Network Systems Integration and Test Engineering (NSITE) Overview

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About NSITE

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NSITE's Mission

"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)

Value Proposition

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**

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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

Cisco Business Unit (BU) or Central Software Engineering Test

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

NSITE System Test ⟶

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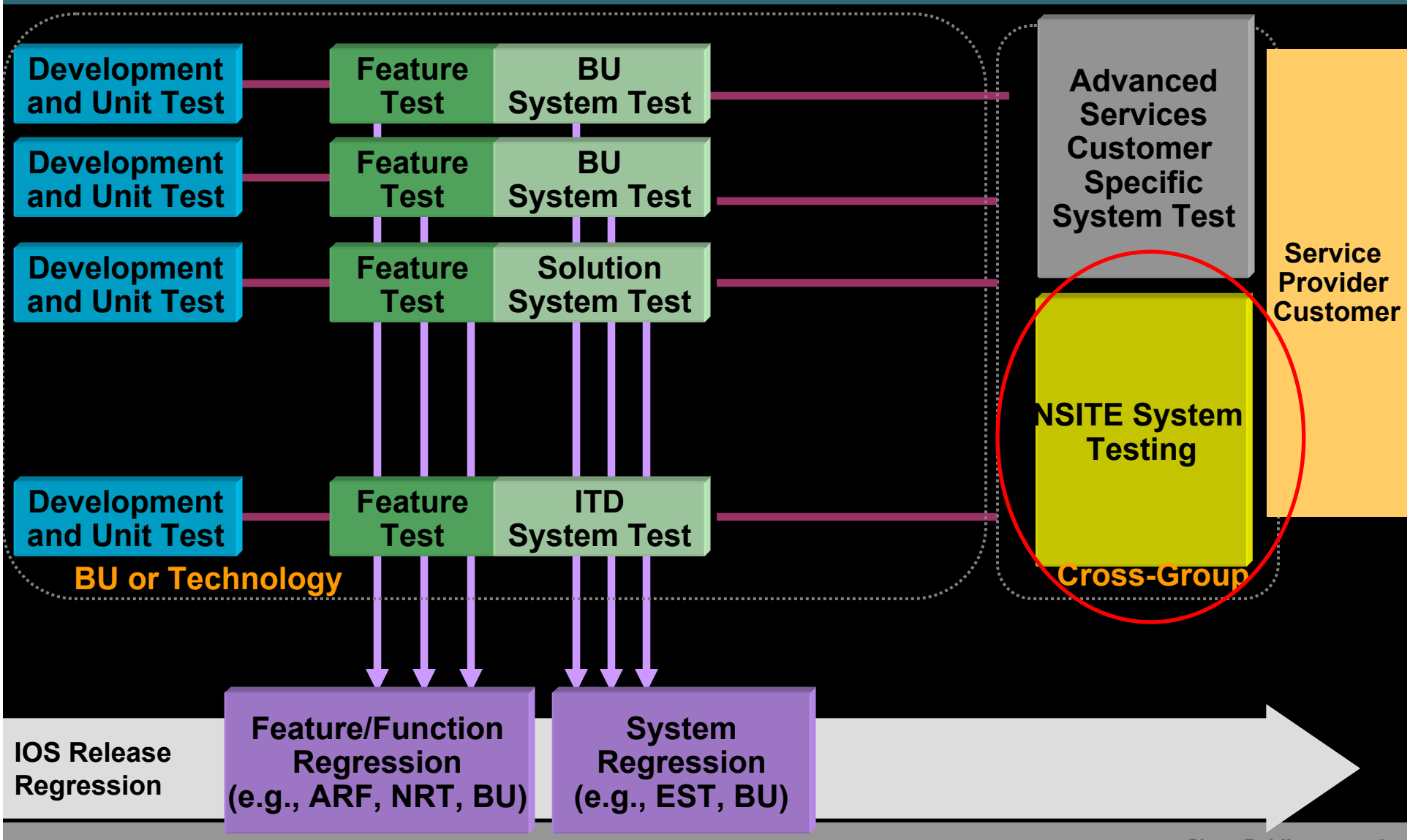
Where NSITE Fits in the Test Cycle



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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)

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NSITE – Research Triangle Park, NC

- Lab Space = 2100m^2
- 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 = 4000ft^2

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NSITE – Research Triangle Park, NC

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

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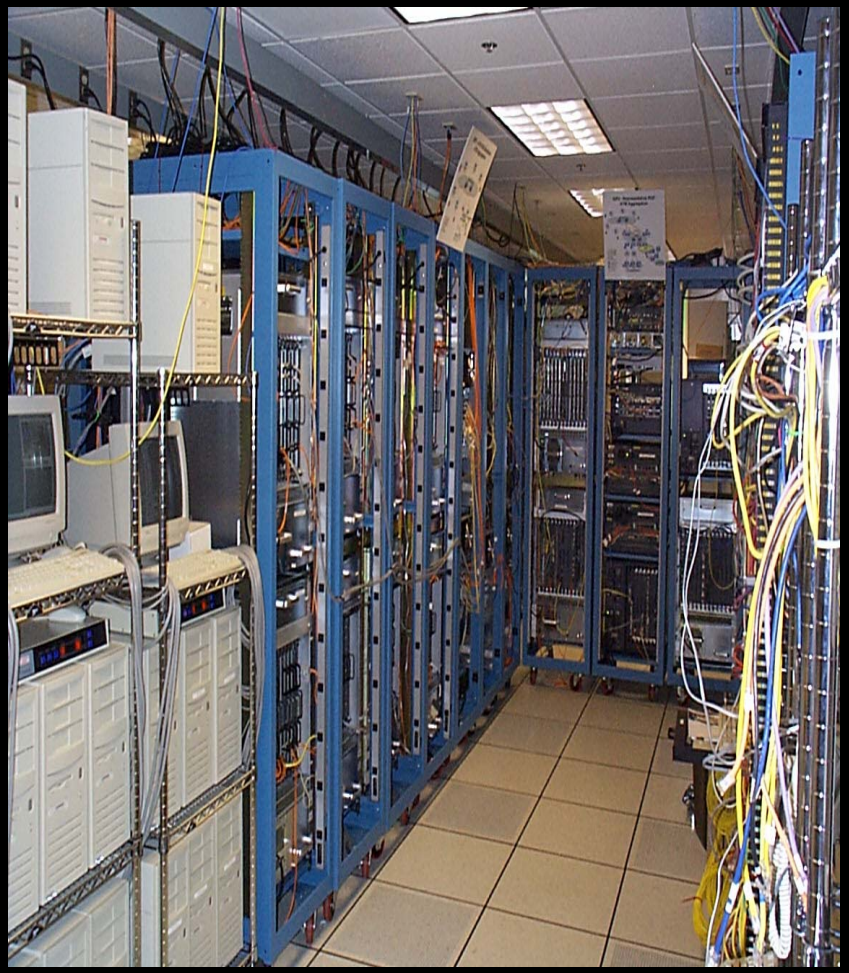
NSITE - San Jose, CA



Typical portion of an end-to-end test bed

- Customer, Enterprise and Service Provider representative test beds consisting of 75-200 routers/switches
- Over 1300m^2 lab space

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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

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NSITE – Brussels, Belgium

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

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Cisco Cable Solution Test Programs

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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

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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

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NSITE 2006
Strategy, Goals & Initiatives

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Cisco's Blueprint for the Future

3–5 Year Goals	Cisco Strategy	2006 Initiatives
Cisco and Networking = Communications and Productivity	**Business Architecture**	Drive tech/business architecture through Cisco
Customer Partner Status		Expand Enterprise Systems & Service > 12%
Leader in Financial Performance, Integrity		Drive Commercial – Data/Voice > 15%
Systems and Solutions: Clear Industry Leader	**Intelligent Information Network**	IP NGN/SP Leadership >20%
Network Architecture Leader		Productivity Leadership 10-15% (5+5+5)
3 Growth Areas		Grow Integrated ATs 5>$2B; 10>$1B
#1 or #2 Position	**Technology Architecture**	Customer Satisfaction 4.35: Drive Quality, Security, Manageability & Innovation in all product architectures
		Profits 15%+ Growth

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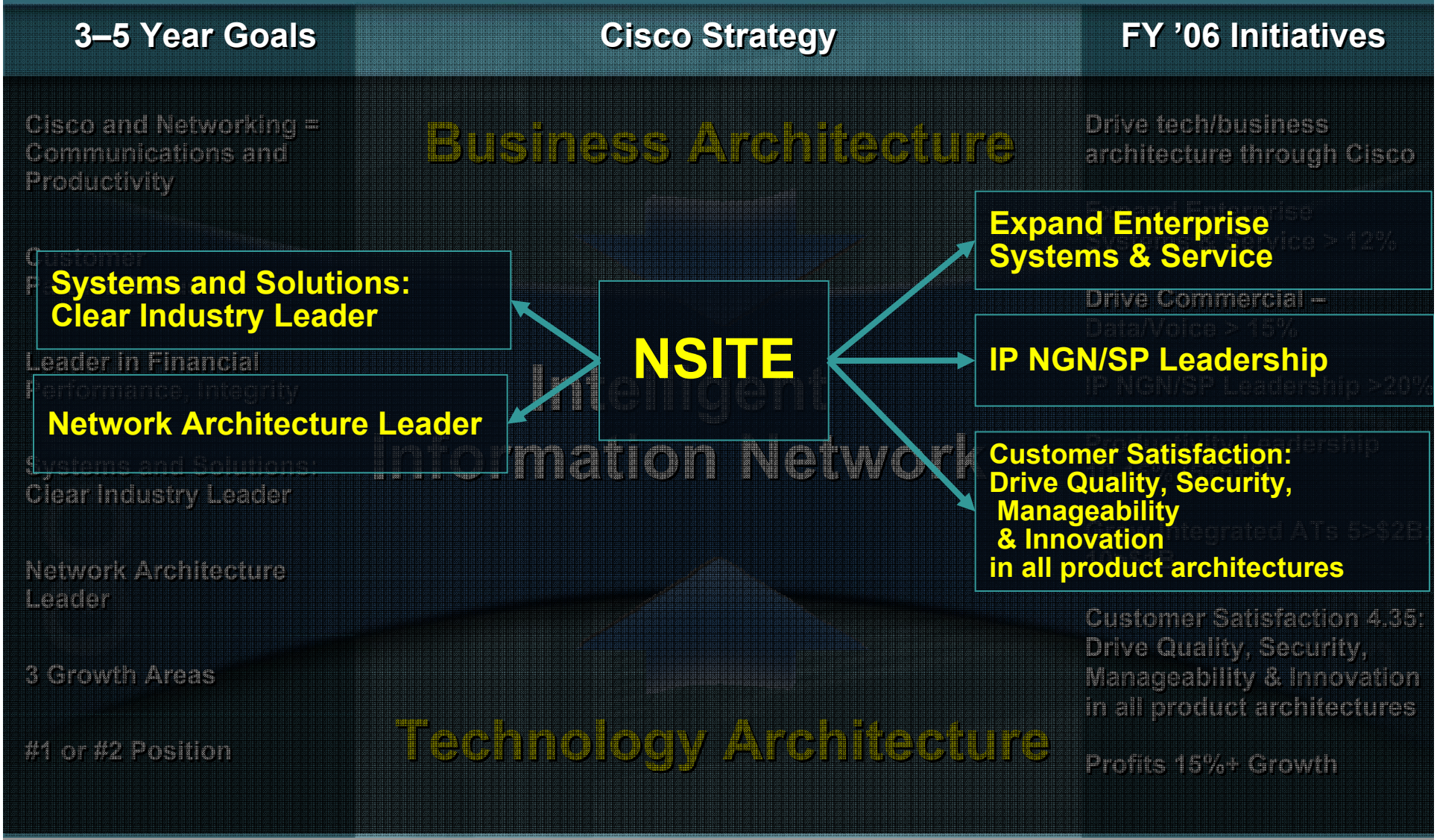
Cisco's Blueprint for the Future



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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

Initiatives

	INITIATIVES
	Develop and drive technology and business architecture goals throughout entire organization
nsite	Dramatically expand enterprise network systems and service innovation
	Drive commercial… data/voice implementation
nsite	IP NGN Service Provider leadership
	Productivity leadership
nsite	Expand and grow tightly integrated ATs
nsite	Customer Satisfaction: Drive quality, security, manageability and innovation in all architectures
	Leader in financial performance… Profits growth

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

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