Network Systems Integration and Test Engineering (NSITE) Overview
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About NSITE
“NSITE’s mission is to system test complex solutions spanning multiple technologies and products to accelerate successful customer deployments.”

NSITE within Cisco is “Customer Zero”.
Cisco—Technology Innovator

INVESTMENT
• $3.2 billion R&D investment
• Extensive investment in systems and solutions development
• 12,400 engineers working in more than 1110 labs worldwide
• Driving technology standards development for networking and the Internet

RESULTS
• More than 1100 patents have been issued to Cisco inventors
• Leading-class products and solutions
• Cisco IOS® Software—the most widely deployed network system software—and Cisco IOX
• NSITE is part of Cisco Development Engineering (CDO)
NSITE tests and validates complex, multi-platform solutions architected to meet key customer requirements worldwide.

Take advantage of a diverse and highly experienced staff, extensive labs, and geographic diversity.

Key Customer Benefits:
- Roll out new solutions and technologies quickly
- Enable higher quality tested releases through customer representative solution test and regression before deployment
- Receive solution-level, lab-validated collateral and characterization in advance
- Identify issues prior to service launch, reducing quantity and severity of customer-found problems
- Increase customer satisfaction
Test Levels and Test Types

- **Test level** refers to testing one of three complexity levels: i.e., unit, feature, or system level testing.
- **Test type** refers to a specific kind of testing at a given level.

### Unit Testing
- White-Box (code aware)
- Black-Box
- Positive, Negative
- Static analysis
- Code/branch/path coverage
- Single stepping with debugger
- Test harness
- Middleware for injection of faults
- State machine validation

### Feature Testing
- Feature Interaction
- Feature Combination
- Black-Box
- Positive, Negative
- Stress
- Scalability
- Performance
- Interoperability
- Conformance
- Startup/Shutdown

### System Testing
- Feature Combination
- Role combination
- Operational
- Feature Interaction
- Positive, Negative
- Stress & Scalability
- Performance
- Interoperability
- Configuration
- Conformance
- Startup/Shutdown
- Installation/Migration/Deployment
- Provisioning/Billing/Manageability
- Customer Scenario

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NSITE System Test
Where NSITE Fits in the Test Cycle

- Development and Unit Test
- Feature Test
- BU System Test
- Advanced Services Customer Specific System Test
- Service Provider Customer
- NSITE System Testing
- Cross-Group
- Feature/Function Regression (e.g., ARF, NRT, BU)
- System Regression (e.g., EST, BU)
- IOS Release Regression

- BU or Technology
- Solution System Test
- ITD System Test
- Customer Specific System Test
- Customer
- Advanced Services
- ITD System Test
- Cross-Group
- Service Provider Customer
NSITE Worldwide Project Summary

- **Research Triangle Park (RTP), North Carolina:**
  ~110 employees, >30 projects
  - Cable VoIP and Triple Play, IBM Technologies, L3VPN, Metro Ethernet, Security
- **San Jose, CA:** ~50 employees, ~8 projects
  - Broadband/iEdge Aggregation, Enterprise Systems, L2VPN
- **Green Park, United Kingdom (UK):**
  ~25 employees, ~8 projects
  - Enterprise Voice, SP Voice, Mobility
- **Brussels, Belgium:** ~15 employees, ~4 projects
  - Broadband Aggregation, Next Gen Core, QoS (Tight SLA)
NSITE – Research Triangle Park, NC

- Lab Space = 2100m²
- Asset Count = 6,397
- Ethernet Cable = 8000km
- Rack count = 1100+
- Shielded T1 = 5600km
- DC Power = 29km
- Power_{DC} = 9000+ Amps
- Power_{AC} = 4000+ Amps
- Recent Addition = 4000ft²
Multiple areas of expertise and capability:
- Complete Class 5 interop test environment
- IOS (MPLS, Resilient IP, etc.)
- IOS quality initiatives
- Access
- Voice, video, and data over cable
- IPv6
- Optical
- Operational core
- MPLS/VPN core
- MPLS/VPN ATM core
- Network management
- Metro Ethernet
NSITE - San Jose, CA

- Customer, Enterprise and Service Provider representative test beds consisting of 75-200 routers/switches
- Over 1300m² lab space
NSITE – Green Park, UK

- 300KVa of UPS, 1350 Amps of DC power
- Switch room and lab protected by Inergen
- GPS clock, Satellite and broadcast TV feeds
- Video on Demand and Video Broadcast Servers
- DMS 100, PABXs, SP scale Cisco 12000 Series (20x) core
- Telephony and Voice Quality Equipment
Lab Details:
- Floor space = 600m²
- Racks = 150
- 48V installation
- Cisco CRS-1 Carrier Routing System, Cisco 10000 Series Router
- Agilent, Spirent
- Broadband Video Network

Test Efforts Underway:
- MPLS/VPN SLA Validation
- Broadband Triple Play
Cisco Cable Solution Test Programs
NSITE – Cable System & Solution Test

• Cable NGN Solution
  – Focused on MSO NGN transport testing; e.g., Regional Core
  – Full cable broadcast video capability, leveraging satellite content
  – Full VoD
  – Interconnect to cable VOIP solution for live voice capability
  – Cisco CRS-1 Carrier Routing System; Cisco 12000, 10000, 7600, 7200 Series Routers, and Cisco uBR10012 and uBR7246VXR Universal Broadband Routers
  – Initial alignment around Comcast requirements, with an expansion to other cable operators (worldwide)

• Cable VoIP Solution
  – SIP Interconnect for On net to On net calls
  – SIP interconnect via SIP trunks
  – SS7 Connectivity
  – Cisco BTS 10200 Softswitch, Cisco Broadband Access Center, Cisco MGX8000 Series Media Gateway, Cisco uBR10012 and uBR7246VXR
  – Extensive cable modem test capability
  – Focused on end-to-end VoIP solution test for cable
NSITE RTP Lab cont. (Video Gear)

- **APOP – Content Hub**
  - 2 Satellite Dishes
  - Receivers –
    - Scientific Atlantic (CMC Feeds)
    - DSR 4400 (HITS Feeds)
  - Video Headend (IP begins!)
    - Big Band BMR 1200 – Headend Start /IP Multiplexer and Ad splicer
    - DM6400 (Cherry picker) – Headend Start/IP Multiplexer and Ad Splicer
  - VOD Video Pumps
    - Media Hawk 4000 – Harness software simulate STB (Play, FF, Reverse)
    - FYQ2 Full VOD capability – Head Resource Manager, Billing Server
  - Traffic Generation Tools
    - Ixia
    - Ineoquest

- **Residential Hubs**
  - QAMS
    - Motorola SEM V8s – Broadcast Harmonics – VOD
  - Multiple Legacy STBs
  - Amino IPTV STBs
  - RF Network out-of-band manager RPD 1000
NSITE 2006
Strategy, Goals & Initiatives
Cisco’s Blueprint for the Future

3–5 Year Goals

- Cisco and Networking = Communications and Productivity
- Customer Partner Status
- Leader in Financial Performance, Integrity
- Systems and Solutions: Clear Industry Leader
- Network Architecture Leader
- 3 Growth Areas
  - #1 or #2 Position

Cisco Strategy

- Business Architecture
  - Drive tech/business architecture through Cisco
- Intelligent Information Network
  - Expand Enterprise Systems & Service > 12%
  - Drive Commercial – Data/Voice > 15%
  - IP NGN/SP Leadership >20%
  - Productivity Leadership 10-15% (5+5+5)
  - Grow Integrated ATs 5>$2B; 10>$1B
  - Customer Satisfaction 4.35:
    - Drive Quality, Security, Manageability & Innovation in all product architectures
- Technology Architecture
  - Profits 15%+ Growth

2006 Initiatives

- Drive tech/business architecture through Cisco
- Expand Enterprise Systems & Service > 12%
- Drive Commercial – Data/Voice > 15%
- IP NGN/SP Leadership >20%
- Productivity Leadership 10-15% (5+5+5)
- Grow Integrated ATs 5>$2B; 10>$1B
- Customer Satisfaction 4.35:
  - Drive Quality, Security, Manageability & Innovation in all product architectures
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<td>Drive tech/business architecture through Cisco</td>
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Cisco and Networking = Communications and Productivity

Cisco’s Blueprint for the Future
FY 2006 Goals… (3–5 Years)

Cisco and networking synonymous with communications and productivity

Customer partner status… Technology / Business architecture success

Systems/Solutions: Clear leader in industry… Internet experts

Network Architecture Evolution Leader…
End-to-End → Network of Networks → Intelligent Information Network

#1, #2 position… Products → Quality, Security and Manageability

Three Growth areas (Core, Service Provider, Advanced Technologies)

Leadership in financial performance, integrity
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<td><strong>Develop and drive technology and business architecture goals throughout entire organization</strong></td>
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<td><strong>Dramatically expand enterprise network systems and service innovation</strong></td>
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Goal Highlights

- Enable successful customer deployment of Cisco solutions and technologies
- Improve stakeholder satisfaction by ensuring tight alignment with priorities and plans
- Maximize the efficiency of system test through the development and implementation of standard processes
- Deliver against our commitments