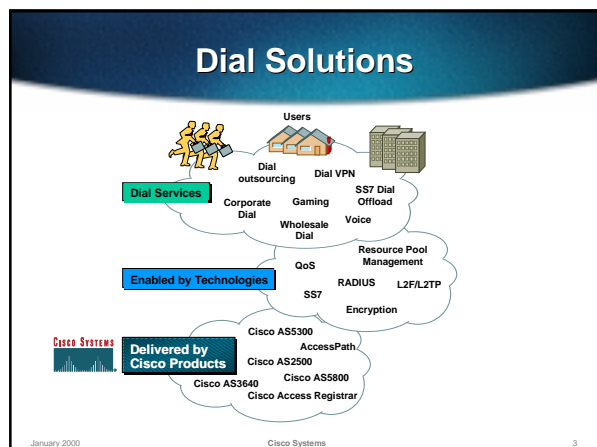


Agenda

- Dial Architecture and Service Basics
- Applying the Principles to Dial POPs
- Big Time Dial Aggregation
- The Extra Value Add

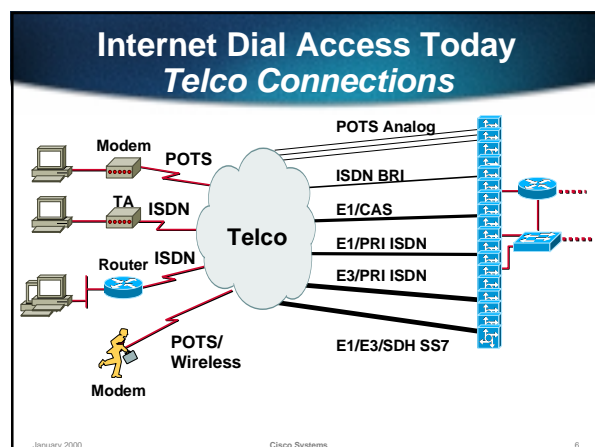
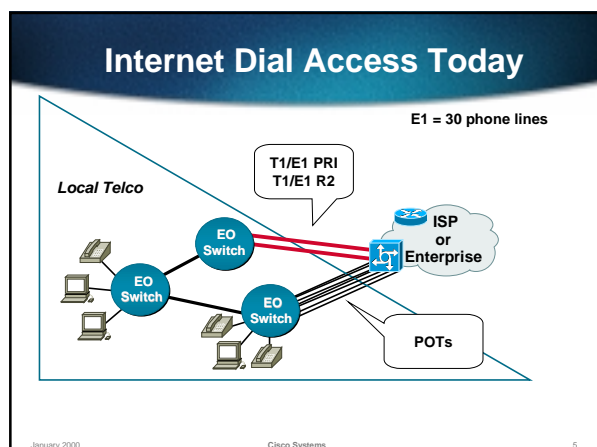
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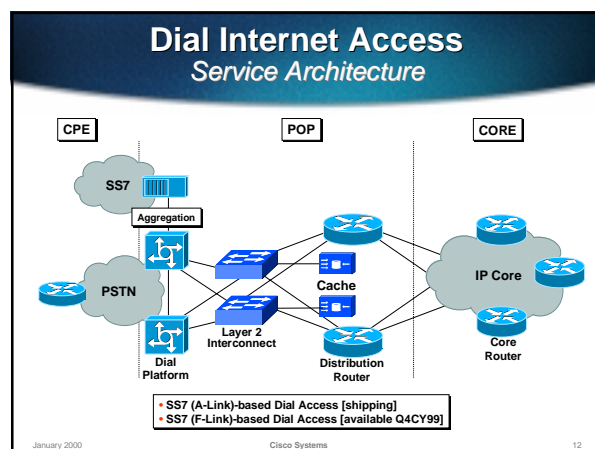
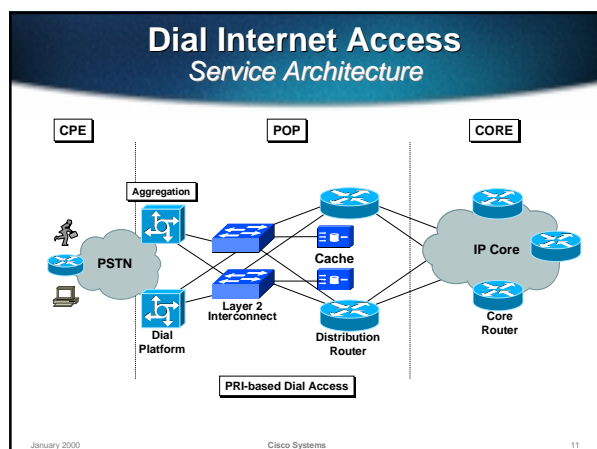
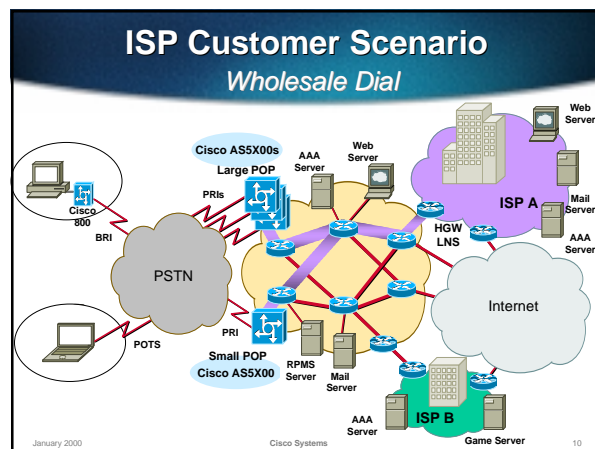
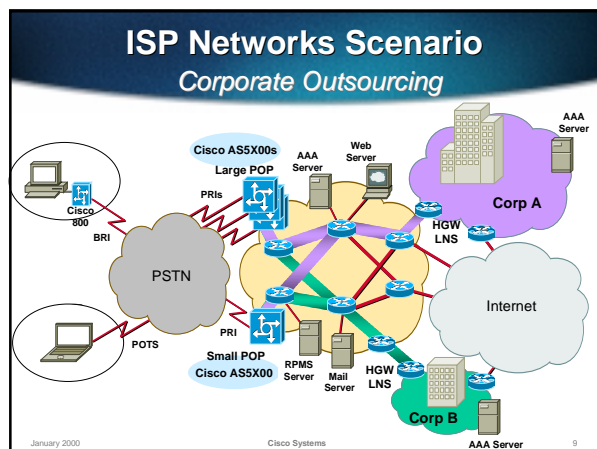
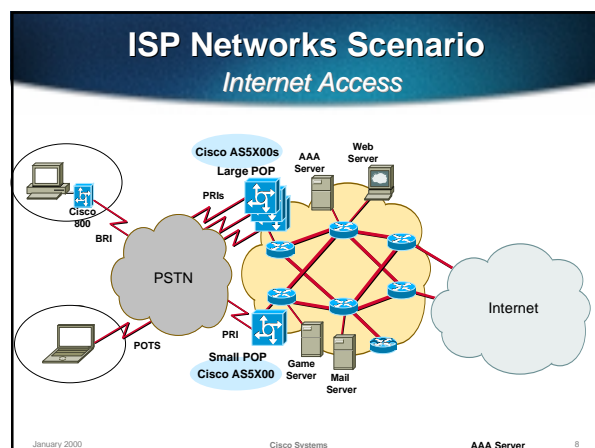
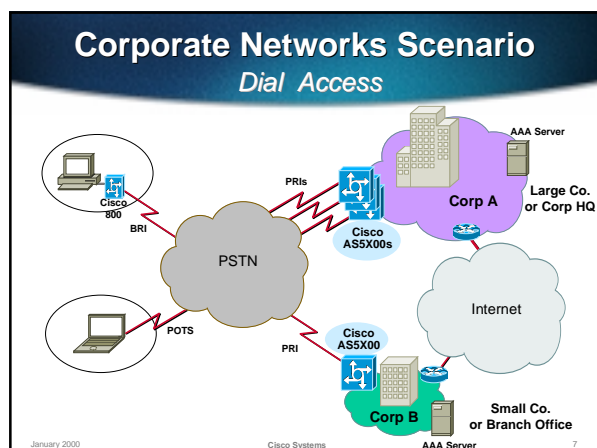


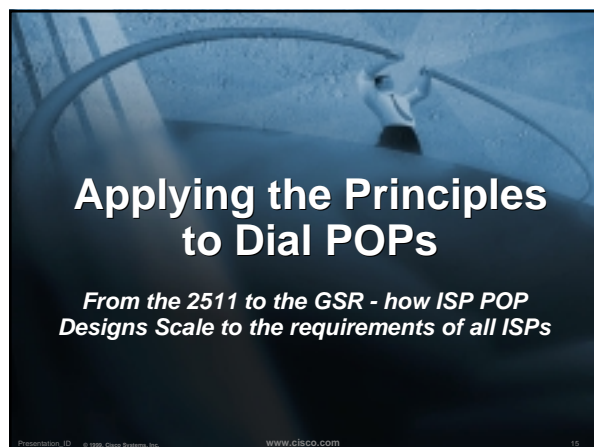
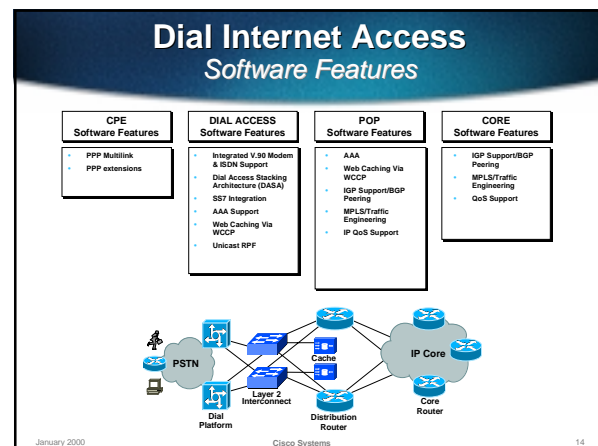
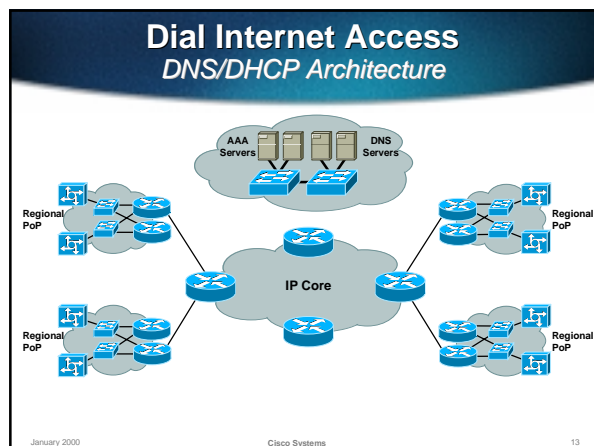
Network Scenarios

- **Corporate Networks**
 - Dial access for employees
- **ISP Networks**
 - Internet Service to end user
 - Corporate outsourcing
 - Wholesale Dial

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Small Start-up ISPs

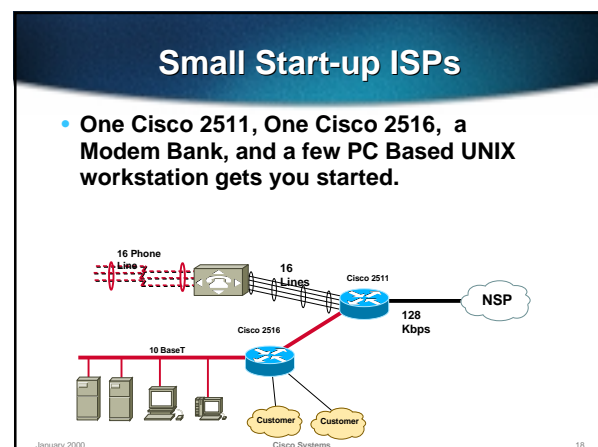
- Cisco's 2500 Access Server Series: A low-cost entry-level access server product family
- Connects async devices (such as terminals, modems, ISDN terminal adapters) into routed network
- Backhauls routed traffic through T1/E1 lines
- Cisco 2500 Series is the workhorse of the start-up ISP

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Cisco 2509 and Cisco 2511 Access Servers

Central Site Access Server Solutions		
	Cisco 2509	Cisco 2511
Ethernet	1	1
Synchronous Serial Ports	2	2
High-speed Async. Serial Ports	8	16

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Cisco 2500 Integrated Hub Models

Hardware Configuration

		LAN Interface					WAN Interface		
	Topology	Hub Port	MDI-X Switch	AUI Port	Loose Exp Port	Ring-In Ring-Out Port	T1/E1 Sync Serial	Low Speed Async	ISDN BRI
2505	Ethernet	8	—	—	N/A	N/A	2	1	—
2507	Ethernet	16	—	—	N/A	N/A	2	1	—
2516	Ethernet	14	Yes	—	N/A	N/A	2	1	1
2517	Token Ring	11	N/A	N/A	Yes	Yes	2	1	1
2518	Ethernet	23	—	Yes	N/A	N/A	2	1	1
2519	Token Ring	23	N/A	N/A	No	Yes	2	1	1

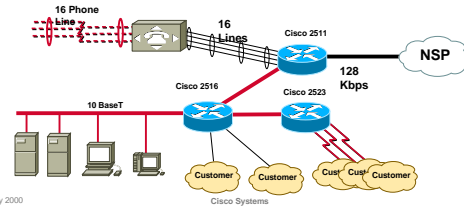
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874_115c3 8P

Small Start-up ISPs

- Add a Cisco 2522 for low speed lease line ports.



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Cisco 2522 - Low Cost Lease Line Aggregation

- 1 Ethernet (AUI/10BT)
- 2 High-speed synchronous serial
- 1 ISDN BRI S/T interface
- 8 Low-speed (115.2 kpps) asynchronous/synchronous serial (5-in-1)



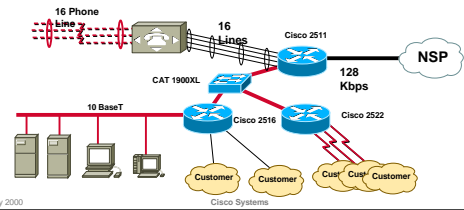
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Small Start-up ISPs

- Add a CAT 1900XL for switched ethernet with VLAN



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Catalyst 1900

- Extremely low price per port
- Affordable high-performance alternative or complement to shared media 10BaseT hubs
- 12 or 24 switched 10BaseT ports
- Choice of 100BaseTX or 100BaseFX uplinks
- Slimline one-rack unit high enclosure
- VLAN



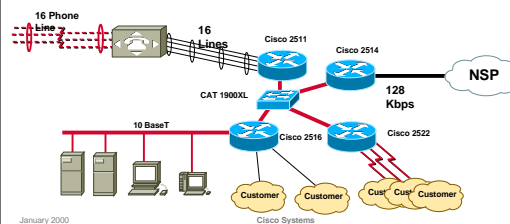
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Small Start-up ISPs

- Start Adding Redundancy - Break the Dial and the Backbone



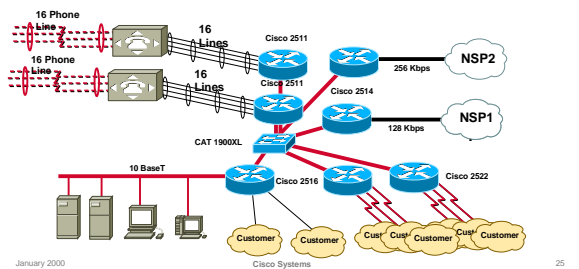
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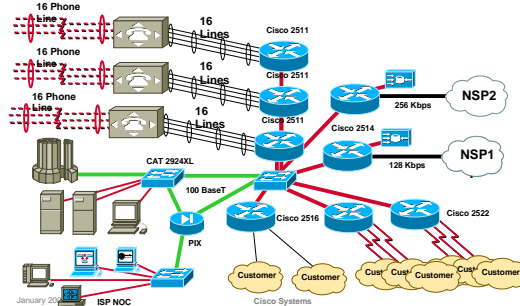
Small Start-up ISPs

- Multiple directions of growth...



Small Start-up ISPs

- Multiple directions of growth...



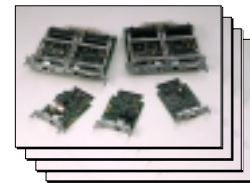
Cisco 3600 Family Platforms

- 50-70 kpps fast switching
 - 3-4 kpps process switching
 - Four network module slots
- Versatility
Integration
Performance**
- 20-40 kpps fast switching
 - 1.5-2 kpps process switching
 - Two network module slots



Cisco 3600/2600 Family Interfaces

- Multiple LAN/WAN combinations
 - Ethernet, Token Ring, Fast Ethernet, Serial, ISDN, CSU/DSU
- Broad range of network services
 - Dial-ISDN, async, modems
 - Multiservice—Voice and fax over IP packet gateways (BR/PRI digital interfaces, VoFR, and VoATM in '98)
 - Emerging technologies—ATM, xDSL in '98
- Simplified solutions
 - Integrated 56K CSU/DSU (T1 in '98)
 - Integrated compression and encryption
 - WICs shared with Cisco 1600 series

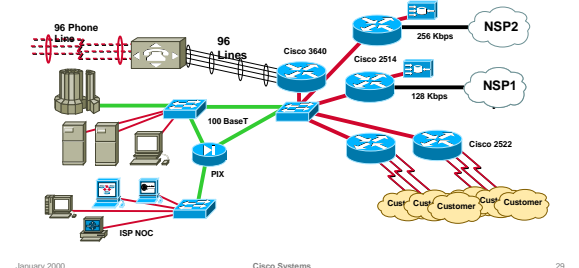


**Over 5000
Unique Combinations!**

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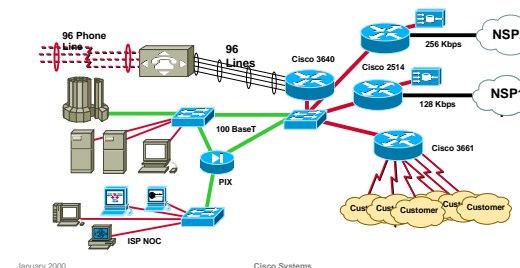
Scaling the Start-up ISPs

- Replace six 2511s with one 3640 with 96 ports



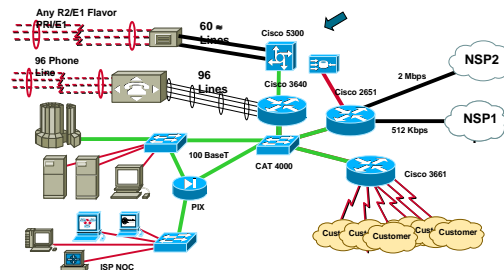
Scaling the Start-up ISPs

- Replace three 2522s with one 3661 with 48 low speed ports (up to 128Kbps)



Small Start-up ISPs

- Add Digital R2/E1 or PRI/E1 Dial-up lines with the Cisco AS 5300.



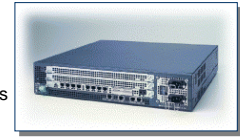
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Cisco Access Servers AS5300 Specifications

- **T1/E1:** Up to 8
- **Data ports:** Up to 192/240
- **Voice ports:** Up to 96/120
- **Serial:** 4
- **LAN:** 10/100Mbps + 10Mbps
- **Power:** Redundant AC or DC
- **Compliance:** NEBS/ETSI compliant

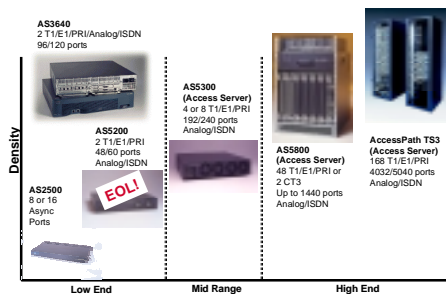


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Cisco Access Servers



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Big Time Dial Aggregation

What do the Tier 1 & Tier 2 ISPs use for their Dial Solutions

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Cisco Access Servers AS5800 Specifications

- **T1/E1:** Up to 48
- **T3:** Up to 2 (Up to 56 T1s)
- **Data ports:** Up to 1344
- **Voice ports:** Up to 1344*
- **WAN:** OC3, POS, FR, ATM & more!
- **LAN:** 100Mbps, 10Mbps
- **Power:** Redundant AC or DC
- **Compliance:** NEBS/ETSI compliant



* Requires dual router shelf configuration

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Cisco Access Servers AS5800 Features

- **Carrier class access server**
- **Multiservice platform**
 - Modem, ISDN, VoIP, Fax Relay
- **Security**
 - AAA, RADIUS, TACACS+, IPsec
- **Scalability**
 - MMP, L2F, L2TP, SS7
- **Availability**
 - Hot swap on all cards, hot sparing of modems, highly redundant architecture
- **Vast range of dial features**
 - Dialout, policy based routing, QoS, per user attributes



Earned Tester's Choice award in independent test by DataComm


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Cisco Access Servers *When to sell AS5800*

- **Large deployment**
 - 288 to 1344 voice/dial ports (12xT1 to 2xCT3)
 - Supporting ~2880 to ~13440 users
- **Carrier class system**
 - Hot swap cards, power supply, fans
 - High availability with redundant elements
- **Range of WAN backhaul options**
 - Wide selection of WAN interfaces, including PoS, OC3, ATM, HSSI & more!
- **High density chassis**
 - Up to 1344 dial ports in single chassis
 - CT3 ingress interface
- **Basic VoIP/Fax support with high density**
 - Up to 672 voice calls per Router Shelf

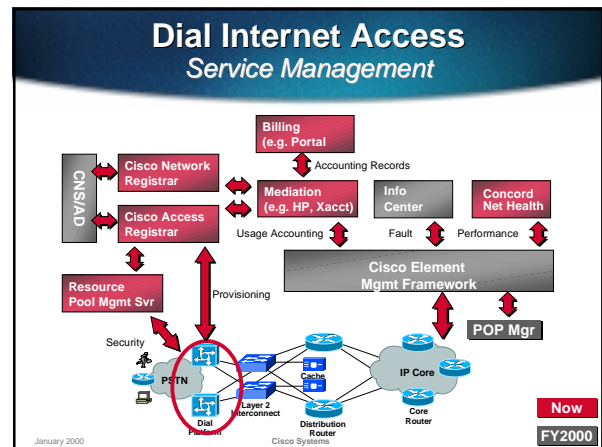
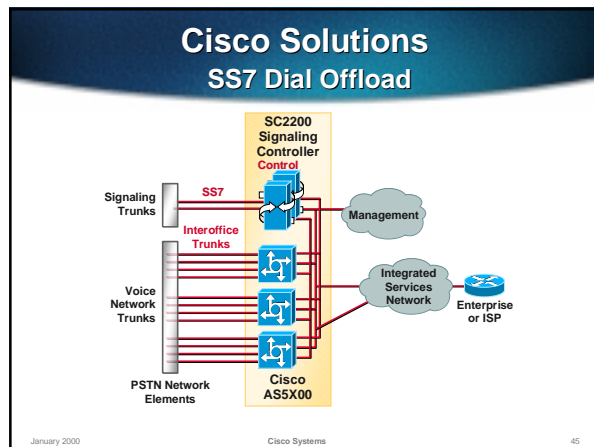


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The Extra Value Add

The other factors that add value to Cisco's Dial Solution

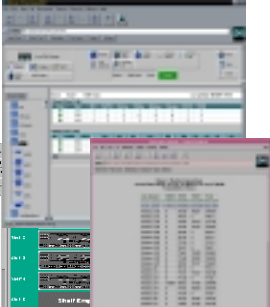
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Network Management Cisco Access Manager

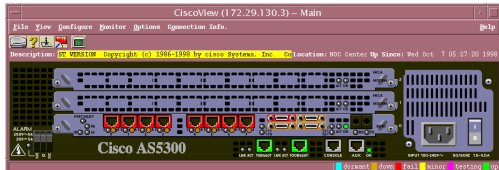
Dial Pool Management

- Functional areas:
 - Device Provisioning
 - Configuration
 - Stack, Shelf creation
 - Activation
 - Template management
 - Dial Pool Operation
 - Performance, Status, Alarm monitoring
 - Utilization Reporting
 - Web Based User Interface



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Network Management Cisco View 2000



- Real Time Call Monitor and Statistics
- Configuration Capability
- Extensive reporting and scheduling

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Network Management Cisco Voice Manager

- Functional Areas
 - Voice Configuration
 - Monitoring and Diagnostic Utilities
 - Reporting



ID	Device Name	Device Type	Device ID	Device IP	Device MAC	Device Status	Device Config	Device Log
1	192.168.1.1	192.168.1.1	192.168.1.1	192.168.1.1	192.168.1.1	192.168.1.1	192.168.1.1	192.168.1.1
2	192.168.1.2	192.168.1.2	192.168.1.2	192.168.1.2	192.168.1.2	192.168.1.2	192.168.1.2	192.168.1.2
3	192.168.1.3	192.168.1.3	192.168.1.3	192.168.1.3	192.168.1.3	192.168.1.3	192.168.1.3	192.168.1.3
4	192.168.1.4	192.168.1.4	192.168.1.4	192.168.1.4	192.168.1.4	192.168.1.4	192.168.1.4	192.168.1.4
5	192.168.1.5	192.168.1.5	192.168.1.5	192.168.1.5	192.168.1.5	192.168.1.5	192.168.1.5	192.168.1.5
6	192.168.1.6	192.168.1.6	192.168.1.6	192.168.1.6	192.168.1.6	192.168.1.6	192.168.1.6	192.168.1.6
7	192.168.1.7	192.168.1.7	192.168.1.7	192.168.1.7	192.168.1.7	192.168.1.7	192.168.1.7	192.168.1.7
8	192.168.1.8	192.168.1.8	192.168.1.8	192.168.1.8	192.168.1.8	192.168.1.8	192.168.1.8	192.168.1.8
9	192.168.1.9	192.168.1.9	192.168.1.9	192.168.1.9	192.168.1.9	192.168.1.9	192.168.1.9	192.168.1.9
10	192.168.1.10	192.168.1.10	192.168.1.10	192.168.1.10	192.168.1.10	192.168.1.10	192.168.1.10	192.168.1.10

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November 1, 1999

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