

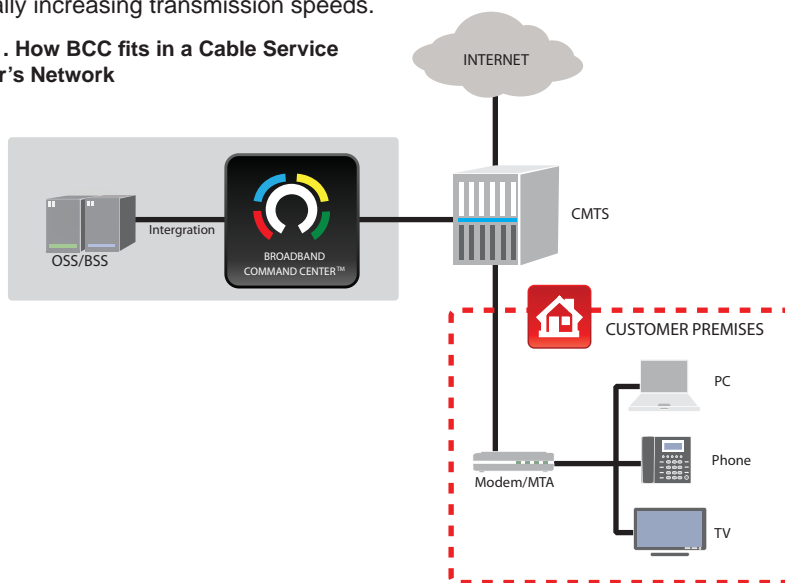
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Broadband Command Center™

High-Speed Data and Multimedia-Cable Edition

Broadband Command Center™ software automatically brings modems, MTAs, ATAs, set top boxes, IP phones and other customer premise equipment (CPE) online based on subscriber-selected services and operator-defined policies. It provisions SIP, PacketCable, and DOCSIS devices according to service speed or quality, subscriber location, device type, MAC address, or other criteria across a variety of networks such as cable, wireline, wireless, satellite and ePON. The solution retrieves subscriber and device information directly from OSS and billing systems to ensure the usage of only the most up-to-date information. Additionally, Broadband Command Center now allows MSOs to take advantage of DOCSIS 3.0 channel bonding capabilities hence drastically increasing transmission speeds.

Figure 1. How BCC fits in a Cable Service Provider's Network



Improved Reliability, Scalability, and Performance

Regardless of your network's size or speed of growth, Broadband Command Center ensures reliable service deployment. It vastly reduces manual administration and enhances customer service with powerful auto-configuration capabilities. It also provides much higher availability, ease of use, performance, scalability, and security than open source code.

In benchmark tests for stability, monitoring, redundancy, and ease of administration, Broadband Command Center scored a total of 1875 out of 2000, leading the competition by at least 30%.

Meet Customer Expectations, Maximize ARPU, and Increase Profitability

Reliability and speed are key benefits. Device provisioning is one of the first touch points of your service so it needs to be flawless. Any delays or outages can lead to customer churn, support costs, and lost revenues. Broadband Command Center lets you make the best decision for your network in meeting changing market demands.

Accurate billing is fundamental. With Broadband Command Center you can prevent fraud, and ensure that the services activated match the fees collected, with device authentication that integrates with LDAP database or OSS/billing systems via a comprehensive API set.

You can also control costs by reducing administration and truck rolls. Cut system expenditures by integrating directly with existing OSS/billing systems. Automated provisioning can result in savings of 20% on subscriber activation costs.

HIGHLIGHTS

- Fast, minimum-effort provisioning of SIP, PacketCable™, and DOCSIS® devices based on subscriber-selected services and operator-defined policies
- Always-on availability to prevent delays and assure revenues (VoIP requires at least 5-nines, 99.999% uptime)
- Simplified billing and service rollout with dynamic file generation, special event handling, and easy OSS/billing as well as LDAP integration
- High-performance response to ensure fast device activation and revenue collection
- Flexible device support so you can choose the best-fit devices for your business model
- Scalability and hardware efficiency: Up to 1,000,000 IP addresses per server
- High security with private RFC compliant code, user-specific privileges, and auditing
- Carrier-grade: higher reliability, ease of use, performance, scalability, and security than open source code
- Customizable warnings and alarms via Fully integrated DHCP, DNS, ToD, Configuration File Manager (CFM), Multimedia Provisioning Service (MPS), and optional PacketCable KDC
- Support for the latest standards and technologies including ePON and DOCSIS 3.0

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Features

New Support for SIP NOTIFY and Softswitch Connectors

Broadband Command Center now enables continuous provisioning updates to be delivered to SIP VoIP terminals via Softswitch integration. This includes both SIP Notify and API methods to trigger a remote device reboot action.

SIP Device User Configuration Decoupling

With consumers demanding more phone lines and possessing more devices than ever, service providers must be able to properly configure these users. Broadband Command Center now supports decoupling of SIP phone user configuration from a SIP device configuration. This allows a SIP user to be provisioned to multiple line appearances spanning multiple simultaneous devices.

Comprehensive Security

Multi-level security includes secure administrator login, triple DES password encryption, granular user access privileges, access control lists, and delegation limits.

Plus, the fully integrated, RFC-compliant DHCP, DNS, and TFTP components are highly secure, as they are proprietary and not based on open source code. The DNS is also closely integrated with the DHCP for DDNS FQDN mapping (as required by PacketCable), and provides a secure alternative to BIND.

Broadband Command Center's improved security model also ensures multiple levels of permission applied against entities. User accounts are assigned security profiles to allow user specific privileges.

High Performance DHCP Configuration File Management

Broadband Command Center manages the device provisioning process through its DHCP, Multimedia Provisioning Service (MPS), Configuration File Manager (CFM) Configuration File Management Proxy (CFM Proxy), and DDNS servers. All are specially designed for maximum performance in a broadband environment.

Together, the servers provide the IP addresses, DHCP options, and configuration files which allow subscriber devices to go online. These data transfers must occur whenever subscribers turn on, re-start their devices, or revise their service packages. On a large network, these transfers can number in the thousands per day – and can be fully automated by Broadband Command Center.

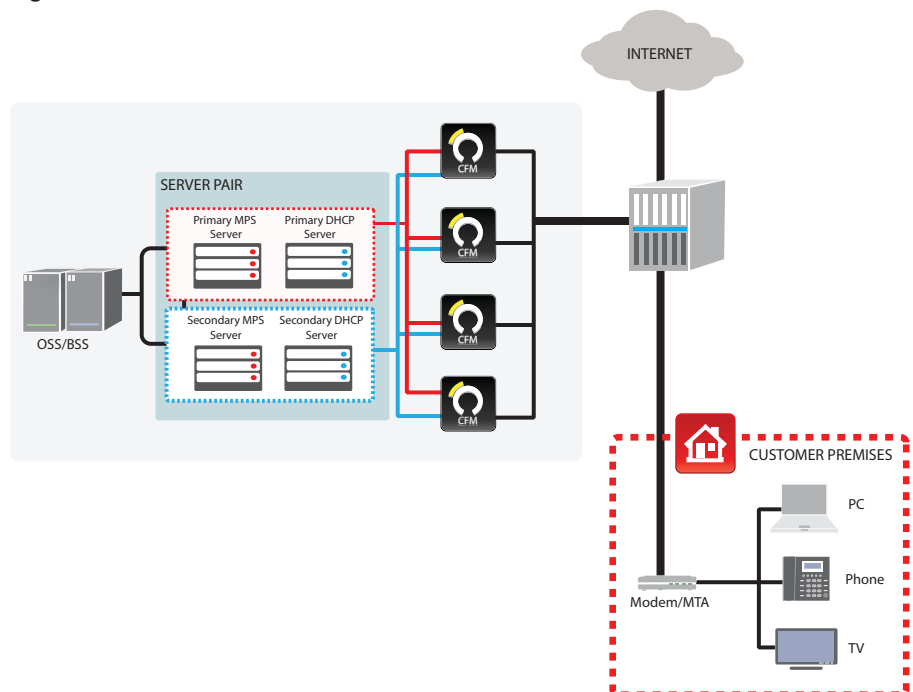
DHCP and MPS for Initial Coordination

Broadband Command Center's DHCP service is the fastest in the industry. Its built-in database eliminates network calls to a separate application, leading to faster performance. The DHCP server enables load balancing of CFM servers in BCC cluster environments. The MPS provides subscriber and device management, as well as OSS integration. For PacketCable environments, the MPS also load-balances the CFM servers to handle the special requirements of VoIP provisioning file processing. Both DHCP and MPS services may be used with LDAP subscriber databases enabling a simplified integration of subscriber information to the provisioning systems.

Server Redundancy for High Reliability

Reliability is a critical requirement for successful service deployment. For example, VoIP services require 5-nines uptime to compete with the PSTN. The challenge is that implementations of DHCP failover and clustering vary widely across the industry, and even subtle differences can have a huge impact on reliability.

Figure 2. Load Balanced CFM Servers



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Broadband Command Center produces industry-leading results across all its component servers. In the case of DHCP, it goes beyond IETF specifications with 1:1 primary to secondary server backup – true hot standby instead of a 1:many architecture. Also, for fast updates between servers, TCP is used for data transfer during initial synchronization, and multi-threaded UDP for synchronization and heartbeat data.

Broadband Command Center's MPS server pair, which performs VoIP provisioning and subscriber management, also provides load-balanced failover for maximum reliability.

The CFM Proxies administer TFTP, HTTP, HTTPS, or FTP services, offer reliability through its server clusters. If a CFM Proxy server is unavailable, the DHCP or MPS server that is controlling the direction of clients to a Proxy in the cluster can assign another (redundant) CFM Proxy server to handle file transfers to CPE. This allows the CFM to handle massive volumes of simultaneous file transfers, especially during peak periods when thousands of devices may come online simultaneously.

Another aspect of this highly efficient CFM system is that it supports integrated clustering of multiple CFM servers for each DHCP or MPS server. This one to many architecture ensures long term scalability for broadband operator networks.

Dynamic File Generation for Complete Automation

Broadband Command Center's ability to dynamically generate customized configuration files minimizes the operator's effort in creating personalized responses to activation requests. This is why dynamic file generation is one of the keys to profitable growth.

Broadband Command Center 5.5 separates dynamic file generation and distribution into two components: Configuration File Management (CFM) Service for generation of dynamic files and Configuration File Management Proxy Service, for delivery of that data using FTPs, TFTP, HTTPs or FTP protocol. The Configuration File Management and Configuration File Management Proxy services supports integrated clustering to allow in-service growth. When the demand for file transfers increases, only Configuration File Management (CFM) proxy services will be added. Similarly, an increase in demand for dynamic file generation will only require additional Configuration File Management services. Thus allowing service providers to greatly reduce their capital costs during growth.

Dynamically Generated Files vs. Static Files

Device configuration files are required during the provisioning process, whether it is auto-provisioning where subscribers self-register devices after purchase, or pre-provisioning where the operator registers device and service information before deployment to customers. Especially for auto-provisioning on large networks, activating devices with dynamically generated configuration files is much more efficient than using static files.

Broadband Command Center can dynamically generate files at the time of the subscriber's activation request by automatically applying a handful of rules to a variety of possible service combinations. Alternatively, the software can create massive numbers of static files in advance and store them until activation is required; however these static files are more labor-intensive and inflexible.

By using dynamic file generation, there is no need to track and store large numbers of static files, and it allows the operator to easily change service features without any manual re-configuration of devices in the field.

How Dynamic File Generation Works

Broadband Command Center's "Client Class" feature allows the software to dynamically create configuration files on the fly, at the time of the activation request.

During software setup, the operator can define each Client Class by any network criteria such as CMTS, ISP, location, service speed, or device type. Each Client Class can point to a set of DHCP options necessary for device configuration, and can be associated with a "scope" or IP address range.

Then, to prepare the system for all possible service selections, the operator can associate each device to multiple Client Classes using those devices' MAC addresses, hostnames, or CMTS addresses.

For instance, suppose a broadband operator needed to prepare the provisioning system for 180 types of activation requests, based on a mix of 5 service speeds, 4 CMTSs (each with a different authentication key), 3 geographic locations, and 3 types of subscriber devices.

If static files were used, the system administrator or customer service representative would need to generate, store, and track 180 different files – all before any customer even requested activation.

A simpler method is to set up 15 Client Classes, based on all the service speeds, CMTSs, locations, and device types. After associating the appropriate devices with those Client Classes, the software would be ready to automatically create any one of 180 files at the time of activation. Plus, one change to a service speed would only involve one Client Class change instead of manual changes to 36 static files.

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Customized Special Event Handling

To handle customized provisioning flows, Broadband Command Center can automatically interpret and act on selected DHCP data or system incidents. It can do this using Event Triggers or SNMP Traps. For example, the software can trigger events (such as external programs) based on DHCP packet values to:

- Request information from third-party software (such as a database or LDAP directory) related to certain subscribers identified by MAC address.
- Limit network access for un-registered subscribers to a single web page for registration (“DNS lying”).
- Process requests based on device type. Broadband Command Center can also send unsolicited SNMP packets in response to selected incidents, such as the initiation of DHCP failover, or an IP address pool approaching total usage. SNMP traps are also more efficient for OSS notification than continual polling by the OSS

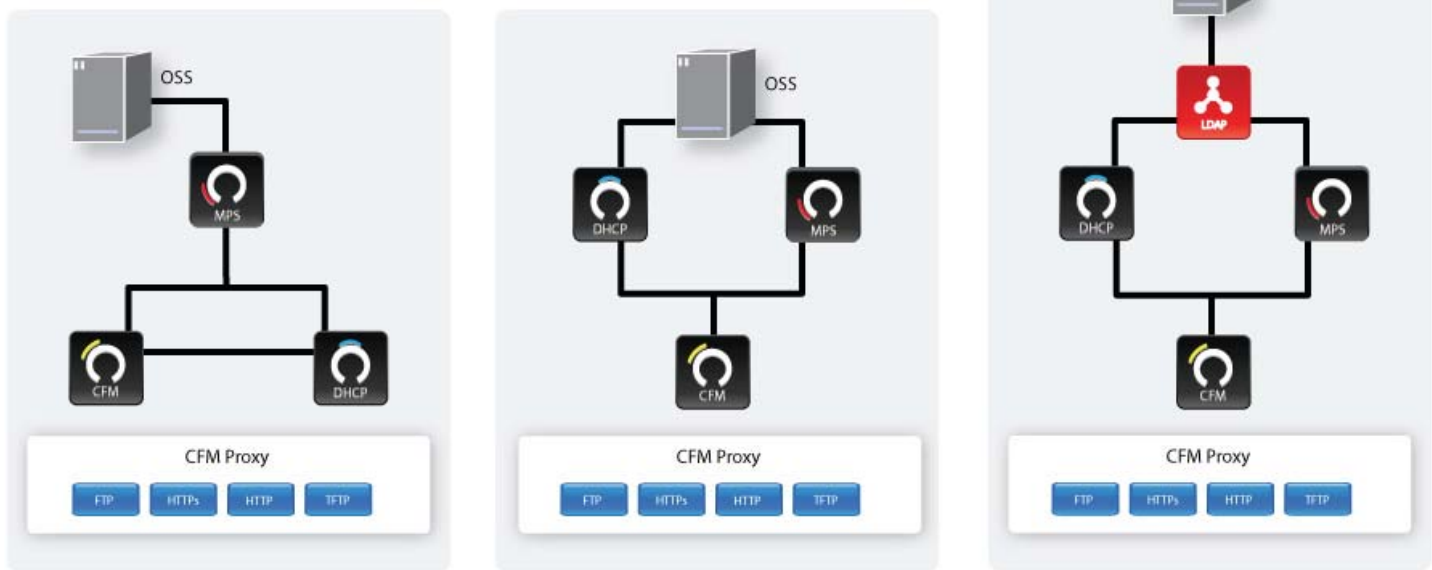
Subscriber Management and OSS Integration

Broadband Command Center supports subscriber management capabilities. It can track subscribers and their devices, IP addresses, and associated broadband services.

If you need to provision new subscribers, change service options, or add static IP addresses, Broadband Command Center can incorporate data entered into its own database or retrieve the information automatically from a LDAP database, OSS, BSS, or Customer Care Center.

The solution can gather customer data in three ways: Data can be entered into its own database; transferred automatically from an OSS, BSS, or Customer Care Center or directly retrieved from a centralized backend database via integration with LDAP. The follow diagram illustrates the various ways Broadband Command Center can integrate with the OSS.

Figure 3. Ways in which Broadband Command Center can retrieve customer data



Subscriber, Device, and Service Data Sharing

Data transferred from the OSS or manually entered into Broadband Command Center can include:

- Subscriber data such as identification, contact information, and devices owned
- Subscriber device data such as MAC address, maximum # of CPEs, voice line configuration, and call agent information
- Service options such as speed or Quality of Service (QoS)

When adding a static IP addresses, Broadband Command Center can automatically send reserved IP address data to the OSS. An option for manual device reset is also available.

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API and CLI Toolkits

For easy setup of data retrieval from an OSS, BSS, or Customer Care Center, Broadband Command Center comes with an array of integration toolkits: CORBA APIs, XML APIs, and a command line interface (CLI). Another option for OSS interfacing is SNMP.

Broadband Command Center's CORBA APIs are programming language independent so that client tools can run in C/C++, Java, and other popular languages. The APIs are also platform independent, allowing client tools to run on Windows, Solaris, or Linux.

The XML APIs are subsets of the CORBA APIs, designed specifically for device provisioning. XML data is transported to the CORBA service through a simple, single-function CORBA API.

Incognito HTTP XML API enables real time pull interface in native XML for the most relevant of subscriber device provisioning information from both the DHCP and the MPS service. Network operations staff will find the ability to retrieve lease information by MAC address via XML to pull an invaluable feature for their NOC EMS systems.

For offline dynamic lease data retention, Incognito DHCP service enables operators to store lease updates into a separate LDAP instance. This may often be leveraged by law enforcement for trap and trace purposes, as well as by service network operations staff seeking a copy of the Dynamic addresses in use.

In addition, the CLI enables scripting and interfacing with other applications. It runs on Windows, Linux and Solaris platforms.

Flexible Device Support

Broadband Command Center leads the industry in provisioning an extensive variety of devices – SIP, PacketCable, or DOCSIS. The software lets you choose the best device type for your business so you are not limited in any way by hardware. You are free to choose the way you want to roll out high-speed data, VoIP, and IPTV services.

The software also leverages a flexible architecture that supports the fast addition of new non-standards-based devices from multiple vendors. One system supports all.

With other provisioning packages, SIP deployments are complicated by the fact that standards support do not always guarantee device support.

Broadband Command Center provisions a variety of SIP devices from multiple vendors. Plus, it provides the dynamic file generation you need to efficiently deploy SIP services – static files are not manageable in a constantly changing SIP environment.

Additionally, the software can manage all PacketCable device provisioning flows: Basic, Hybrid, and Secure.

Device support includes cable modems, multimedia terminal adapters (MTAs), embedded MTAs (eMTAs), analog telephone adapters (ATAs), set top boxes, and residential gateways.

Scalability for Cost-Effective Growth

Broadband Command Center ensures the cost-effective growth of your business by offering vastly superior scalability and server efficiencies. It supports up to 1,000,000 IP addresses (or subscriber devices) per server, as well as an unlimited number of CMTSSs per server.

It also maximizes efficiencies in the design of the Configuration File Management (CFM) service clustering and DHCP failover schemes. The CFM clustering system incorporates a streamlined 1-to-many DHCP-to-CFM (or MPS-to-CFM) architecture, where dedicated file servers handle the transfer of configuration files to subscriber devices.

DHCP failover system make the most efficient use of available IP address space by having the primary and secondary DHCP servers use the same IP address range. In other systems, up to 50% of IP addresses may be reserved for the secondary server alone, where they sit idle most of the time.

Time-Saving GUI with Diagnostics

Broadband Command Center's intuitive GUI gives you a tree-like structure of configuration and administration options. You can manage all functions from one convenient interface – with network views across regions, departments, ISPs, subnets, or subscribers. Wizards and templates ensure fast deployment and streamlined workflows for everyone, whether their job is system administration or customer service.

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Diagnostic and Reporting Tools help you Quickly Resolve Problems and Assess Network

- Auditing: tracking of all changes made, and automated reports triggered by specific data, actions, or requests
- Backups: automated scheduled backups of database and audit records
- Real-time, color-coded IP address usage statistics (free, active, offered, static, reserved, or unused)
- Security alerts
- 5 emergency notification methods: SNMP traps, system logs, email, event triggers, or pop-up messages. Emergency notifications can be initiated when an operator-specified threshold is reached. For example, customizable high-water marks can prevent the network from running out of IP address space.

System Packages

Broadband Command Center is available in three versions, which can also be pre-configured on an appliance:

- Multimedia with SIP, PacketCable, and DOCSIS device support
- High Speed Data with DOCSIS modem support
- SIP with SIP device support

An optional add-on is Address Commander™ software, Incognito Software's complete IP address management package. This convenient solution is a perfect match for broadband environments. It tracks and reports on organization-wide IP address space to prevent inventory depletion and outages, optimize usage, ensure cost-effective expansion, and serve ARIN/RIPE needs including SWIP updates. Its centralized IP address allocation policies ensure consistent management by all administrators.

Specifications

Minimum Server Requirements*	Operating Systems Requirements*	Client Requirements
<ul style="list-style-type: none"> ● CPU: Pentium® 4 2.8 GHz UltraSPARC-IIi Processor @ 650 MHz ● RAM: 512 MB ● Disk Space: 10 GB 	<ul style="list-style-type: none"> ● Microsoft® Windows 2003 ● Debian 4.0 Etch (32 bit and 64 bit) ● Solaris 9, 10 (Sparc) ● Redhat RHEL 5.1 (32 bit) ● Redhat RHEL 5.2 (64 bit) 	<ul style="list-style-type: none"> ● Windows Management Console: Microsoft Windows 2003 / XP ● Java™ VIP Monitor and Statistics Monitor: JRE 1.4.1_02 ● Command Line Interface (CLI): all server operating systems
<p>Interfaces:</p>		<p>* Dependent on customer deployment size ** Please refer to product release notes for the most up-to-date information. Note that hardware processing power influences overall system performance. † Currently only DHCPsvc and DHCPCLI supported</p>
<ul style="list-style-type: none"> ● CORBA v2.3 ● XML ● Java VIP Monitor and Statistics Monitor: JRE 1.4.1_02 ● Command Line Interface (CLI): All server Operating Systems 		