



High Availability WAN

How Cisco IT Achieved a High Availability WAN



A Cisco on Cisco Case Study: Inside Cisco IT

Overview

- Challenge:

 - Achieve high availability for CAPNet, Cisco's global backbone WAN

- Solution:

 - Measure availability, identify gaps, and implement improvements in network design, operations, management, support, and infrastructure

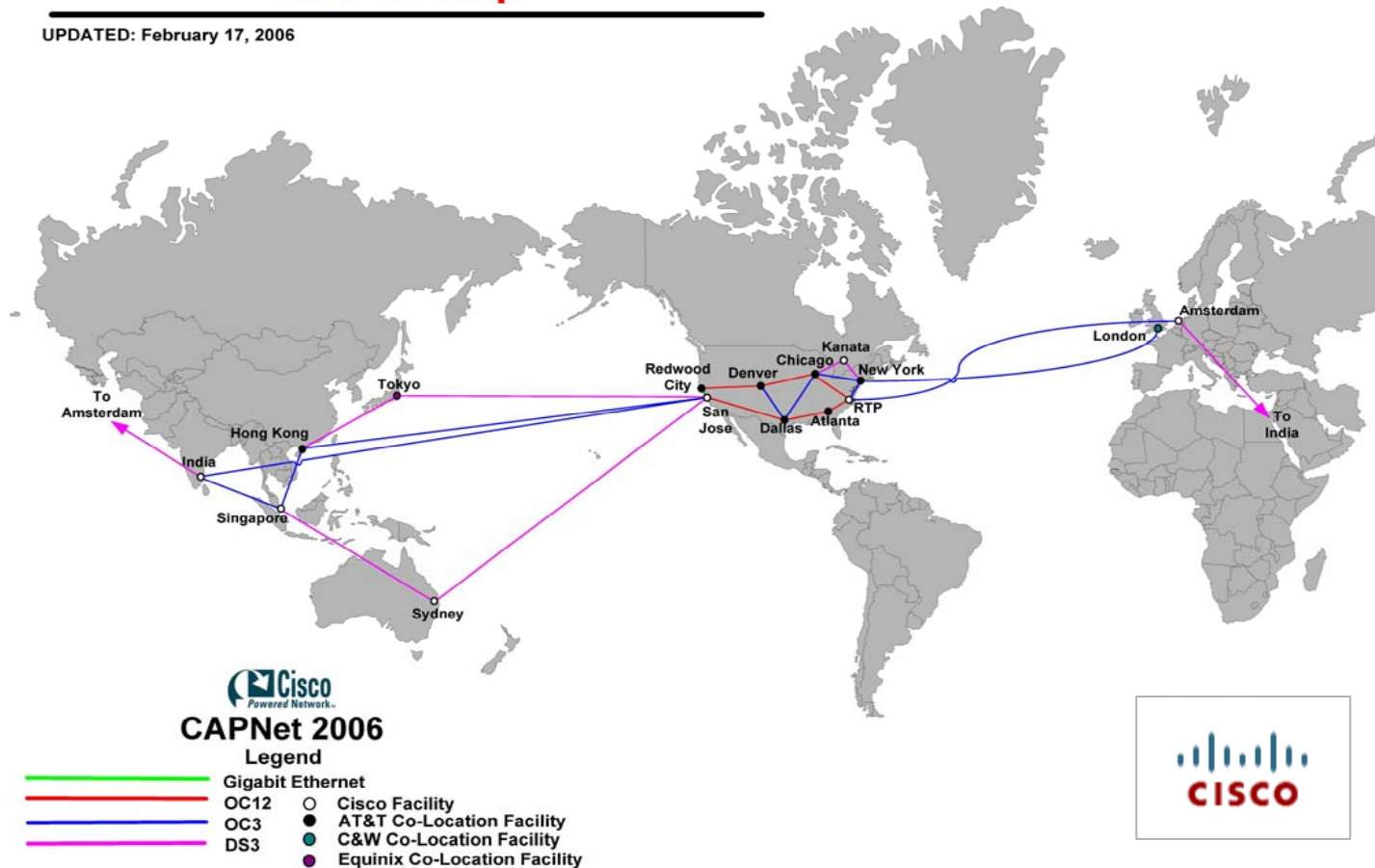
- Results

 - Achieved 99.998% availability and reduced staffing to a single engineer

Background: Cisco WAN Backbone (CAPNet)

Cisco All Packet Network (CAPNet) Global Map

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Challenge: Achieve 99.999% Availability

- Cisco All-Packet Network (CAPNet)
 - Global, backbone network for Cisco Systems®
 - Connects more than 40,000 Cisco employees and contractors
 - Nodes at 15 locations on 4 continents
 - Circuit types range from DS3 to OC12
- Goal: 99.999% network availability = 6 seconds downtime per week
- Initial designs with backup routers and circuits nearly eliminated hardware failure, bringing availability to 99.975%
- Measurement, standardization, and better support processes were needed.

Solution: Improvements in Key Network Areas

- Design: Consistent, architecture-driven designs
- Operations: Consistent processes for changes and upgrades
- Management: Configuration templates and proactive fault and performance management
- Support: Enhanced training, stocking of spare parts, and troubleshooting
- Infrastructure: Standardization across a few platforms

Solution: Three-Phase Move to Five Nines

- Cisco implemented network changes in three phases:
 - Phase 1: Establish reliable availability measurements.
 - Phase 2: Identify key design and procedural gaps and move to four nines (99.99%) availability
 - Phase 3: Execute process upgrade programs and move to five nines (99.999%) availability

Solution: Phase 1 = Measure Availability

- Make use of in-house Enterprise Management system with good device availability measurements
- Build composite host availability metrics with more meaning to WAN team
- Composite host (or aggregate host) availability measures WAN site availability rather than equipment availability

Solution: Phase 2 = 99.99% Availability

- Implemented an IP addressing plan that allows route summarization, which simplified the routing design and reduced instability
- Deployed standard hardware and Cisco IOS® Software releases to simplify network growth, operations, and support
- Enforced standard configurations on network devices to reduce problems created by variances and errors

Solution: Phase 3 = 99.999% Availability

- Refined operational and support procedures

Network design—Facility and circuit planning; resilient technologies for redundancy and fault tolerance

Network management—Host definitions and out-of-band management paths to simplify problem resolution

Network operations—Best practices for Cisco IOS Software upgrades and network changes to reduce disruptions

Fault management and network support—Monitors, alerts, and event procedures to quickly identify problems and minimize impact

Results: Higher Availability, Improved Operations

- Increased WAN availability to 99.998%
- Reduced CAPNet support staff to a single engineer
- Freed other support engineers to work on new programs
- Improved network design, standard equipment and configurations, and processes for management and support

To read the entire case study, or for additional Cisco IT case studies on a variety of business solutions, visit Cisco on Cisco: Inside Cisco IT

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