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# Cable OSS/NM

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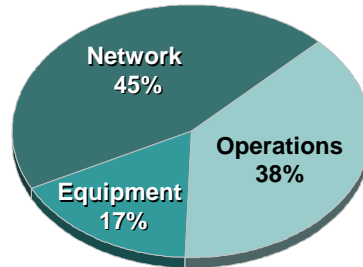
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## Total Cost of Ownership (TCO) Challenge

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### Cable Operations Breakdown

Billing and Customer Care	13%
Provisioning	5%
Network Management	5%
Marketing Support	5%
Fraud Detection	3%
Other	7%



Operating Expenses  
Occupy Nearly 40% of the  
TCO for a Service Provider

Source: Dittberner Associates, 2000

Source: The Yankee Group

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## New Business Models Equals More Complex OSS/NM

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- Tiered-services offerings
- Usage-based charges

400%

Consumer		Business	
\$10 Network Video on Demand		.05c/Min	Voice over Data
\$10 Shopping/Transaction		0.67c/Min	Videoconferencing
\$10 Targeted Advertising		\$200+/Month	E-Commerce
\$25 Communications Phone/Voice Mail		\$100+/Event	Distance Learning
\$25 Financial News Update		\$200+/Month	Secure VPN
\$10 Enhanced-TV		\$100+/Month	Internet Access
\$20 Basic Internet Access			

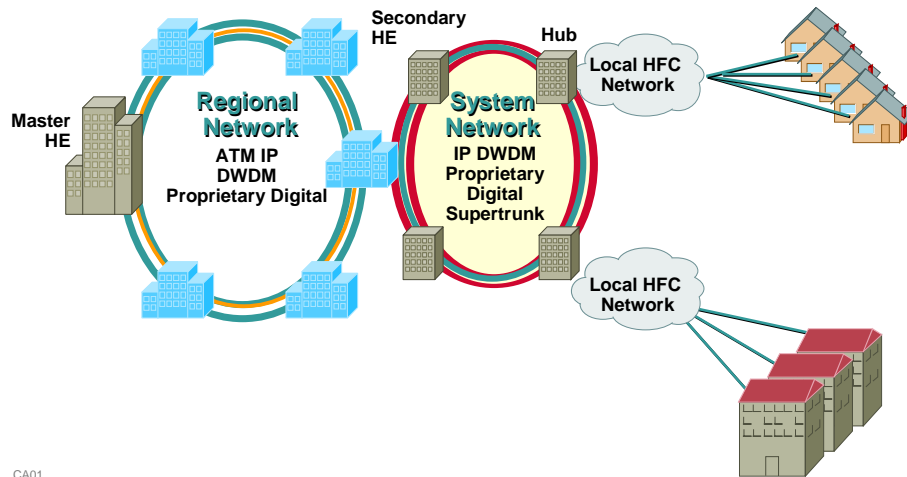
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# Cable Operations Complexity

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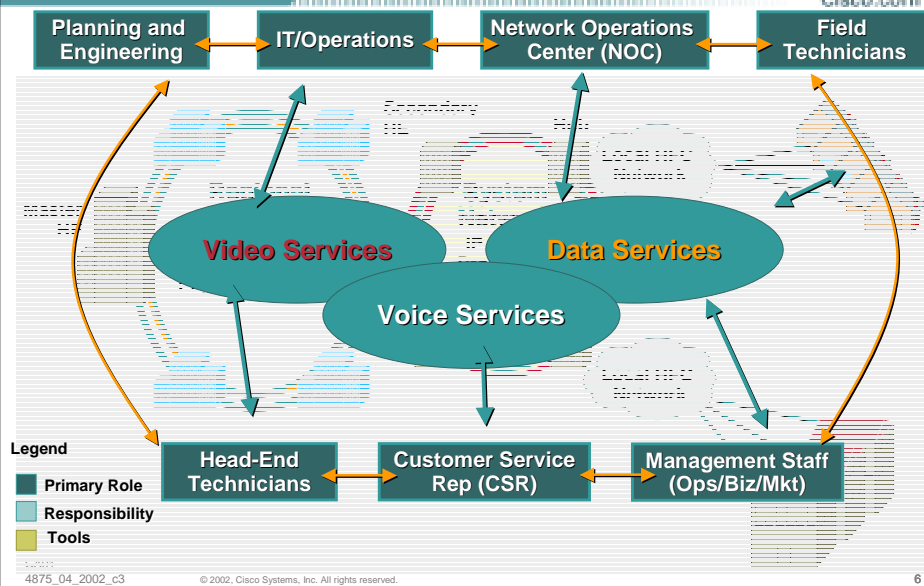
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# Cable Operations Complexity

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Legend

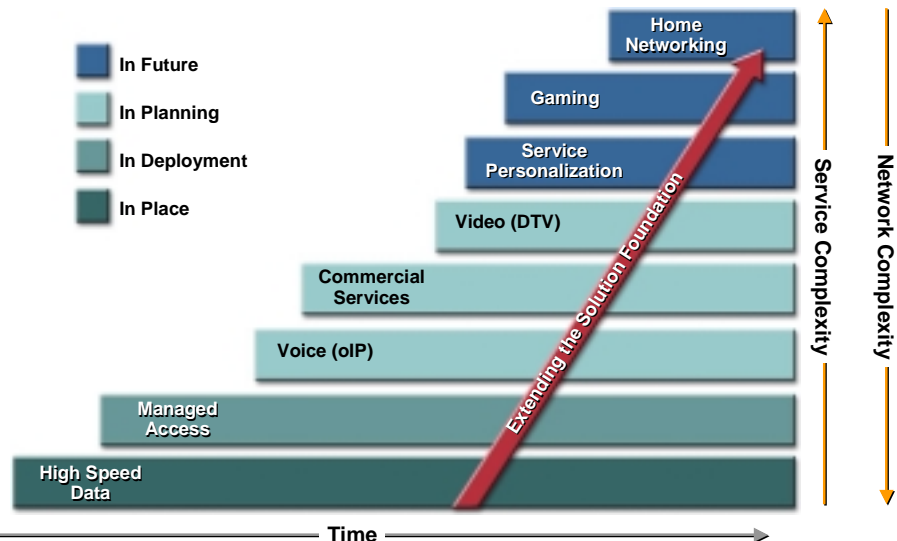
Primary Role  
Responsibility  
Tools

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## The “New Services, Same Network” Evolution



## Moving from HSD to Managed Access

### Managed Access Adds Additional Complexity over HSD

- IP address assignment becomes more difficult
- Routing is more complicated
- Additional services need to be supported
- Subscribers will increase desire to change services



## Moving into VoIP

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### Voice Adds Additional Complexity over Data

- New and additional devices need to be provisioned (Call Management Servers, MTAs, etc.)
- Location services are complex (DDNS, phone no.)
- Security concerns between MTA and CMS
- PacketCable flows become desirable



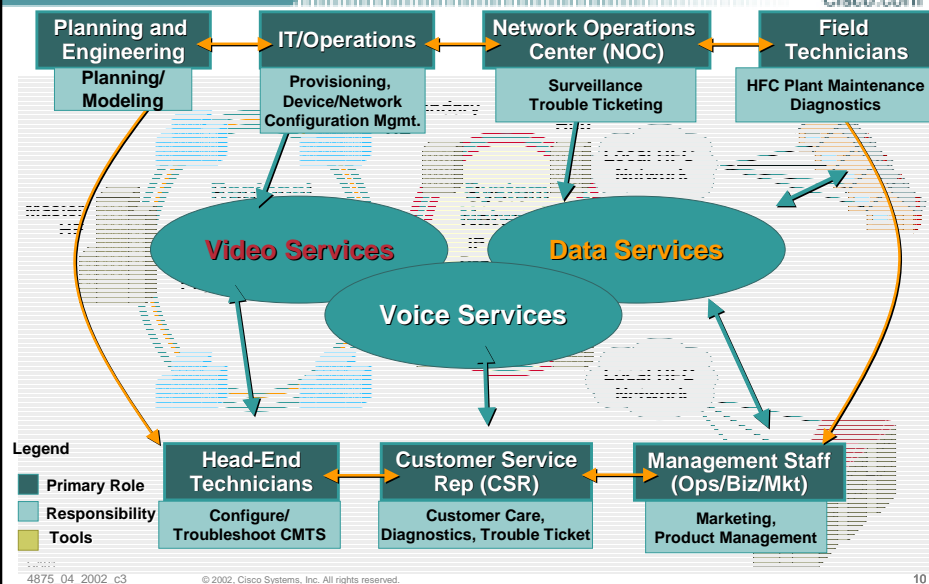
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## Approach: Specific Network Management Roles

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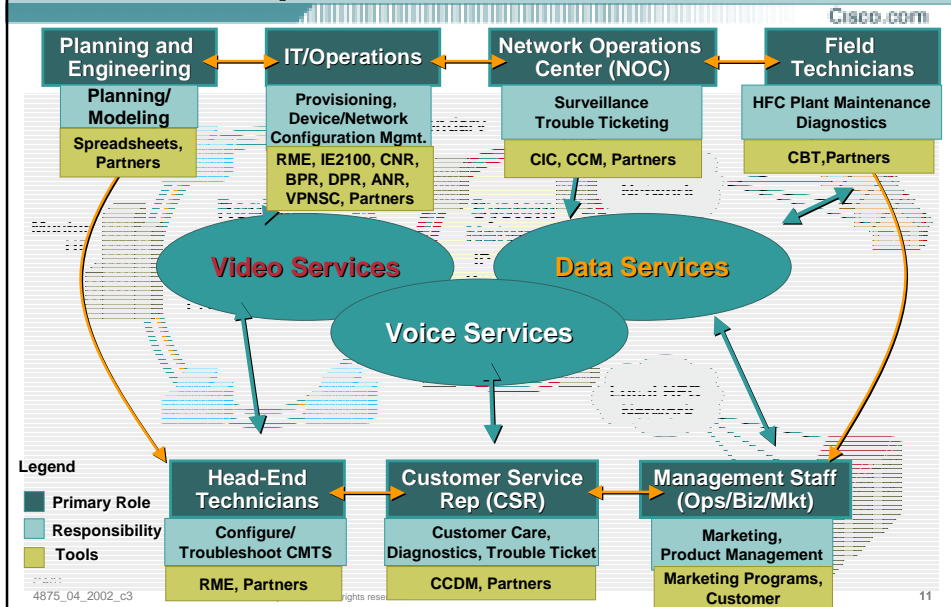


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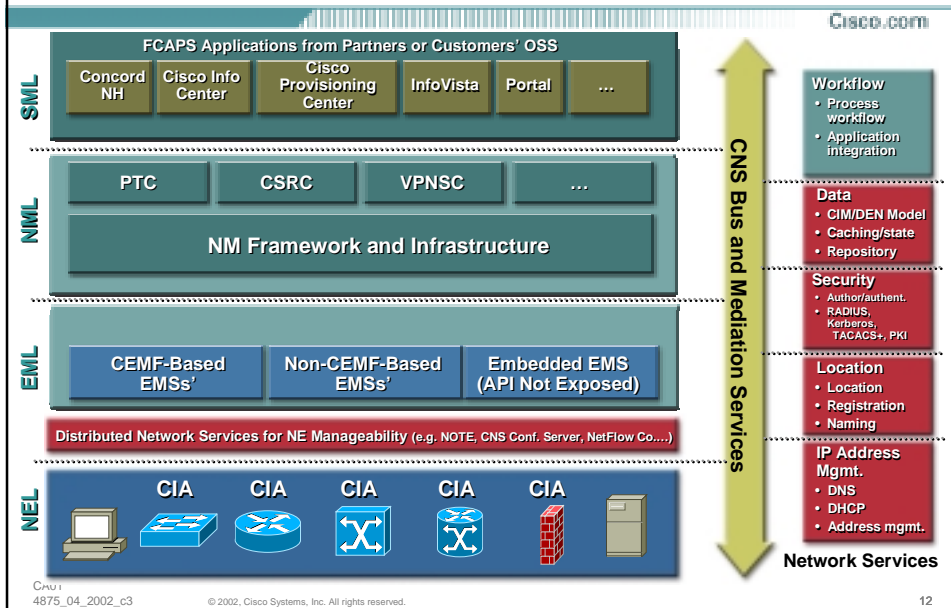
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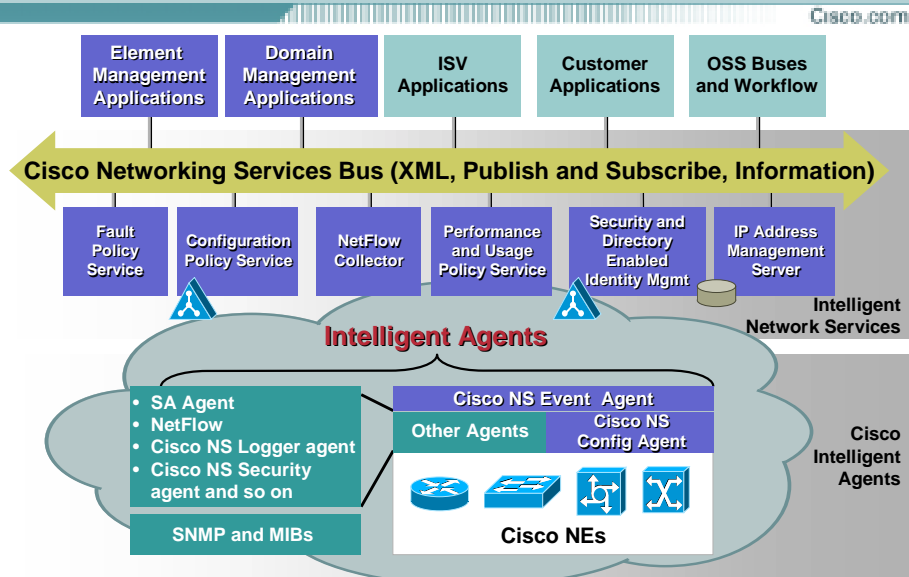
## Approach: Tools for Specific Roles



## Cisco Internet OSS Architecture



# Cisco Programmable Network Layer Architecture



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## Service Fulfillment

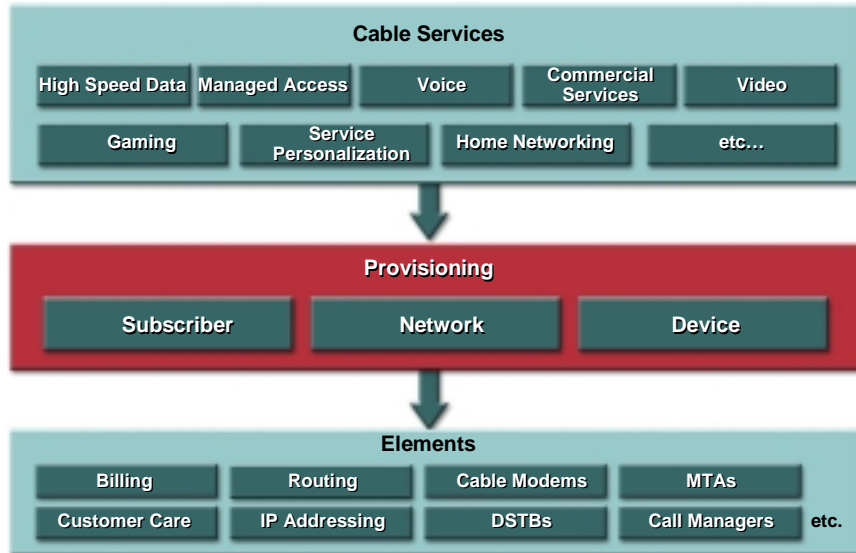
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# Provisioning: A Fundamental Service Offering Requirement

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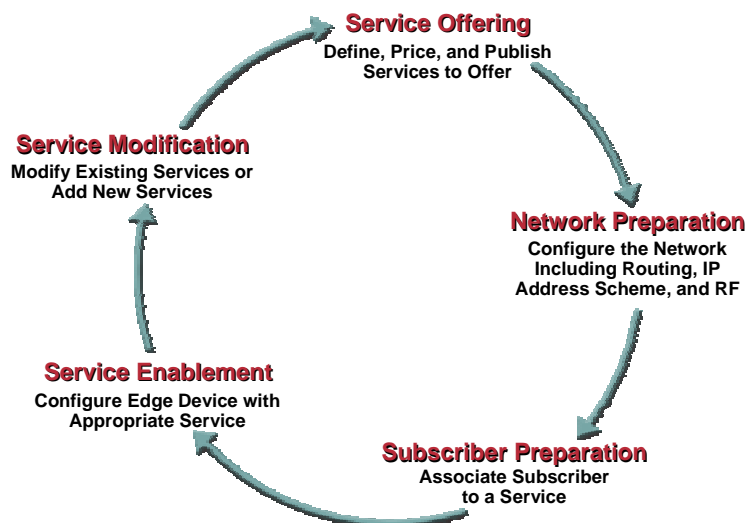
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# Subscriber Provisioning Processes

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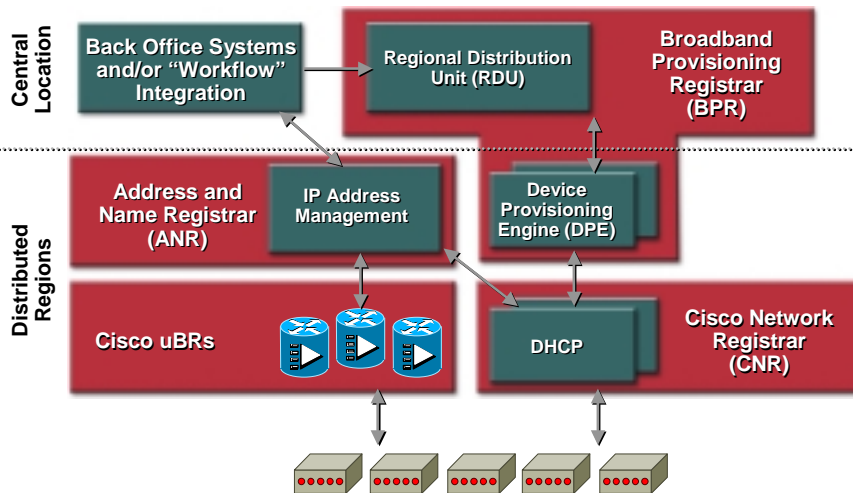
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# Provisioning Architecture

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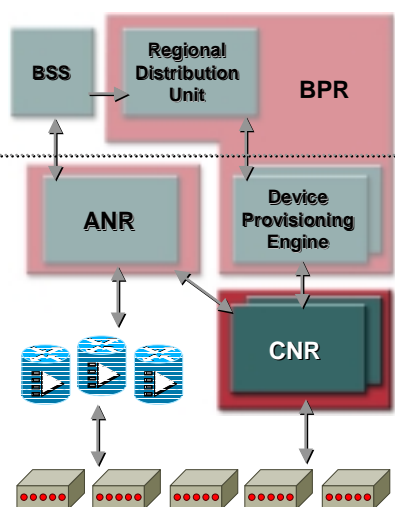
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## Cisco Network Registrar (CNR)

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- **High performance DHCP**

Up to 1,800 leases per second (dual processor NT configuration) in stand-alone configuration

Supports both steady-state and spikes of DHCP traffic

Beats all published and internally derived competitive performance numbers

- **High performance DNS**

Dynamic updates of 1000+ resource records per second

Response to 3600+ queries per second

- **IP history server**

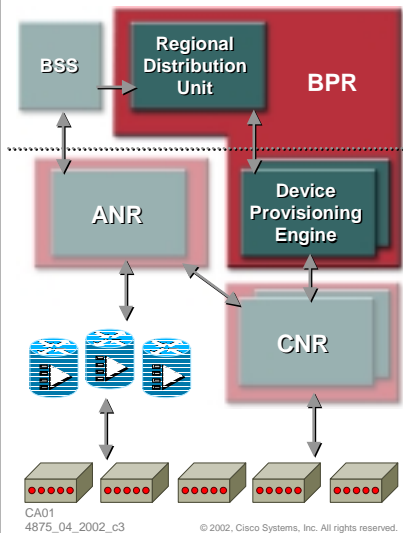
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## Broadband Provisioning Registrar (BPR)

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- Single platform for provisioning multiple technologies and devices: DOCSIS 1.0 and 1.1 Cable Modems, fixed wireless modems, digital set-top-boxes, MTAs, and call managers
- Scales to support over 5 million devices at RDU, 500K devices at DPE
- Performance tested for both steady and spike load scenarios (over 24,000 new subscribers provisioned in 3 minutes)
- Platform designed to support PacketCable and ETTx VoIP
- Includes robust provisioning API for integration with OSS

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## Provisioning Voice Services

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### BPR and PacketCable

- PacketCable provides a standards based process for enabling voice services, including the secure configuration and authentication of devices
- Provides standardized way to push subscriber data down to call agents and CPEs
- Cisco is taking active leadership at CableLabs (and is the only vendor with three core products in the Advanced Interoperability Test network)
  - Primary authors of the PacketCable CMS Provisioning Specification
  - Co-authors of PacketCable EMTA Provisioning Specification
  - Co-authors of PacketCable Security Specification
  - BPR is part of PacketCable baseline network
- PacketCable specs are being finalized, and next BPR release will support these defined voice provisioning flows

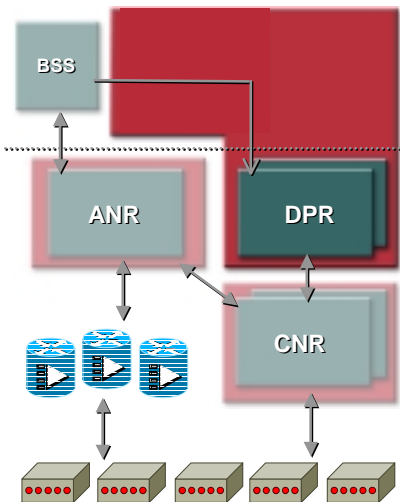
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## Device Provisioning Registrar (DPR)

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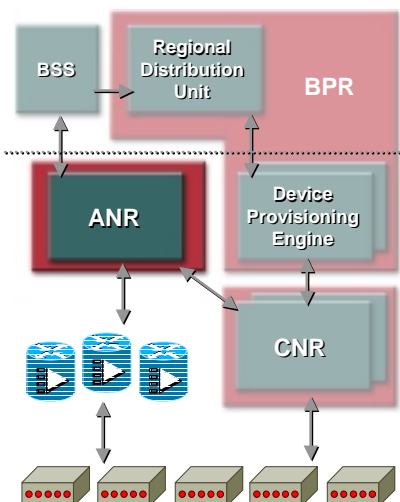
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- Low cost, scales to support up to 100K devices
- Available as an upgrade Option to CNR
- Easy migration to BPR for added functionality or when scale & performance requirements dictate
- Single platform for provisioning multiple technologies and devices: DOCSIS 1.0 and 1.1 Cable Modems, fixed wireless modems, digital set-top-boxes
- Includes robust provisioning API for integration with OSS

## Address and Name Registrar (ANR)

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- Automated IP distribution and configuration management of network elements
  - Allow customers to tailor policies for the automatic distribution of IP addresses based on utilization triggers
  - Dynamically configures of DHCP server and CMTSs
  - Eliminates the manual and inefficient portion of IP Address management
- Automates the monitoring and reporting of IP address space
  - Predict trends in IP consumption by monitoring and tracking IP usage over customized time periods

[Cisco.com](http://www.cisco.com)

- [illegible]

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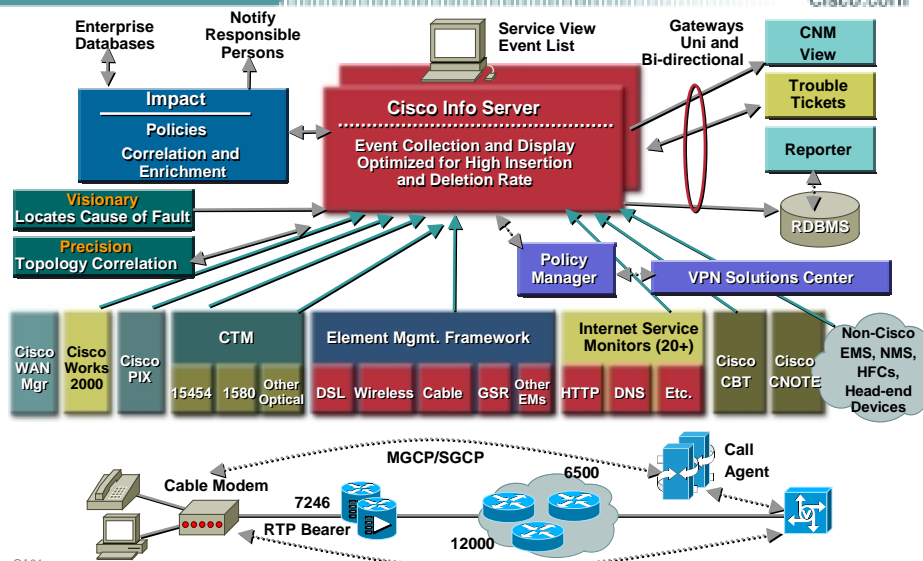
# Service Assurance

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## Cisco Info. Center (CIC)

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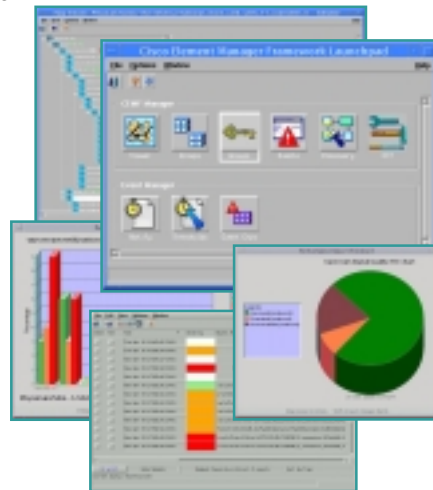
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## Cisco Cable Manager (CCM)

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- Fault, configuration, and performance management for Cisco CMTS and DOCSIS cable modems via proactive network surveillance
- Cable Modem SW image download
- Topology tree map of CMTS and modems
- Tabular and graphical historical utilization and performance reports
- Color-coded chassis views
- Northbound SNMP and CORBA interface
- CCM bundled with
  - CiscoView
  - DOCSIS CPE Configurator
  - Cable Troubleshooter



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## CiscoWorks 2000 CiscoView

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- Web-based browser interface for real-time monitoring and configuration of Cisco devices
- Distributed and multi-user enabling collaborative management
- Integrates with Network Management systems (e.g., HP OV, Tivoli Netview, etc.)
- Integrated with Cable Manager



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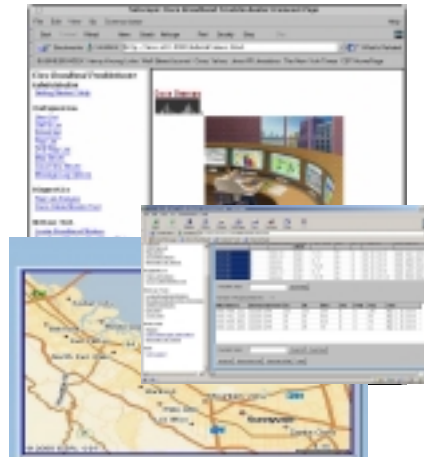
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## Cisco Broadband Troubleshooter (CBT)

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- Diagnostic tool for RF technicians to quickly and easily isolate problems in RF plant
- Analyzes and sorts RF conditions into 4 specific problem categories:  
Attenuation, Provisioning, Noise, Packet Corruption (CRC errors)
- Provides dashboard views of:  
Network health  
CMTS and CM statistics  
Modem snapshots
- Correlates modem to subscriber information
- Works with optional tool to map modems and status to subscriber street-level views



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## Cisco Cable Diagnostics Manager (CCDM)

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- Given Customer “Key”, runs appropriate “diagnostics” and returns important customer specific data information relating to the High Speed Data and Advanced Services as gathered from the CMTS, Cable Modem, MTA, Provisioning Server Complex and CMS Servers
- Prototype currently deployed by one of the largest MSOs



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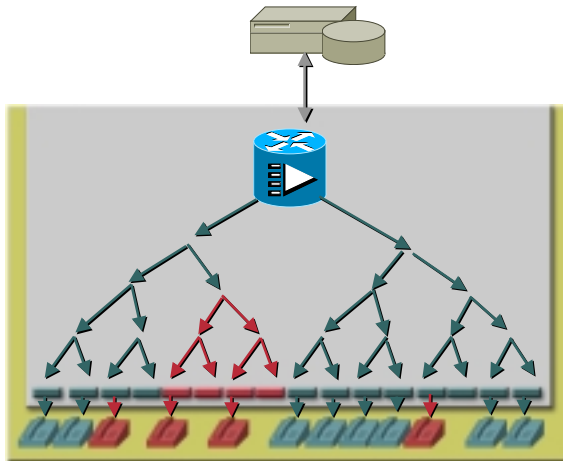
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## DOCSIS Data Collector

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- Given CMTS, discovers modems and CPE
- Collects performance data from CMTS, Cable Modems and CPE
- Integrates with Cisco Network Services Performance Engine Acquisition Server (CNS-PE)



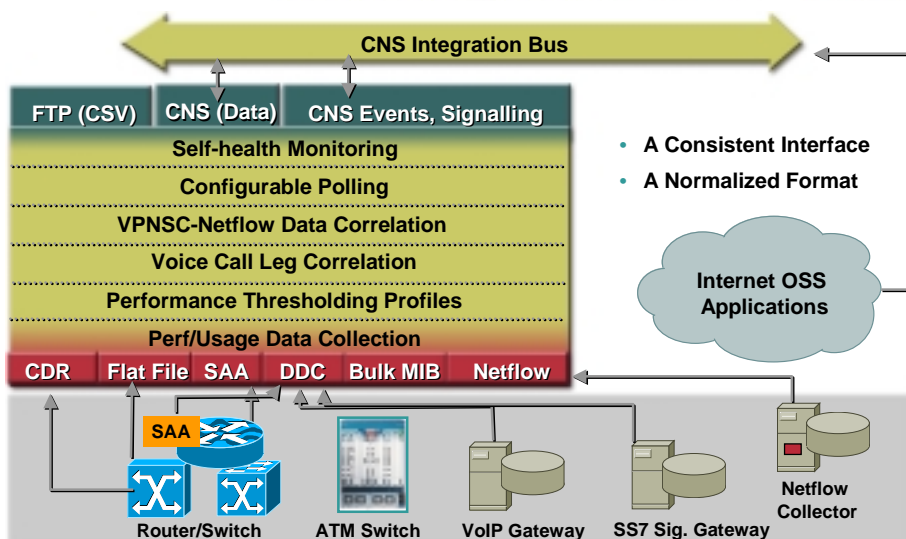
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## CNS Performance Engine Features

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# Service Billing

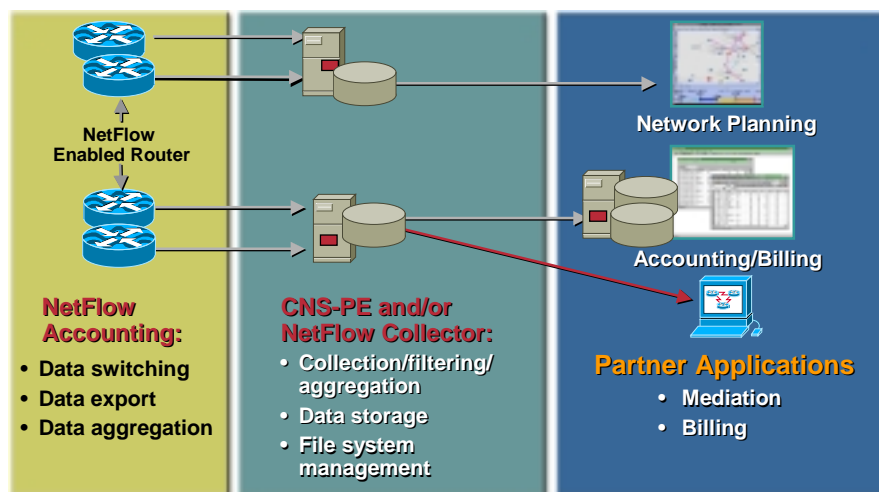
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## Accounting/Billing

### NetFlow and NetFlow Collector

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## Cable OSS/NMS Partners

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- **Service fulfillment**
  - Ceon
  - Sigma Systems
  - Interactive Enterprises
  - Granite, Visionael
  - IPFonix
- **Service assurance**
  - Acterna
  - InfoVista, Concord, Visual Networks
  - Trendium
  - Peregrine (Remedy)
  - AM Communications
- **Service billing**
  - CSG Systems
  - Convergys
  - DST Innovis
  - Mentis
  - Portal
  - NARUS
  - xACCT
  - Daleen
  - Bay Packets

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## Cable System Integrators

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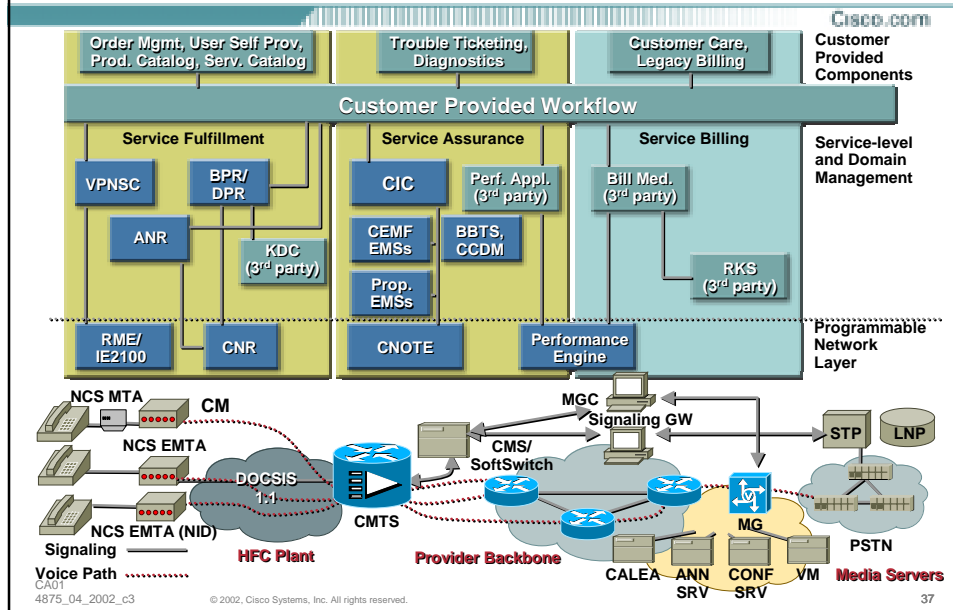
- **CGEY**
- **Business Edge**
- **KPMG**
- **Accenture**
- **IBL**
- **IBM Global Services**
- **HP Integrated Services Manager**
- **ThruPoint**

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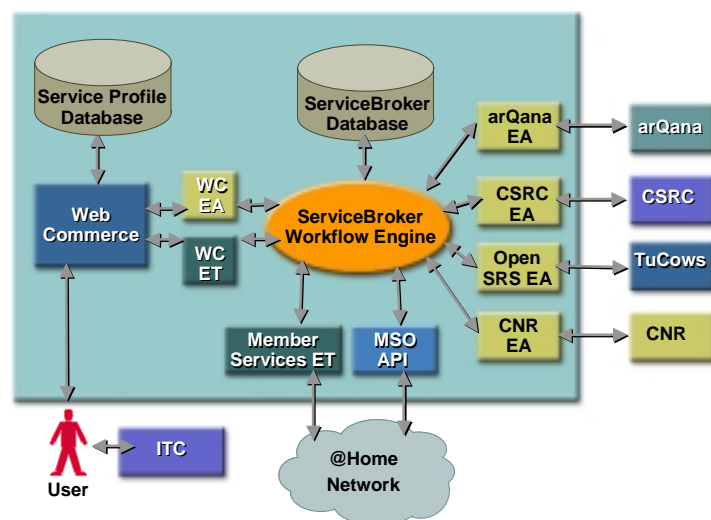
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# Cisco Internet OSS for Cable



# Backup

## Case Study Cogeco



## OSS Spending Mix

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### Focus: End-to-End Service Assurance and Provisioning

SP Market Segment	CLEC	INCUMBENT*	CABLE**
Billing	35%	20%	10%
Customer Care	10%	10%	25%
Provisioning	15%	30%	15%
Network Management	15%	15%	15%
Marketing/Sales Force Support	0%	10%	15%
Workforce Management	8%	7%	10%
Gateways IN+OUT	5%	3%	0%
Fraud Detection	12%	5%	10%
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

\* Typical major sale for incumbent operator

\*\* Cable upgrade to handle cable modems for Internet access only  
Source: Dittberner Associates, 2000

Major % Growth Areas

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## Worldwide Cable Modem Service Subscriptions by Region, 1999–2005 (000)

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	1999	2000	2001	2002	2003	2004	2005	2000–2005 CAGR (%)
United States	1417.4	3845.4	6429.0	9656.0	13,102.0	16,765.0	20,674.0	40.0
Share (%)	54.6	53.4	48.0	44.7	41.6	38.6	35.9	
Growth (%)	206.4	171.3	69.8	47.9	35.7	28.0	23.2	
Western Europe	367.0	1009.0	2679.0	5047.0	8406.0	12,574.0	17,696.0	77.3
Share (%)	14.1	14.0	19.7	23.4	26.7	28.9	30.8	
Growth (%)	233.6	174.9	165.5	88.4	66.6	49.6	40.7	
Asia/Pacific	387.0	1197.0	2442.0	4015.0	6151.0	9240.0	13,130.0	61.4
Share (%)	14.9	16.6	17.9	18.8	19.5	21.3	22.8	
Growth (%)	723.4	209.3	104.0	64.4	53.2	50.2	42.1	
ROW	425.0	1153.0	1965.0	2862.0	3840.0	4897.0	6030.0	39.2
Share (%)	16.4	16.0	14.4	13.3	12.2	11.3	10.5	
Growth (%)	203.6	171.3	70.4	45.6	34.2	27.5	23.1	
<b>Worldwide</b>	<b>2596.4</b>	<b>7204.4</b>	<b>13,615</b>	<b>21,580</b>	<b>31,499</b>	<b>43,476</b>	<b>57,503</b>	<b>51.5</b>
<b>Growth (%)</b>	<b>241.8</b>	<b>177.5</b>	<b>89.0</b>	<b>58.5</b>	<b>46.0</b>	<b>38.0</b>	<b>32.3</b>	

Source: IDC, 2001

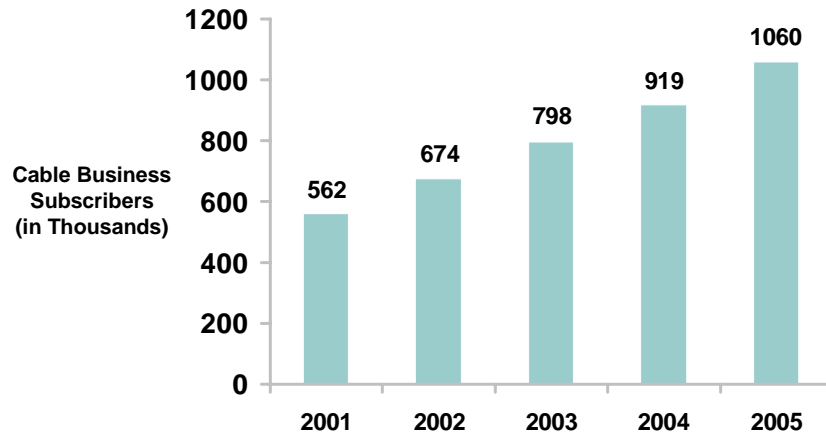
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## Cable Business Subscribers

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Source: The Yankee Group, 2002

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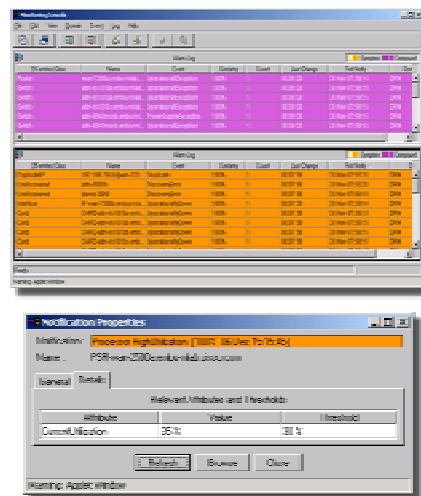
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## CiscoWorks 2000 Device Fault Manager

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- Device level fault analysis for Cisco products
- Identify POSSIBLE Problems
- Determines Root Cause of exceptions
- Monitor for high availability
- Pager/Email/Trap forwarding
- MIBs, Polling Intervals and Thresholds Set - OUT OF THE BOX
- NO RULES TO WRITE



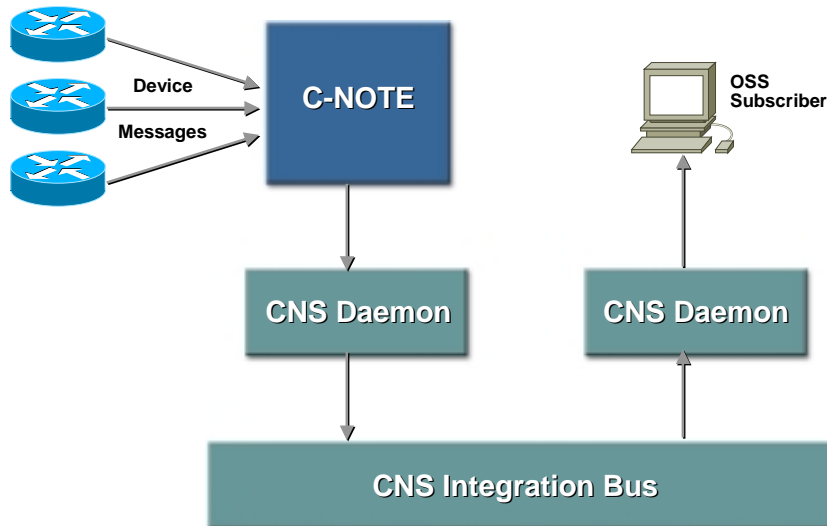
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## CNS Notification Engine (CNote)

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## CNS Plug-and-Play Technology

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### John Chambers Demos IE2100 PnP at Analyst Meeting



- Dressed as a FedEx man, John Chambers demonstrated Cisco IE2100 plug-and-play of Cisco devices out of the box

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## CW2K-RME for Cable Overview

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- A powerful web-based tool that simplifies the management of configuration, SW update/download, and inventory for Cisco UBRs & non-cable routers/switches
- Extends RME configuration/ SWIM capability to cover UBRs for existing RME customers
- Easy to use with online context-sensitive help
- Requires RME v3.4

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