BadgerNet Converged Network
Video Policies

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1. Overview

The State of Wisconsin Department of Administration (DOA) contracts for Video Network Services through the BadgerNet Converged Network contract. Approximately 250 schools, agencies, and authorized users have BCN Managed Video Service and over 300 sites use BCN High-Priority, Low-Latency (HPLL) service for video traffic. As part of the BCN contract extension, the video network infrastructure was upgraded to high-definition, which is now available to all BCN video end-points. This document outlines the Department of Administration's policies regarding service and usage of the BCN video network. This policy replaces all previous versions.

2. Infrastructure

The BCN Video Network supports both High-Definition (HD) and Standard-Definition (SD) Video and includes the following components:

Multipoint Control Units (MCU)

A multipoint control unit allows two or more video end-points to bridge together on a call. BadgerNet's Video Network includes four (4) Multipoint Control Units with a significant amount of capacity to accommodate standard and high-definition end-points in a single call. The MCUs are physically and logically diverse for redundancy and have additional expansion capacity.

Converged Management Application (CMA)

CMA is a management tool used by AT&T to provision, trouble-shoot and control call flow with the BadgerNet video network. All video devices, standard-definition codecs, high-definition codecs, MCUs, gateways, etc. are registered to CMA. Devices in the network can be tracked and call flow can be defined as a standard procedure with CMA. As a tool, CMA is not available for use to consortiums or individual sites.

Video Border Proxies (VBP)

Video Border Proxies (VBPs) are a specific type of firewall and allow certain types of calls to enter or exit BCN. There are two types of VBPs in the BCN Video network; one specifically for BCN Remote Video Access video end-points to use, and another VBP for all other types of users and calls. Introduction of the VBPs now allows certain types of calls to leave the network without using the MCU as a gateway.

Polycom RSS

Service is not currently available using the Polycom RSS.

Polycom RSS is a product that allows recording of videoconferences. The RSS server can be added to a video reservation before or during a call to capture both the people and content portions of an active meeting. Polycom's integration of RSS allows it to be "silently" included, so a blank site does not appear in the viewing window of a multipoint conference.

3. Video End-Points

Any video end-point (an end-point is any device, such as a codec, that can encode and decode video and audio) that would like to participate in a BadgerNet video (HD or SD) multipoint session *MUST* be either H.323-compliant (video over IP) or H.320-compliant (video over Integrated Services Digital Network [ISDN]). See Table 1 for a complete list of supported codecs.

This section reviews the types of end-points supported within the BCN Video network and outlines the services and functionality assigned to them.

a. Managed Video (HD or SD)
b. High-Priority, Low-Latency (HPLL)
c. Remote Video Access (desktop and hand held devices)
d. HPLL with Video Bridging Service

Managed Video (HD or SD)

A managed video end-point includes the BCN network and the highest packet priority through the network, a high-definition codec for an HD enabled room (or three standard definition codecs for a SD enabled room), access to the scheduling system and BCN scheduling office, and full BCN Network Management Center (NMC) support. A managed end-point does *NOT* include room equipment, such as cameras, monitors, microphones or a room control system.

HPLL End-Points

BadgerNet's High-Priority, Low-Latency end-point is a network-based service. Sites in BCN with HPLL are provided the highest priority for end-to-end data connectivity. Any Ethernet device, which is purchased, managed and maintained by the end-user, can connect to an HPLL end-point. Devices other than video codecs can connect to HPLL service too.

Remote Video Access End-Points

Any device utilizing Polycom's RealPresence video client qualifies as a Remote Video Access End-Point. Examples of Remote Video Access End-

Points are desktop computers, laptop computers, iPads, tablets and smart phones.

HPLL with Video Bridging (HPLL VB) Service

HPLL VB end-points have all the capabilities of an HPLL end-point, but have agreed to spend an additional fee for bridging service. The additional functionality provided to HPLL VB includes the opportunity to "host" a call (each multipoint conference must have at least one Managed or HPLL VB end-point), directly access the scheduling system and the scheduling office, place a call directly to the Internet and can register to BCN's Converged Management Application (CMA).

Video End-Point Service and Functionality

Service or Function	HPLL	RVA	HPLL VB	Managed Video
Participate in a bridged call	Yes	Yes	Yes	Yes
Scheduling Office support	Limited[1]	Limited	Limited	Yes
NMC Support	Limited[2]	Limited	Limited	Yes
Codec included with service	No	No	No	Yes
Access to Renovo	No	No	Yes	Yes
Register to CMA	No	Yes	Yes	Yes
"Host" a bridge call	No	No	Yes	Yes
Max MCU connect speed	1 M	384K	1 M	1 M
Direct Off-Net calling	No	No	Yes	Yes
Pt-Pt with E.164 address	No	No	Yes	Yes

[1] The Scheduling Office is not required to support sites that have purchased their own codec.

[2] The BCN NMC is not required to support sites that have purchased their own codec.

4. End-Point Connection Types

Point to Point Calls (no MCU used)

a. Managed Video end-points to Managed Video end-points
b. Managed Video end-points to Off –Net end-points (outbound to the Internet)
c. Any BCN HPLL end-point to any BCN HPLL end-point (e.g. Video Bridging to non-Bridging)
d. An BCN HPLL end-point to Managed Video end-point
e. No Inbound calls from the Internet[3]
f. RVA (hand-held devices) cannot connect inbound to any end-point (bridge only connections).

Point to Point Calling Matrix

	From HPLL	From RVA	From HPLL-VB	From Managed
HPLL	Yes	No	Yes	Yes
Remote Video Access (RVA)	No	No	Yes	Yes
HPLL VB	Yes	No	Yes	Yes
Managed	Yes	No	Yes	Yes
MCU	Yes	Yes	Yes	Yes

Bridged Calls

a. Bridged calls can include any mix of HPLL, HPLL VB, RVA, and Managed Video end-point, but there must be at least one Managed Video (SD or HD) or HPLL VB included in the session
b. Maximum of 10 end-points per reservation (more end-points allowed if resources are available)
c. Maximum of 4 hours (longer if resources are available)
d. Off-net sites can ONLY reach the BCN bridges. They cannot dial *inbound* to a BCN video end-point.

5. Schedulers and Scheduling

a. A scheduler is any person who has been given permission to access the scheduling system and create or modify a reservation. Schedulers are

[3] Inbound calls to the BCN Video network can only connect to a BCN MCU.

assigned a login with a set of privileges that they cannot share with other users.

b. Consortium (Network Directors) and Agency schedulers have access to all the BCN end-points in their consortium through the scheduling system once they've converted to HD Video Service. Reservations using a BCN bridge can include any of their BCN end-points in their consortium.[4]

c. Reservations within a single consortium can still be input into the scheduling system by the Scheduling office, if the scheduler prefers it that way.

d. The BCN MCU Scheduling Office is only responsible for trouble resolution with reservations they create. All other issues should be brought to the BCN Network Management Center, 888 955-2638.

e. Reservations including end-points from different consortia are arranged by network directors/agency schedulers but require the Scheduling Office to input into the scheduling system.

f. Every MCU reservation created by a Scheduler must have at least one Managed Video or HPLL VB end-point. Schedulers cannot create a reservation for "off-net" sites only.

g. Reservations can include as many as ten (10) H.323 compliant end-points in a session lasting up to four (4) hours. As long as MCU capacity is available, reservations will not be restricted in session duration, number of run dates, or number of sites.

h. Only BadgerNet MCUs are allowed to cascade with each other. DOA strictly prohibits a BadgerNet MCU connecting to a non-BadgerNet MCU except for a one-time reservation (non-recurring session).

i. Inbound and outbound ISDN calls are available in the BCN MCU. Outgoing ISDN calls will be billed to the host site unless previous agreements are made.

j. Any video session can include as many as two audio-only end-points.

6. Registration to BCN Converged Management Application (CMA)

a. CMA registration is available to:

- BCN HD Managed Video end-points
- BCN SD Managed Video end-points
- Remote Video Access end-points with Polycom's RealPresence client.

[4] If the reservation contains a Managed SD end-point, only one SD codec from that site will be used for the bridged session. Only one monitor will display the remote sites instead of the traditional three-monitor arrangement.

- HPLL VB end-points and a Polycom codec (see Table 1). HPLL VB end-points with a non-Polycom codec *cannot* register to the BCN CMA.

b. BadgerNet HPLL (that is, an end-point that has not purchased Video Bridging Service from BCN) is not permitted to register to the BCN CMA.

c. Any BCN CMA registered end-point, except a RVA end-point, can launch a point-to-point call to the Internet. A BCN MCU does not need to be included in that call to act as a gateway.

7. BCN Scheduling Office

a. The BCN Scheduling Office schedules all multipoint session types provided there is at least one Managed Video (SD or HD) or HPLL VB site in each reservation.

b. If the BCN Scheduling Office sees an issue with port availability due to the number of off-net sites, it will report that information to DOA for resolution. The BCN Scheduling Office has discretion to adjust connection speeds to maximize MCU port capability for any reservation connecting BCN to off-net users.

c. The BCN Scheduling Office will bill back for ISDN long distance charges incurred.

d. For information on MCU video scheduling process go to the BCN MCU Video scheduling website: www.bcnmcu.net

8. Miscellaneous Policies

a. The capability exists to neighbor BadgerNet's CMA with other management systems, but on the recommendation of BCN's prime contractor (AT&T), the Department of Administration has decided to prohibit it.

b. The Wisconsin Department of Administration sets the charges and fees associated with all aspects of BCN Video network service and usage. Network Schedulers and the BCN Scheduling Office are prohibited from re-selling BCN Video Service or from charging a service fee to end-users for reservations or MCU use.

c. It is *NOT* a requirement for the BCN NMC or Scheduling Office to insure unsupported codecs operate properly (see Table 1 for a list of supported codecs).

d. There are instances in which an end-user design has a unique requirement and needs a modification in a BCN circuit or service to work. Those cases must be reviewed and approved by the BCN Engineering team and the Department of Administration before the modification can be made.

Appendix A Supported Codecs

A "fully supported codec" (e.g. HD Managed Video end-points) means that the BadgerNet local service provider owns the codec and is responsible for maintaining and repairing it. In the event that an issue arises with codec functionality, BadgerNet is required to resolve it. All "fully supported" codecs are manufactured by Polycom.

BCN HPLL sites that purchased their own codec are responsible for maintenance (including software upgrades) and repair of those devices. If Polycom manufactured the device, BCN will support the functionality of the codec only as it relates to BadgerNet video service[5].

Codec Type	Version
Polycom HDX Family	3.0.3.1 or higher
Polycom Telepresence (ITP) Systems	3.0.3.1 or higher
Polycom VSX and V-Series Family	9.0.6.2 or higher
Polycom Viewstation Family	7.5.4 or higher
Polycom Viewstation FX/EX	6.0.5 or higher
Polycom CMA Desktop	5.2.2 or higher
Polycom CMA Desktop for MAC	5.2.2 or higher or higher
Polycom QDX6000	4.0.2 or higher
Polycom m100	1 or higher
Polycom VVX1500	4.0.1 or higher
Polycom PVX	8.0.16 or higher
Polycom iPower 9000	6.2 or higher

[5] This table is updated periodically and is current as of September 12, 2012.

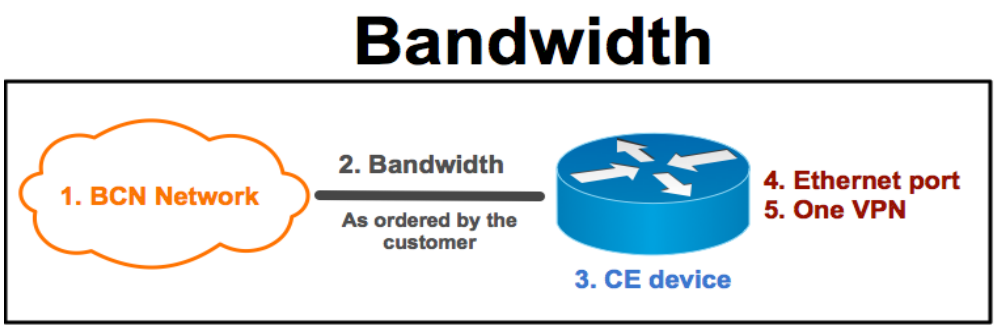
Appendix B Description of BCN HPLL and Video Bridging

1. Basic package (WAN, HPLL or Internet)

The basic package for a BCN site includes only ***ONE*** pricing element, and that is the amount of bandwidth the site would like to have. The Basic Package can be configured for one of three options:

i. WAN (and a choice of which VPN the site participates in)
ii. HPLL (and choice of which VPN the site participates in)
iii. Internet services (which includes a VPN to the ISP only).

Included in the basic package are the following five components:



BCN Network

As part of the access layer circuit connection, a BCN site also receives Aggregation and Core Layer transport services for end-to-end connectivity. We assume that any location within the network may want or need to be transported across the state, and the design accounts for that.

Bandwidth

The customer chooses from circuit speeds available in the contract to connect their site to the BCN network. This selection allows one site to connect to BCN. Any site that it needs to interact with also needs to purchase service unless they choose to connect through the Internet.

CE Device

BCN provides either a Cisco switch or router at the customer's premise to act as the "Customer Edge" (CE). WBAA's local service provider determines the type of equipment depending on facilities and their equipment deployment strategy. The BCN CE device includes a 10/100 port as the service demarcation. If bandwidth requirements require it, a BCN CE device can include a Gigabit interface as well.

Virtual Private Network

Each 10/100/1,000 Ethernet port is configured with a Virtual Private Network (VPN). When WAN or HPLL service is ordered, the customer must specify which VPN this site will participate in. If the basic package is for Internet service, the VPN is automatically configured for the ISP POP within that LATA. Multiple VPNs can be configured on a port as an enhanced service for an additional monthly cost (Fusion).

2. Description of Enhanced Services

Any feature or service that isn't part of the basic service package listed above (see Basic package WAN, HPLL or Internet) is a BCN Enhanced Service. A subset of the list of additional services is described below:

HPLL

High-Priority, Low-Latency (HPLL) service can be configured for a stand-alone application (i.e. Basic Package), or it can be added as an additional port to WAN or Internet Transport Service. HPLL is an Ethernet port on a BCN CE device configured with the highest class of service in the network. This allows any traffic on this port to take precedence over lower class traffic during times of network congestion. BCN both preserves and honors QoS markings introduced by the customer within certain parameters. When HPLL is added as an additional port, there is an additional monthly charge.

Video Bridging

Video bridging allows users in different Virtual Private Networks (VPNs) to connect to each other. By definition, a VPN is private allowing only sites within the VPN to connect to each other. Video bridging service allows specified users (or perhaps all sites) to cross the boundaries of their VPN to a pre-defined location within another VPN. For example, a court room within the Department of Justice's VPN could be pre-configured to leave the DOJ VPN and connect to a penitentiary holding cell in the Department of Correction's VPN for a video arraignment. Unless otherwise specified, only those two sites within those two networks could connect to each other.

Unlike the rest of the enhanced services, video bridging is NOT configured on an Ethernet port at the CE device. Instead, the site is provisioned in the BCN firewall, which allows users either HPLL or WAN VPN to access and use the BCN MCU. Video Bridging is available for an additional monthly charge. The rate includes unlimited use of the bridge for each codec purchasing the service.

Glossary

Cascading MCUs
A multipoint video session that includes two or more MCU's bridged together

Codec
A device that encodes and decodes audio and video for transport across a network

H.320
H.320 is an umbrella recommendation by the ITU for running Multimedia (Audio/Video/Data) over ISDN based networks.

H.323
A video protocol defined by the International Telecommunications Union (ITU) in 1996 to standardize video conference over IP-based networks.

High-Priority, Low-Latency (HPLL) Service
A BCN network service including a 10/100 Ethernet interface, bandwidth in a customer specified amount, highest network Quality of Service, NMC support (to the network demarcation point). HPLL services does not include a codec, access to the scheduling system or support from the NMC for any customer provided device connected to the BCN CE.

Managed Video Service
A turnkey video service offering including a codec, 2 Mbps of band, highest network Quality of Service, access to the scheduling system, and NMC support.

Multipoint Control Unit (MCU)
A network device allowing two or more video end-points to bridge together (e.g. a conference call for video end-points)

RSS (Rich Site Summary)
is a family of web feed formats used to publish frequently updated works—such as blog entries, news headlines, audio, and video—in a standardized format. An RSS document (which is called a "feed", "web feed", or "channel") includes full or summarized text, plus metadata such as publishing dates and authorship.

Video End-Point
A network connection that includes a video codec