



Adding More Intelligence to the Network

Where and Why?

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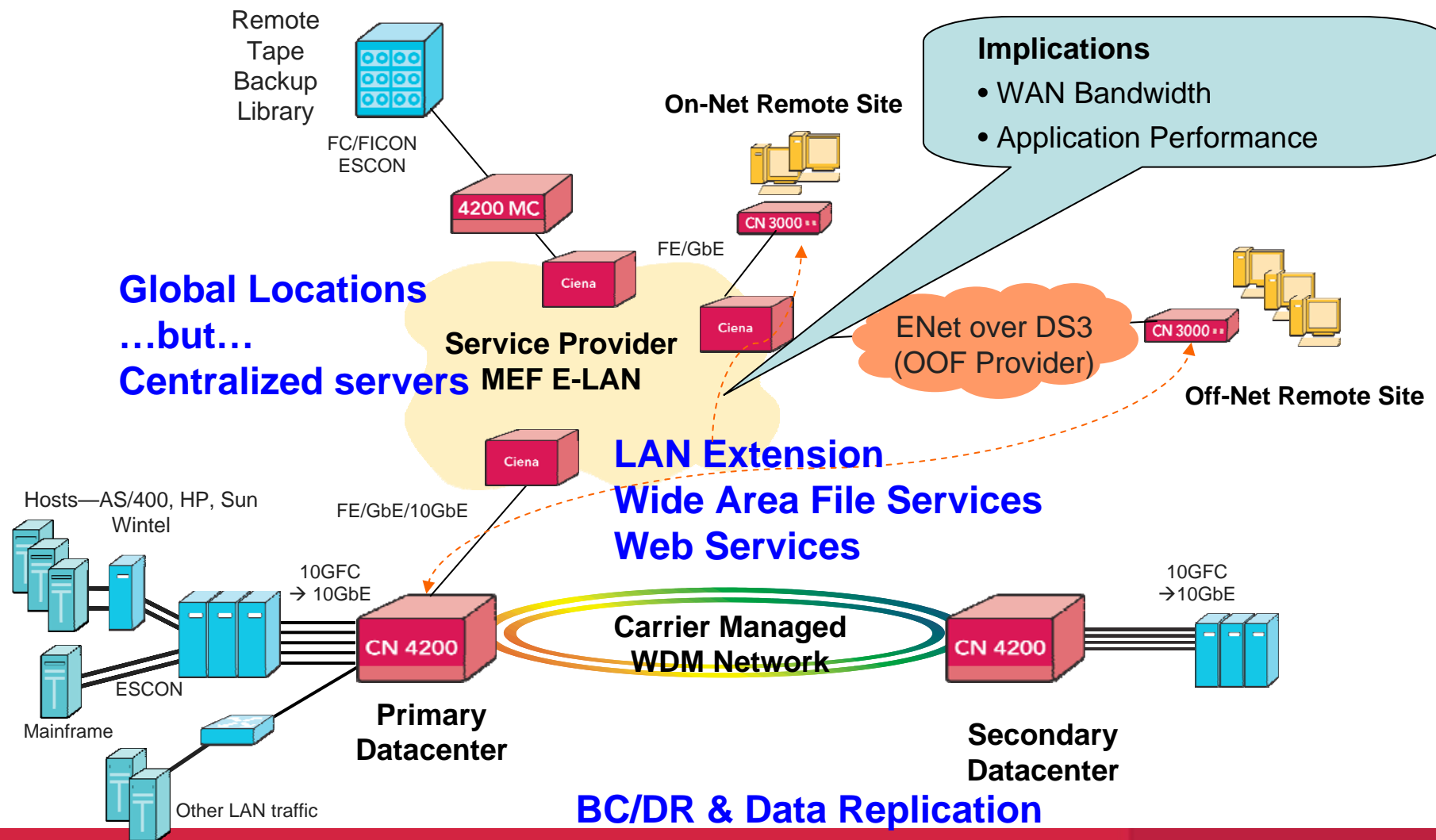
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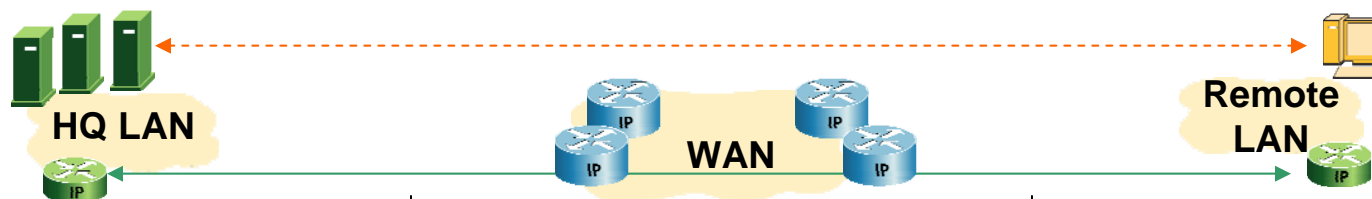
Outline

- Enterprise LAN performance impact
- Application problem vs Network problem
- Intelligence in the Network (LAN vs. WAN)
- Conclusion: Fix the Application and Keep the Network Simple

Reality Check: Enterprise Network



Issues for “LAN” across a WAN?



Application	<p>HQ Servers/Storage</p> <ul style="list-style-type: none"> → Chatty protocols → “White space” → Multiple Servers → Application DoS → Authentication 	<p>WAN</p> <ul style="list-style-type: none"> → Application DoS 	<p>Remote Desktop</p> <ul style="list-style-type: none"> → Chatty Protocols → “Repeated” data
Network	<p>HQ LAN < > WAN</p> <ul style="list-style-type: none"> → Shared WAN Link → TCP/IP Window → Flow QoS → IP (TCP/UDP) DoS → Security 	<p>WAN</p> <ul style="list-style-type: none"> → (Shared / Dedicated) WAN → Multi-site Aggregation → Deterministic QoS → IP (TCP/UDP) DoS → Security 	<p>WAN < > Remote LAN</p> <ul style="list-style-type: none"> → Low speed WAN Link → TCP/IP Window

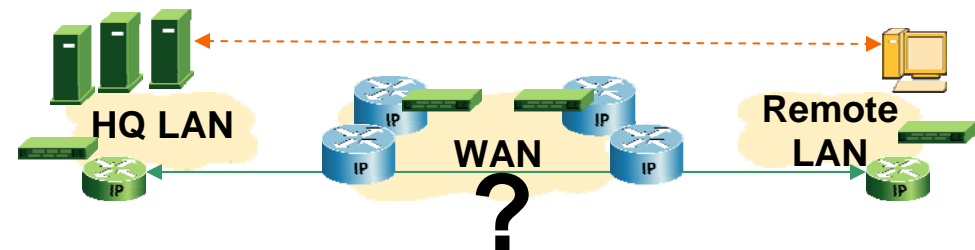
Defining Intelligence

→ Application: Client <> Server Interaction

→ **Context:** Web Services, Database Mirroring, WAFS, Internet, Email

→ **Protocols:** SOAP, FCIP, SQL, CIFS, HTML, MAPI, IMAP/SMTP/POP

→ **Intelligence:** Layer 4-7 aware, Protocol spoof, File cache, Load balance



→ LAN/WAN Connectivity

→ **Context:** Packet behavior & Network performance

→ **Protocols:** TCP/IP, Ethernet, Control plane signaling & routing

→ **Intelligence:** L2/L3 aware, TCP optimize, Deterministic QoS,

Application Intelligence in Network (WAN)?

→ Unnecessary bind.

→ Why couple ever evolving applications with stable network elements?

→ Why get penalized with cost and performance of packet inspection?

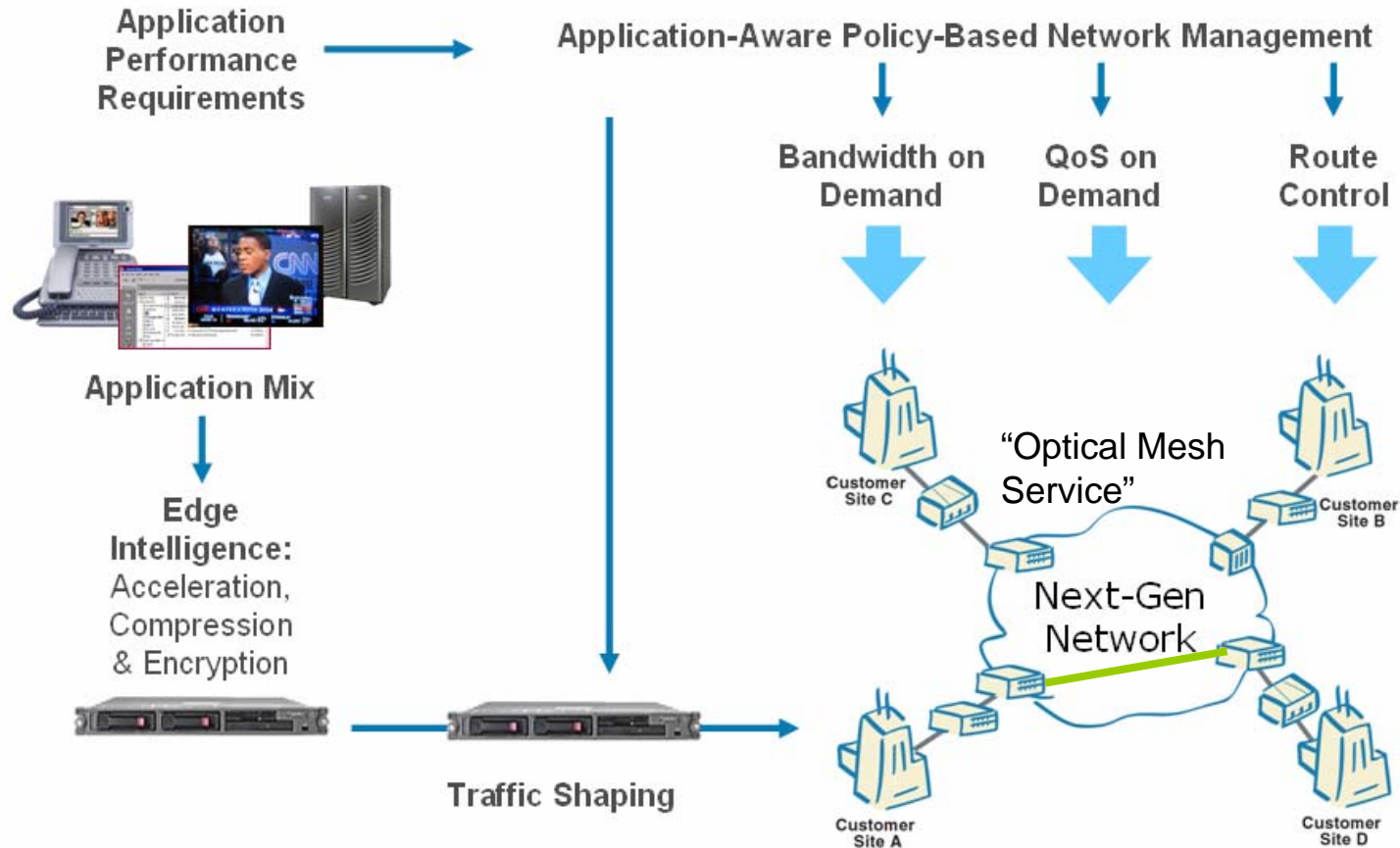
→ Business flexibility.

→ Can enterprise afford to lose their agility in responding to user needs?

→ Operational complexity.

→ Why force enterprise to spend time for application performance tweaking?

End-to-End Optimization

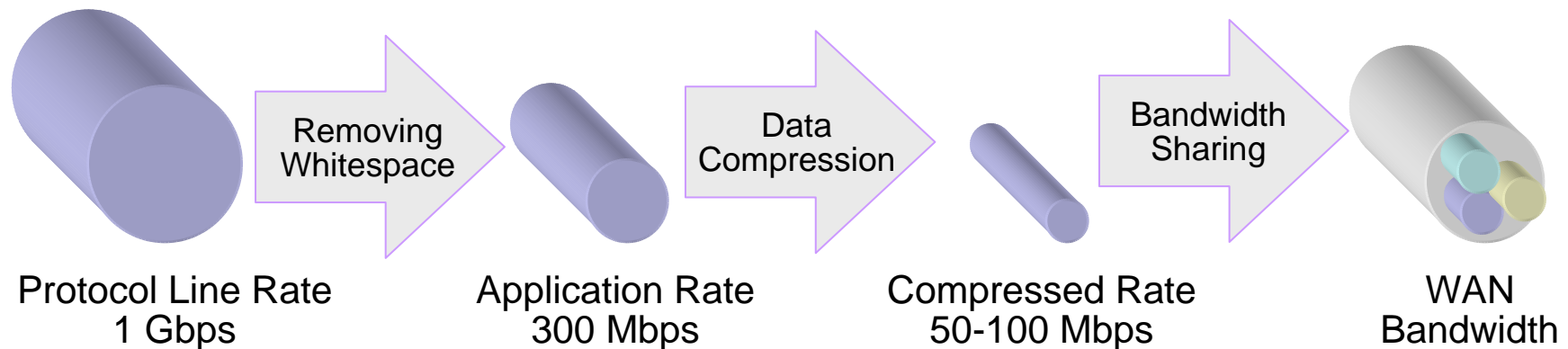


Source:
Light Reading Master Class Lecture Series
 Joe Weinman, AT&T Strategy and Emerging Services

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What makes sense: Improving WAN Performance



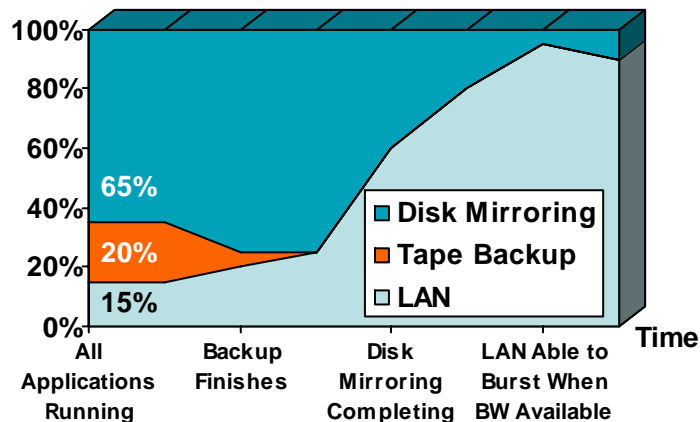
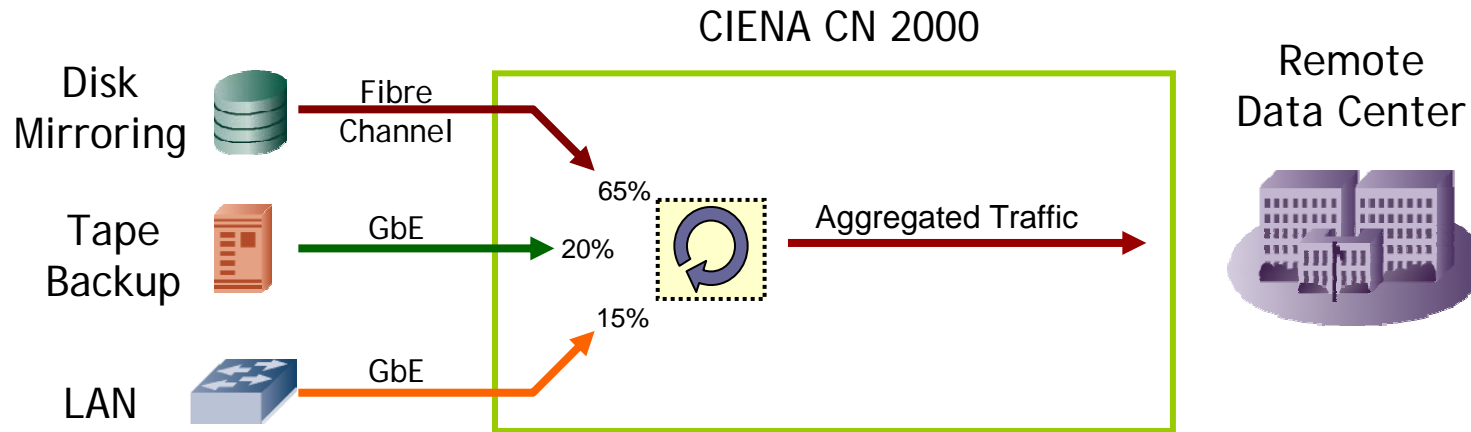
→ Reduce WAN bandwidth consumption by

1. Removing unused portion of protocol line rate (whitespace)
2. Using dedicated compression chips on each client port to compress data 3x to 5x
3. Allowing multiple applications to share the same WAN facility

→ For all client protocols and WAN interfaces

→ Work at the block level and be transparent to all applications and protocols used (as opposed to WAFS appliances)

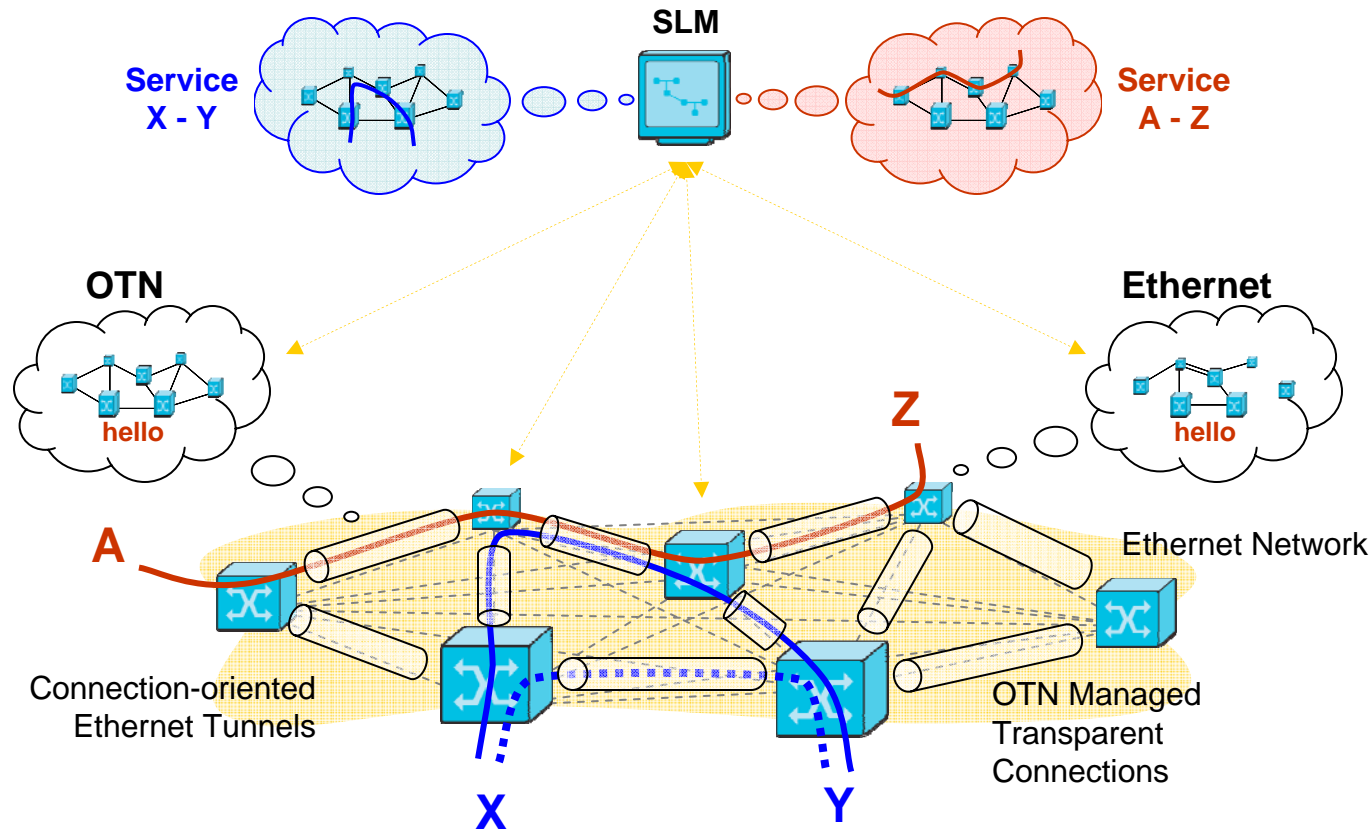
What makes sense: Dynamic Bandwidth Assignment



- Each port is assigned a guaranteed minimum percentage of the bandwidth
- IT WAN managers can assign bandwidth to different applications (e.g. to the Storage guys) without having to tweak IP router QoS
- Applications remain physically isolated, guaranteeing security and performance

What makes sense: Deterministic Ethernet WAN

“4 key components”



1. OTN/G.709

→ Robust Packet Transport Substrate

2. Connection-oriented Ethernet Tunnels

→ Deterministic and Efficient Connectivity

3. Control Plane

→ Multi-layer Mesh Automation

4. Service Level Mgmt

→ Correlation of Client Services with Network Resources

Conclusion

- **Enterprise IT need to deal with degraded application performance across WAN**
- **Need to focus on application vs network related impact**
 - **Near term: mitigate with solutions in LAN**
 - Caution: It takes only one application to spoil the party
 - **Longer term: solve application/server protocol behavior**
- **Keep WAN simple**
 - **Deterministic transport that is robust and transparent**