



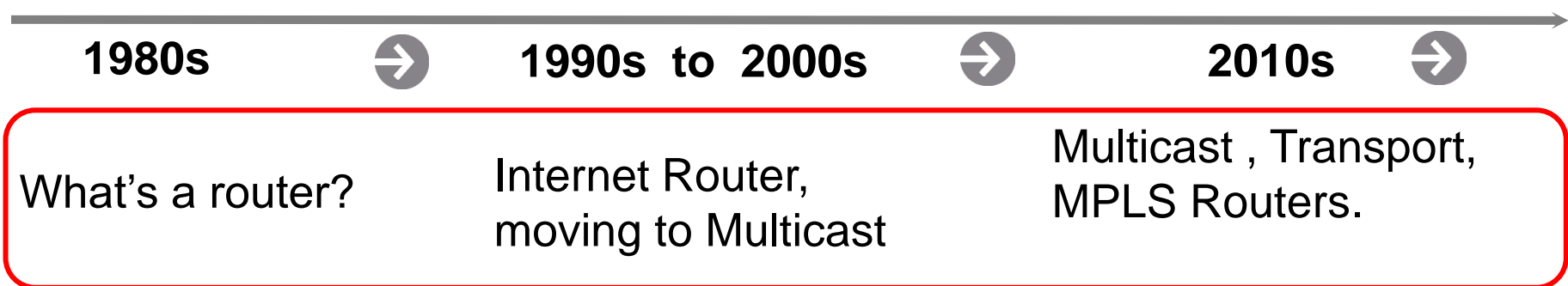
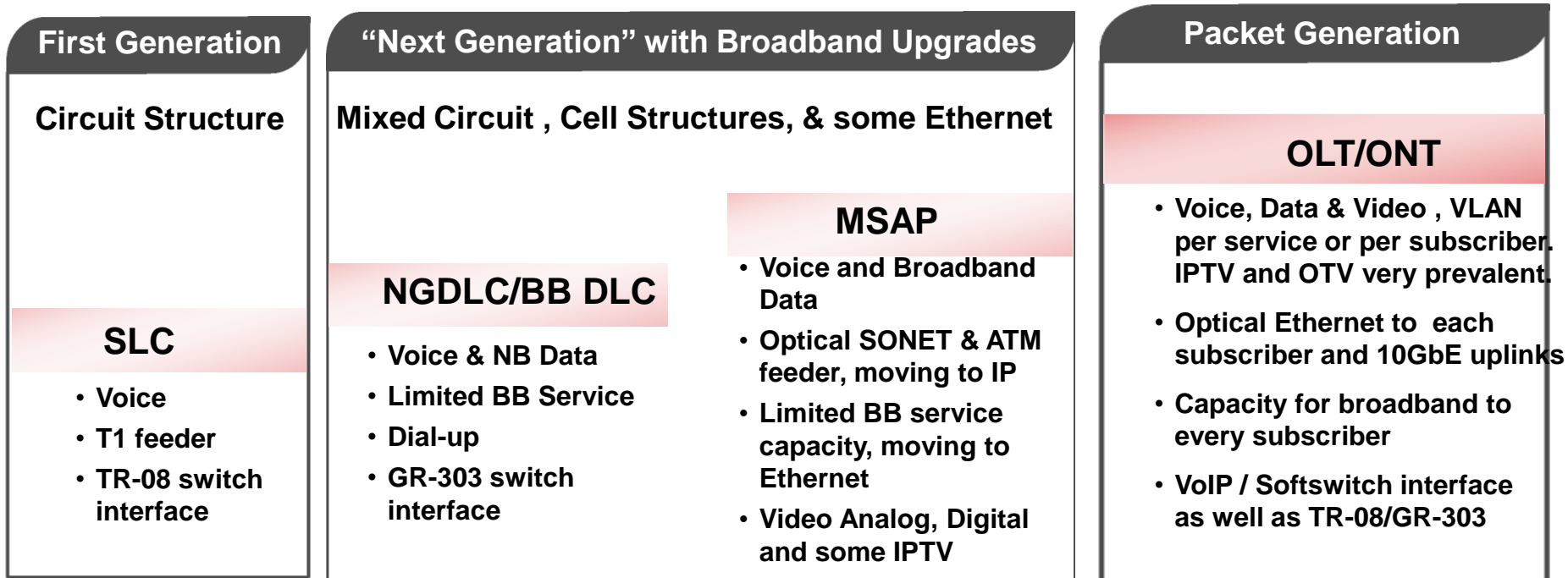
ETHERNET ACTIVE LINE ACCESS: TERMINATION OPTIONS AND SERVICES

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Evolution to Ethernet: “Circuit-to-Packet” in the Access Network



Evolution to Ethernet:

“Circuit-to-Packet” in the Central Office

All services will soon require Ethernet or a Server

Ethernet Switch

- Access Equipment
- Core Router and Transport
- IPTV and Voice Equipment
- Internet equipment
- All Critical Services need Ethernet

OR

Server

- IPTV, VOD, Middleware
- Unified Messaging
- Email, Voicemail
- Internet caching
- Internal Exchange, Billing, Management
- Don't forget about Storage!

Does your CO resemble this? ...because this is a datacenter



Standard Access or Intelligent Access?

Is providing more than layer 2 at the edge beneficial?

Layer 2 only

Less Complex

- VLAN Only
- Ring Support
- IGMP Proxy or Snooping
- MAC Address Limits
- Possible Broadcast Storms
- Software Upgrade=Service Outage
- Residential Focus



Layer 3/MPLS

More Complex

- Multicast Routing
- GRE Tunneling
- VRF for Multi-tenancy Solutions
- MPLS: VLL, VPLS, LSP, Layer 2/3
- Ethernet OAM and Y.1731
- Dual Stack IPV4 and IPV6
- High Availability/ISSU
- Business



Why not use a box that can handle anything your customers ask for?

What services are you doing?

Active Ethernet provides 1000M....what do you plan to do with it?

Services Today

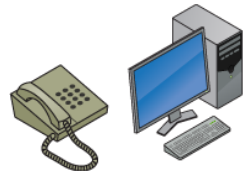
IPTV



Gaming



POTS/HSI



Wireless



Services Tomorrow

Security



Meter Reading



Over the Top



Mobile Backhaul



Hosted PBX

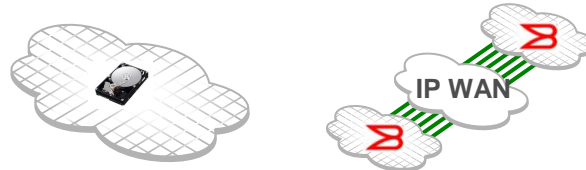


Let's get that Ethernet Circuit to provide more revenue!

What about Storage Services?

Cloud Based Backup

- Rebranding



Physical Storage Backup

- You own the physical disk

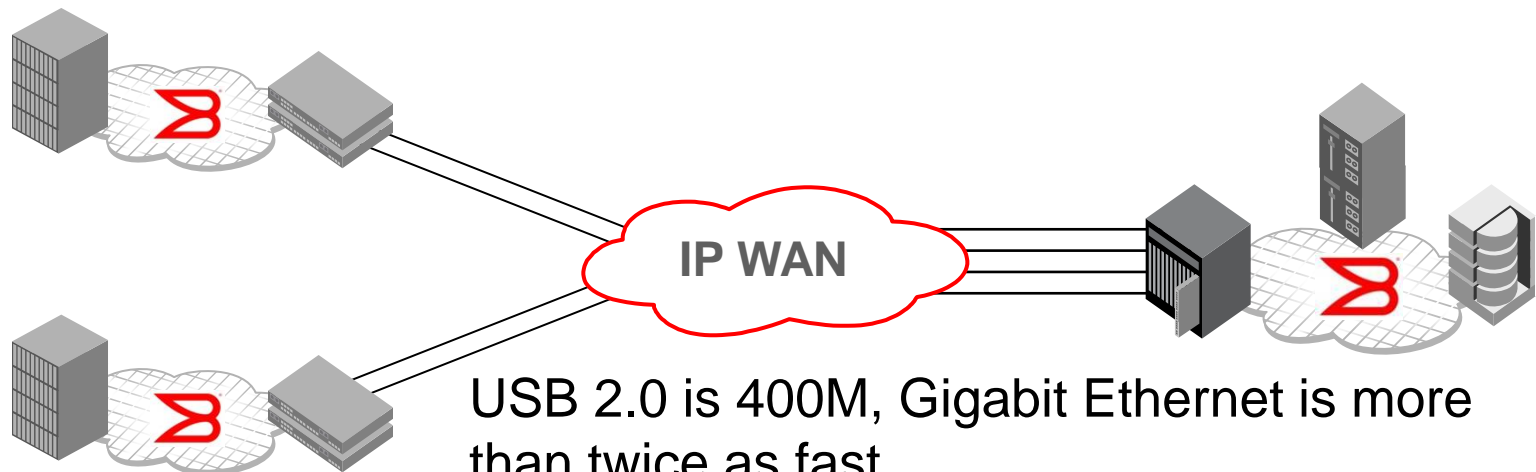


Disaster Recovery

- Extension (data replication)
- Global Server Load Balancing
- Virtual Servers for Biz

Archive Services

- Document recovery
- Home Office
- Business



USB 2.0 is 400M, Gigabit Ethernet is more than twice as fast

Desktop as a Service....

What if you could provide a virtual computer as a monthly service?

- **Compute Power**

- *Lives on a virtualized server in the central office*
- *Many user share a single server*
- *Memory and Processor upgrades done in the CO.*
- *Virtual Moves to other servers while maintenance is being performed.*
- *Existing hardware or thin client used.*

- **Backups**

- *Subscriber storage is on a resilient drive, if there is a drive failure a complete image is always available.*
- *Offer Archiving as an additional service*
- *Need more storage, just ask.*

- **Software/Peripherals**

- *Customer loads their own programs onto THEIR computer*
- *Virus Scans are done as service in the CO*
- *Critical patches can be installed to all computers at once*
- *Printer, thumb drives, Ipods, etc. plug into a USB just like they used to.*



What's a Thin Client?

Thin Client/Zero Client **vmware™** **Hyper-V** **Xen**

- Simple Device
- USB, Mic, Audio Out, Monitor and Power
- No Hard Drive, No RAM, simple ASIC, lasts 8 to 10 years.
- Computer lives in CO, Thin Client just displays that image
- Several Manufactures
- Vmware, Microsoft, and Citrix support
- Single, Double and Quad Monitor options
- Tablet, Laptop, and Integrated Monitors

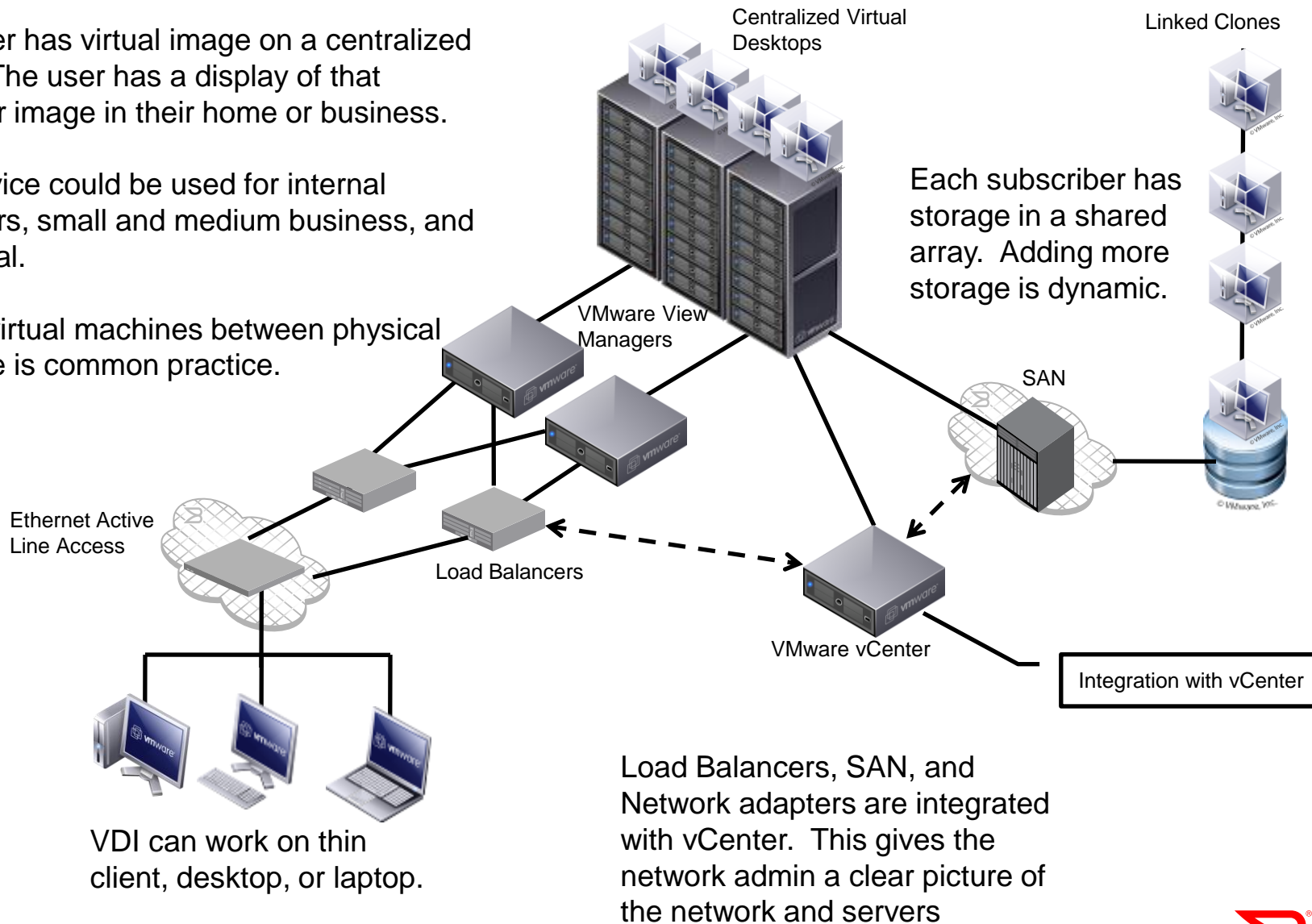


How does it work?

Each user has virtual image on a centralized server. The user has a display of that computer image in their home or business.

This service could be used for internal computers, small and medium business, and residential.

Moving virtual machines between physical hardware is common practice.



The Big Picture

Network Adapter allows server to access storage and data traffic. Offloads CPU functions. Monitors CPU/BW per VM

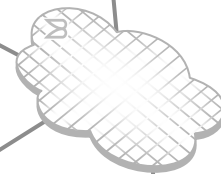
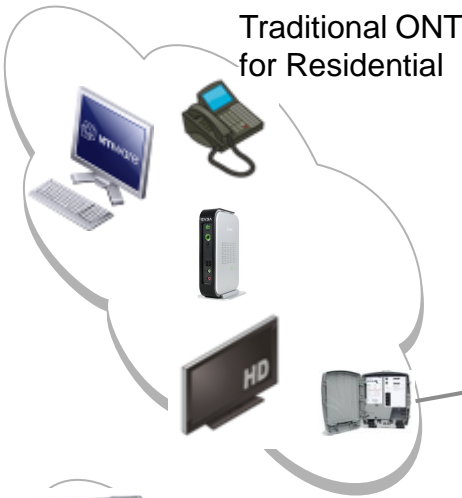


Server Load balancer provides load balancing, multi-site load balancing and NAT V6 to V4



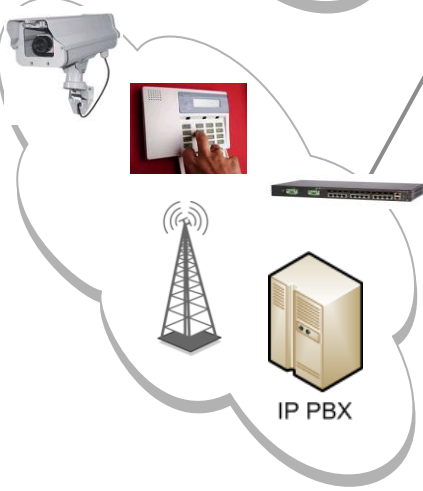
Ethernet Fabric Product for storage and data traffic

Traditional ONT for Residential



Intelligent Access can be deployed for fiber termination and Dense 10G Routers deployed for Core Router resiliency.

Smart Node for Biz Services



Centralized Management provides End to End Network View



Ethernet Active Line Access: Threat or Opp?

Definitely an opportunity! An opportunity to make money.

Attribute	GigE	Notes
Bandwidth	✓	GigE: most future proof FTTP
Deployment Flexibility	✓	GigE scales low to high
OAM & Maturity	✓	802.3ah and Y.1731 widely used
OSP Simplicity	✓	GigE = 1 to 1
Rural Homes	✓	GigE allows reach : 70+ km
Business	✓	Full Gigabit Ethernet Bandwidth
Economic Cents	✓	GbE ports cheaper everyday
Power and Management	✓	Power Efficient Routers

Gigabit Ethernet combined with Intelligent access allows you to offer any type of service!





Thank you!

