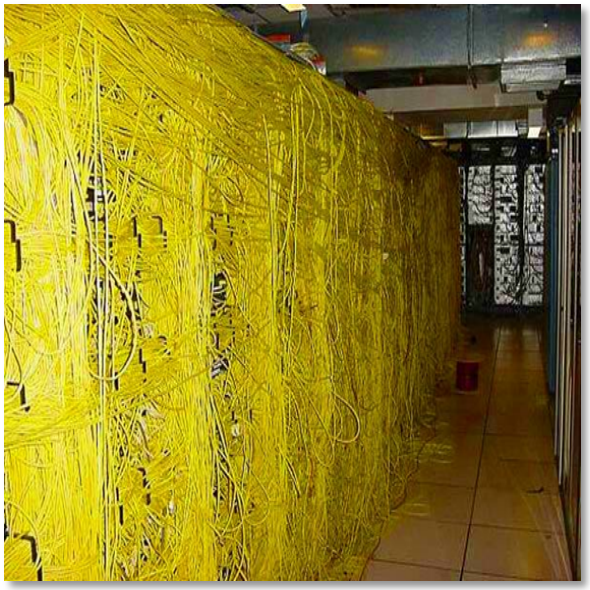
Layer 0 Automation

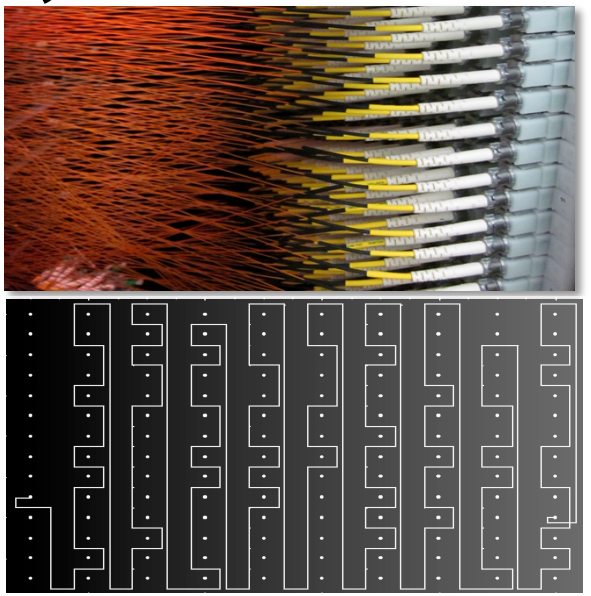
Optimize Data Center Networks

NANOG 57–Orlando, FL, 2-6-13



The Old Way

Today's Way



Automated Layer-0

Problem/Opportunity

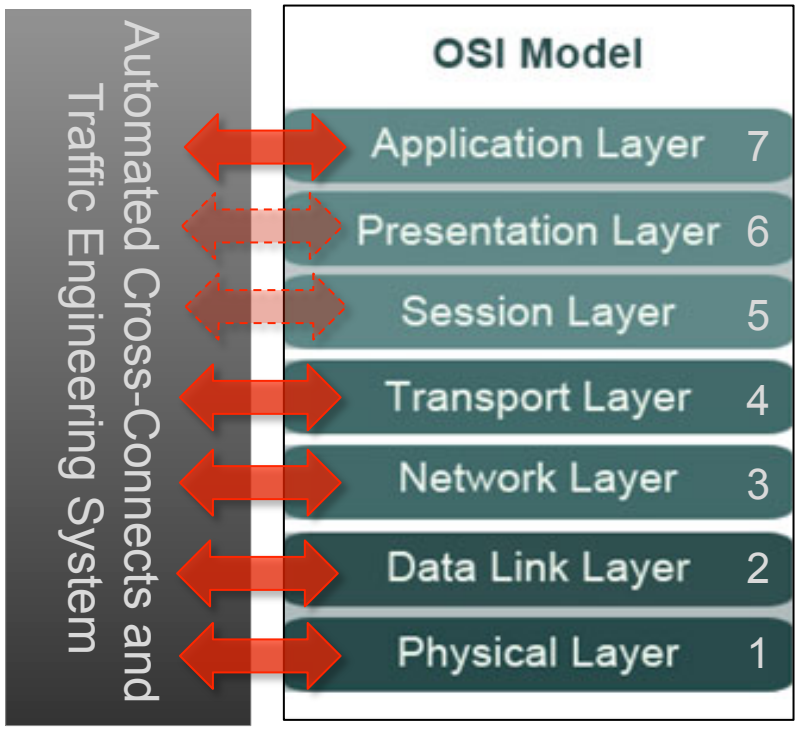
- The Internet PHY layer – only one non-automated - depends primarily on **manual** fiber patch panels – number of interconnected fibers keeps growing with the growth of the internet
- Multiple published studies indicate 50% to 80% of all network outages caused by **human errors at the PHY layer** - in configuration management, provisioning, record keeping
- Today's approach of "don't touch if it ain't broken" at the PHY layer is causing gross/expensive/inefficient overprovisioning of network assets – Network infrastructure provisioned for peak demand rather than average
- Today's average cross-connect SLA is 24/ 48 hours - **human time** - Industry under pressure to respond in **"internet time"**

Internet Economy Wants Agility, Reliability, Security and Elasticity From Layer 0 As Well

Automate All Interconnections

Key Drivers:

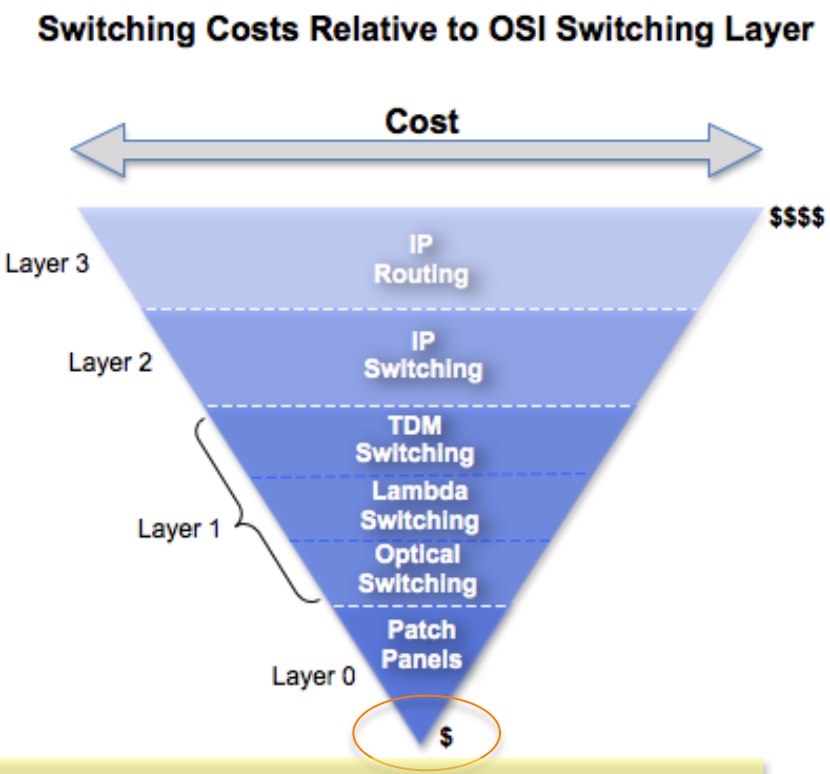
- Make network resources responsive to dynamic demands of applications
- Keep up with exploding demand for bandwidth without going broke - lower network TCO
- Significantly increase capacity utilization - network efficiency



Optimize Connectivity of Layers 1 - 4 Based on Application Layer 7 (e.g. web services, Hadoop)

Non-Optimal Solutions Today

- Several shoe-horned solutions (optimized for other challenges)
- Cost per port of layer 1 solutions based on MEMS, O-E-O are 10X cost of current manual solution
- Scaling for larger and larger switches makes challenges even greater



Static Layer-0 Leads to Expensive, Underutilized Infrastructure Assets

Telescent t-Switch

Management Engine → Fully Software Defined Network Element

t-Switch

Internal Robot (a la tape drive library)

Example Use Cases

1. Smart-Hands Automation / Smart Colo Asset manager
2. Software Defined Interconnections Based on Workloads
3. Relieve Link Congestion
4. Automatic Transceiver Failover
5. Bandwidth Calendaring
6. Dynamic Optical Bypass
7. Network Partitioning for Security
8. Disaster Recovery
9. Rapid Provisioning of Optical Link

“Smart Hands/Smart Colo”

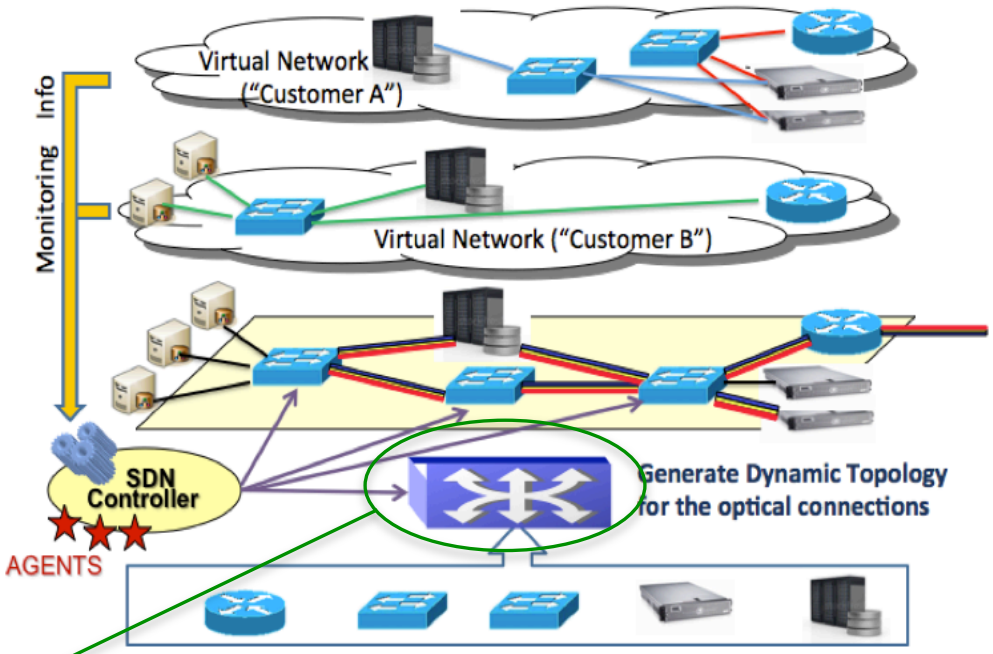
Application:

- Error free, software controlled “Smart Hands” service to multiple clients or
- Dedicated to one client – “Smart Colo”

Key Values:

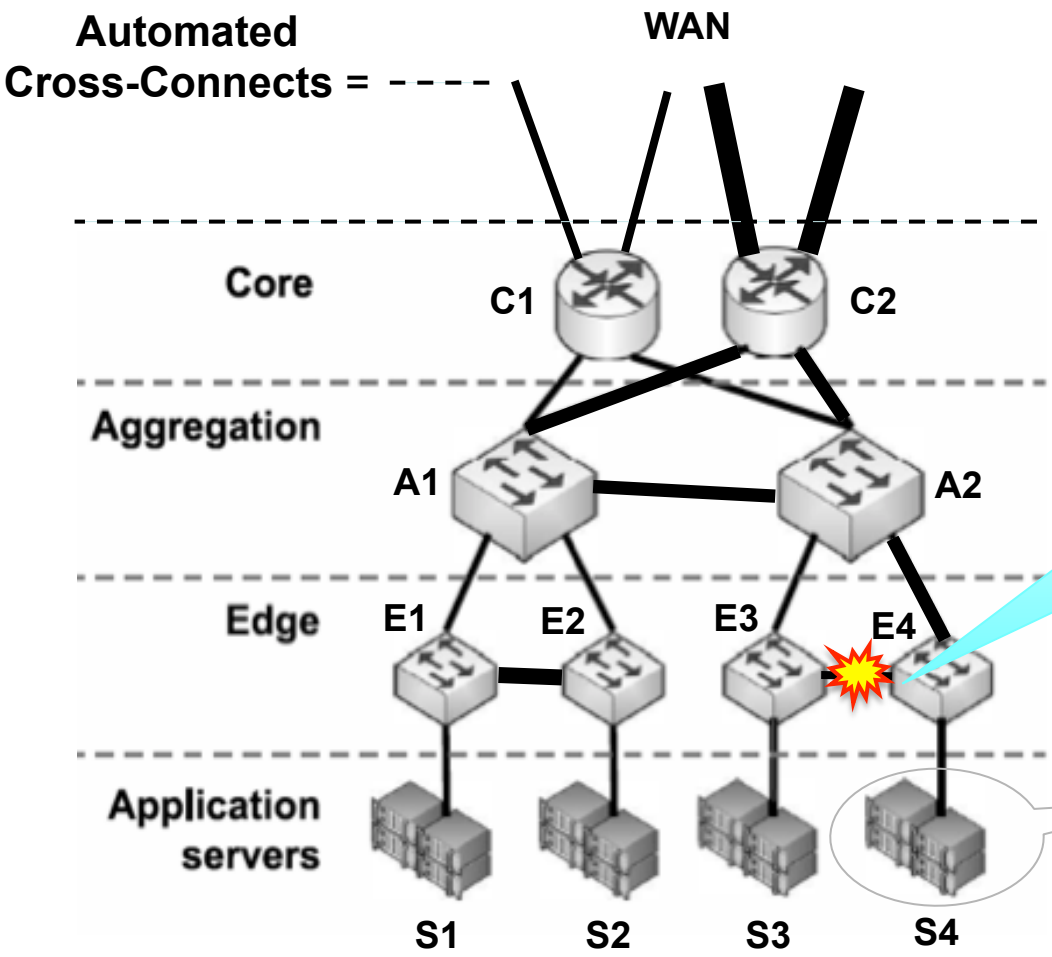
- Reduce execution times from 24/48 hours to minutes
- Eliminate human errors
- Optimize colo assets – provision for average/manage the peaks

Software Define Interconnections Based on Workloads



Key Element: Large Scale, Non-blocking Automated Fiber Cross-connect

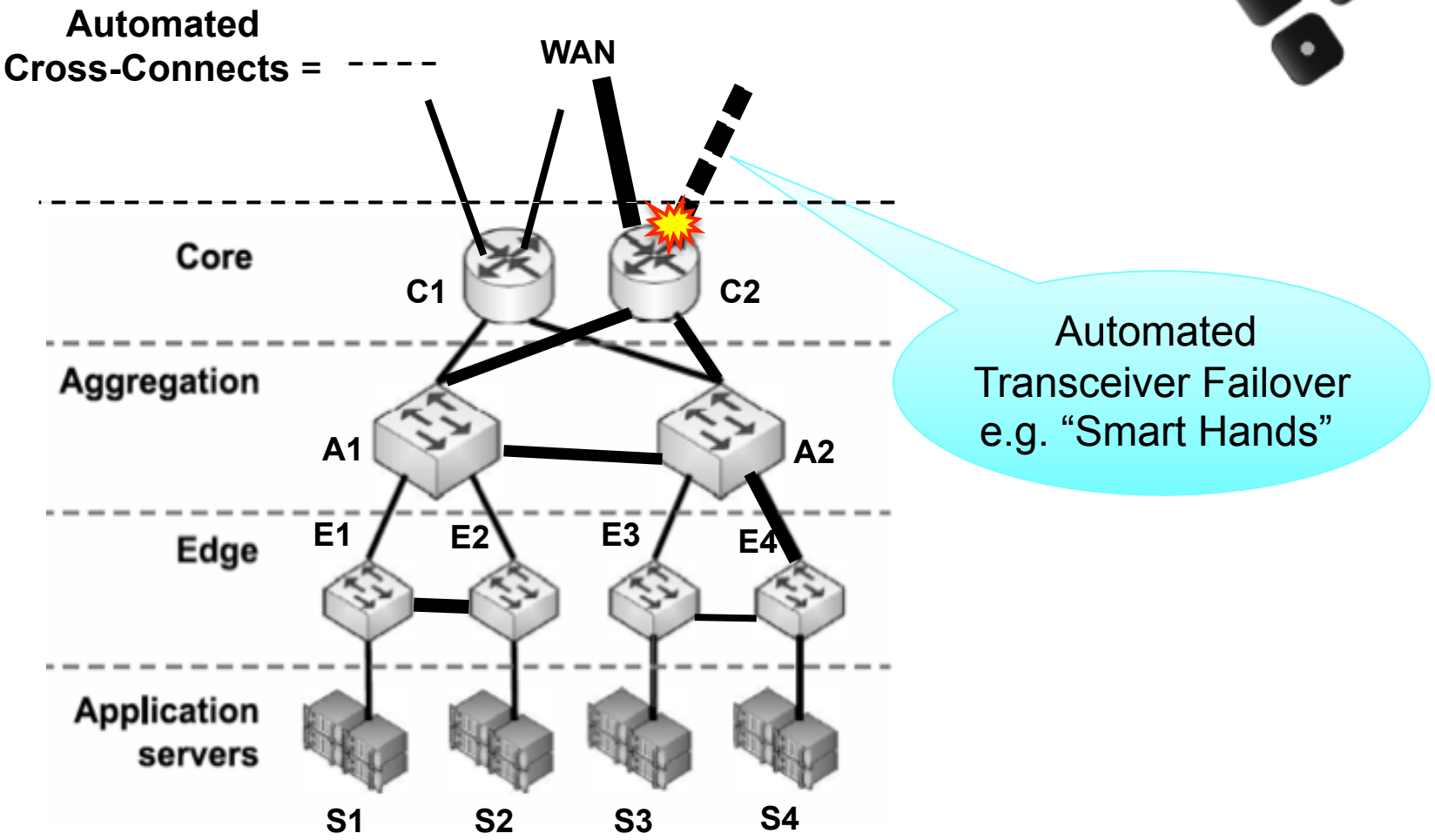
Relieve Link Congestion



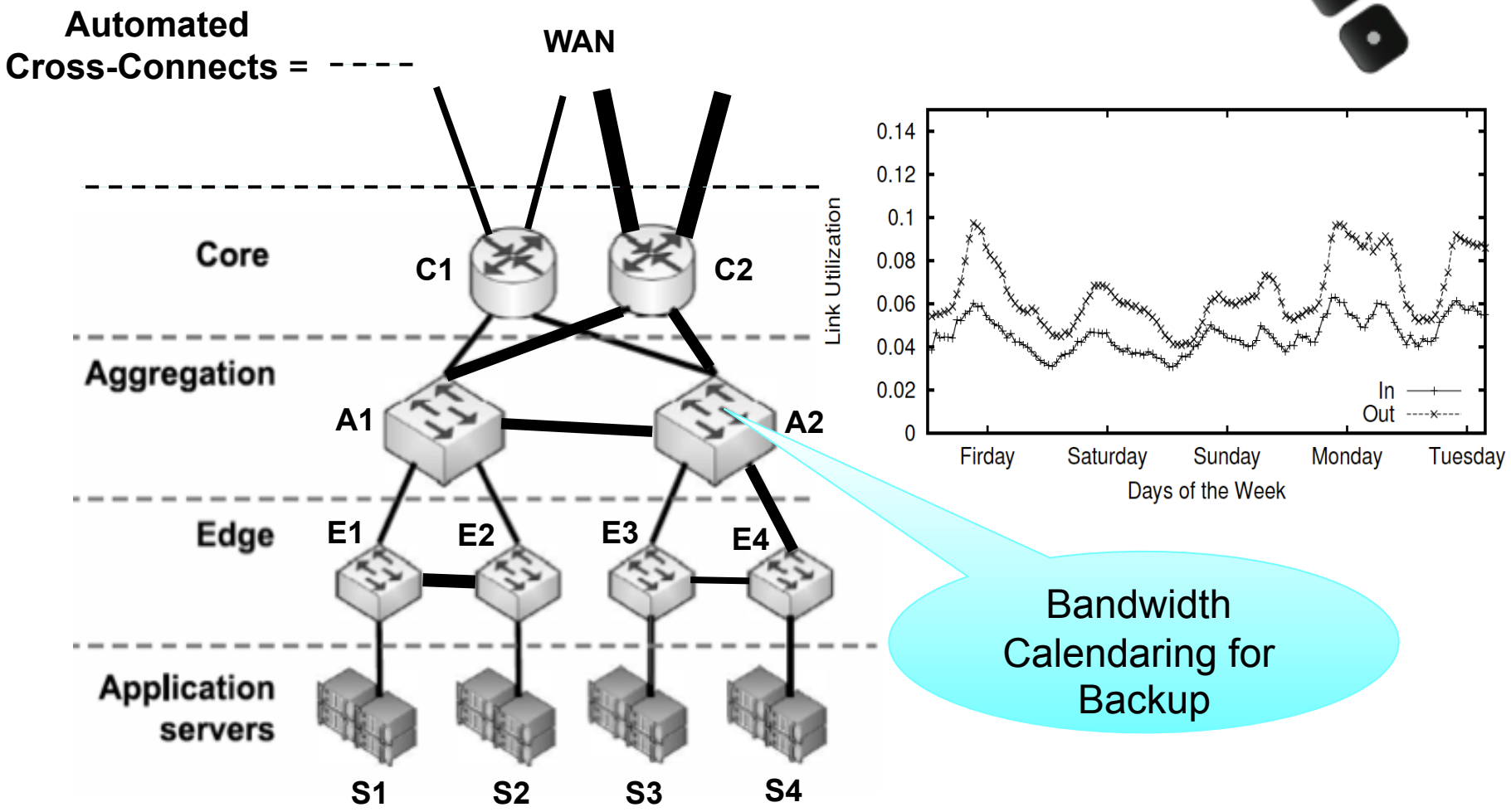
Relieve Congested Trunks in L-2 Switch Fabric

# of t-Switch Ports =
# of 10GE Server Ports

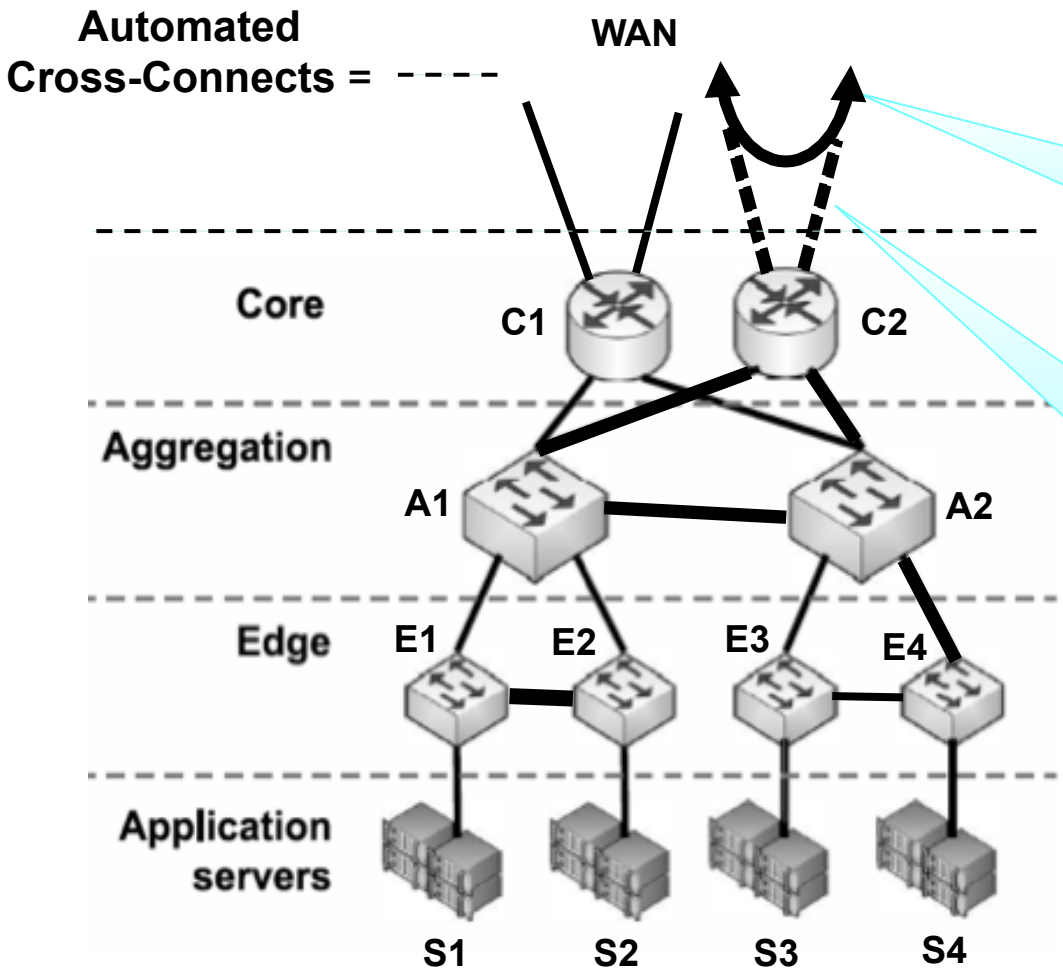
Transceiver Failover



Bandwidth Calendaring for Backup



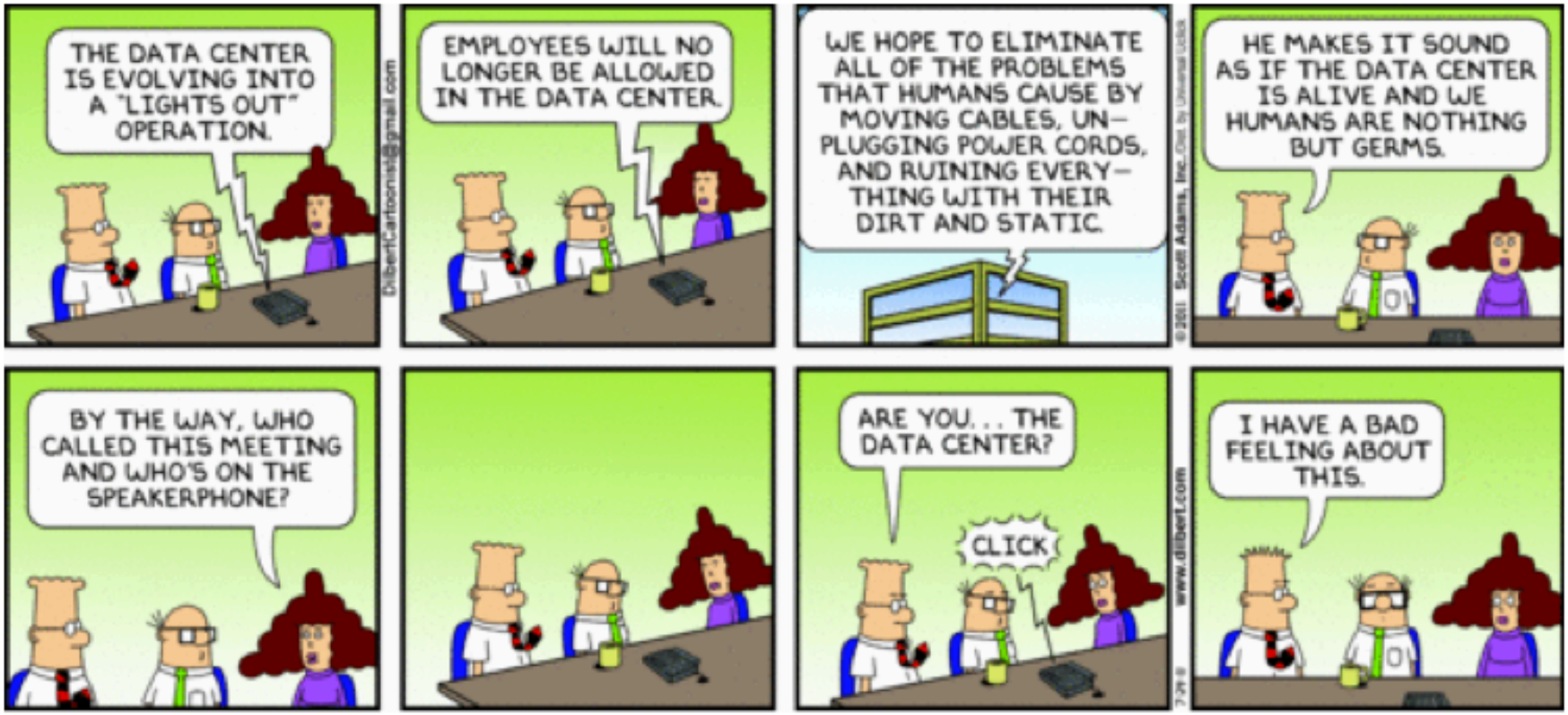
Optical Bypass



Bypass Avoids Costly Router Ports and Reduces Latency

Ports can be Re-Provisioned for Other Jobs

The Dilbert View



For more information please contact
lalani@telescent.com