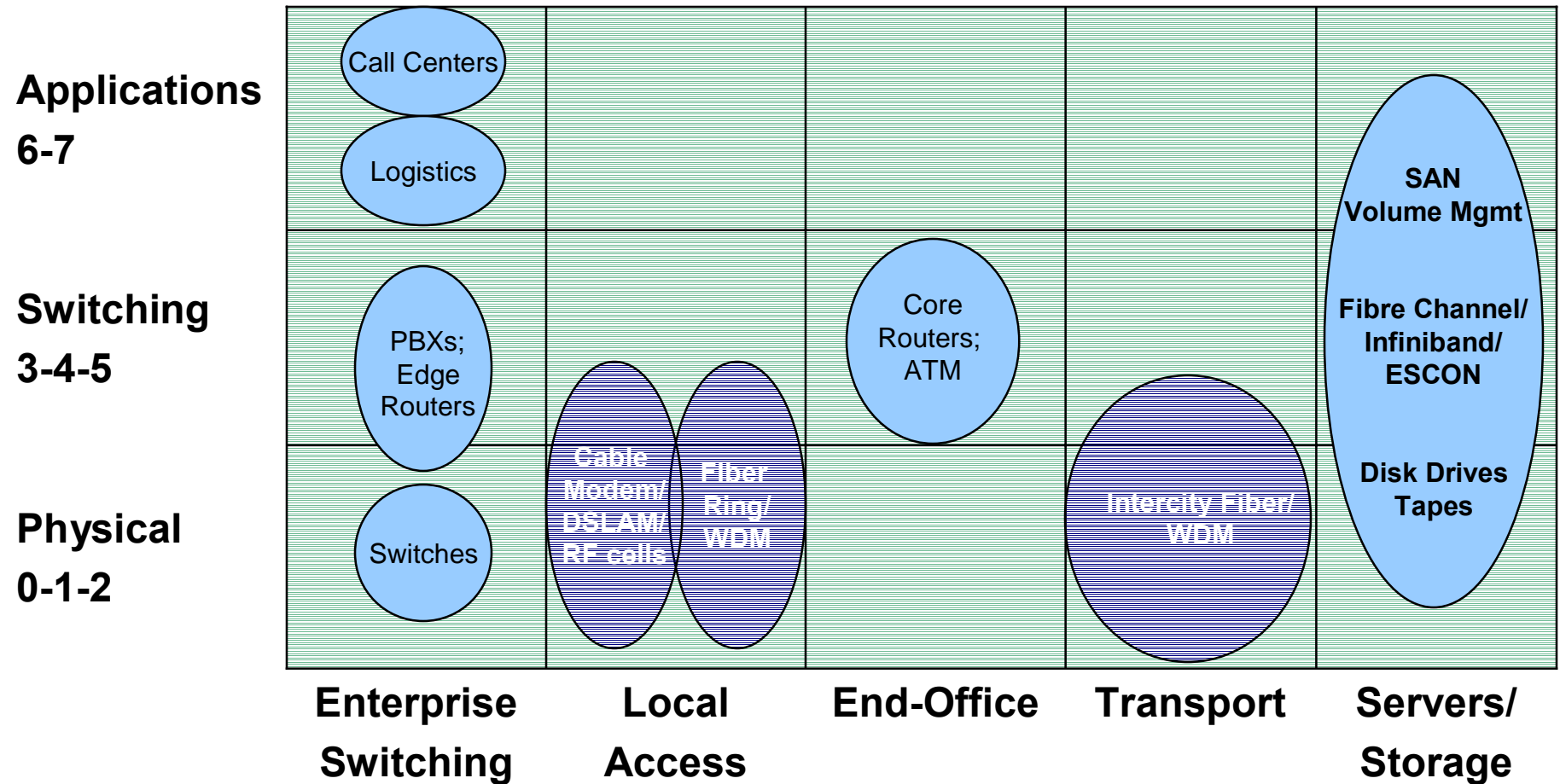
**Servers/
Storage**

Demand Drivers: Historical

Voice (wired/mobile)

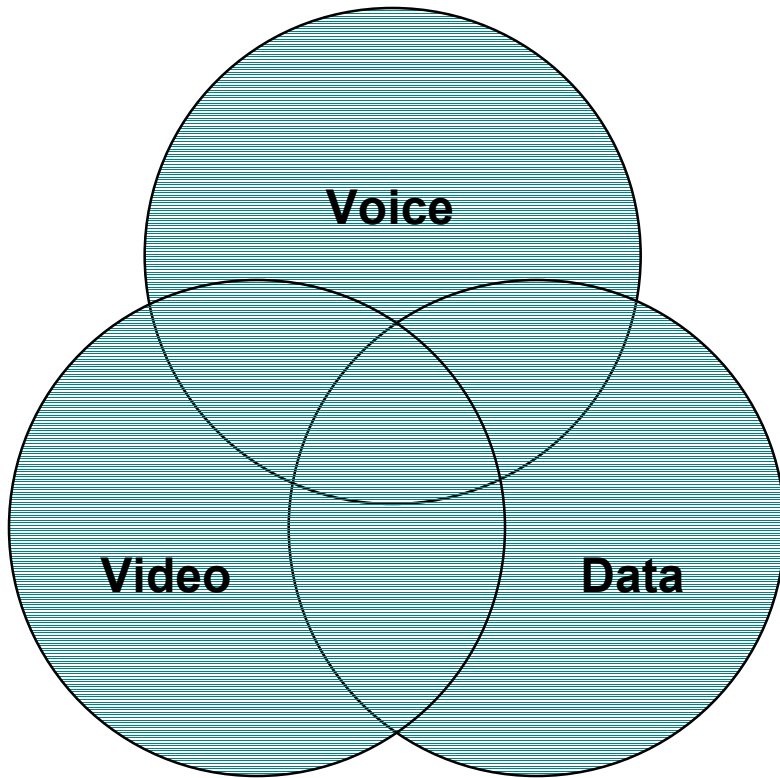


➔ Key NGN Equipment: Historical

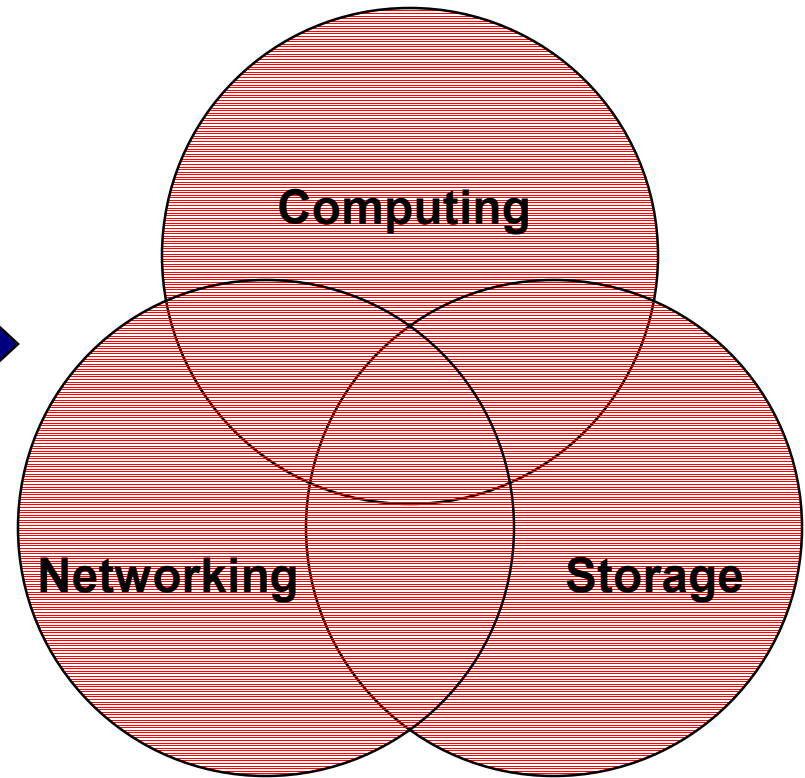


Demand Driver Shift

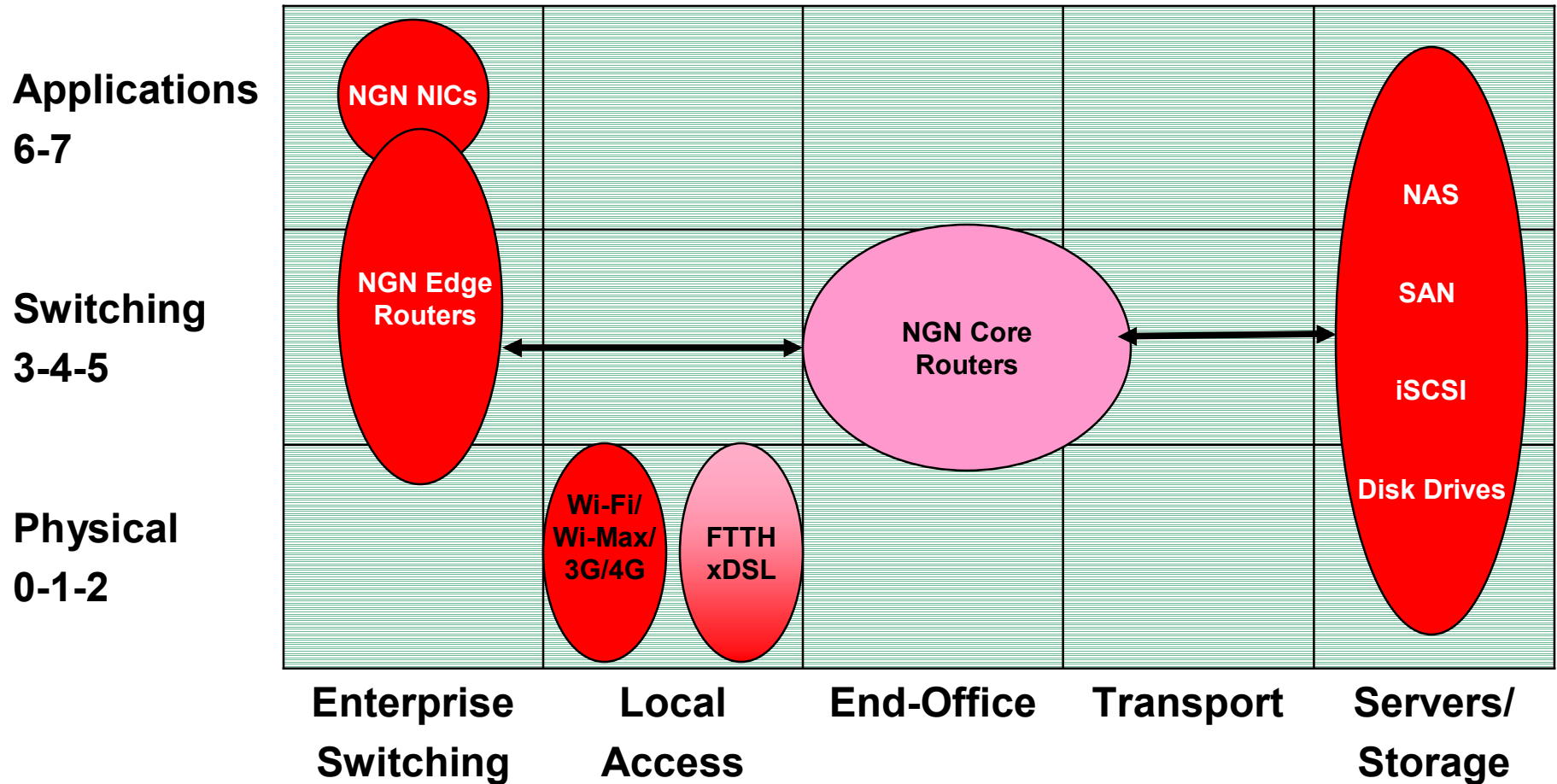
mid 1990s



2004 onward



➔ Key NGN Equipment: Future



NGN Enterprise Switching Requirements

Past	Future
Up to 1 Gbps	10 Gbps
100% L2 / 20% L3	100% L2 <i>and</i> L3
Limited L4-7 awareness	Full L4-7 awareness
Single protocol	Multi-protocol in native form; Protocol conversion/encapsulation @ wire speed
Separate LAN/SAN switches	Unified LAN/SAN switches
Blocking enterprise switches	Non-blocking enterprise switches
IP-sized memory buffers	XML-sized memory buffers
Limited programmability	Substantial programmability @ <i>wirespeed</i>
Pre-installed programming	On-the-fly programmability

Issue: Supporting The Underlying Demand

Switches

- Need enterprise switches with capacities once associated with the core
- But with much more flexibility and programmability
- And at low prices: sub \$500 per port

Line Cards

- Need to adopt PCI Express @ 10G
- Need RDMA to offload microprocessors
- Need flexibility and programmability
- Price under \$100!

Background Articles

- **Demands Shift for Next Gen Switches/Routers**, Stuck and Weingarten, BCR, September 2004
- **Next Gen Switch/Router Design Issues**, Stuck and Weingarten, BCR, October 2004 (copies at NGN)
- See <http://signallake.com/publications/>