MProxy

Bloomberg's Proprietary Multicast Server Solution

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Introduction
This document details MProxy and its features. It provides a high level overview of the MProxy including the following:

- Benefits of MProxy
- How MProxy works within a customer network
- How to monitor MProxy using MPXY<GO>

Terminology

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tr>
<td>Bandwidth feed</td>
<td>Amount of data that can be passed along a communications channel in a given period.</td>
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<tr>
<td>Channel</td>
<td>An instance of live Bloomberg media transmitted to the Bloomberg Professional® service.</td>
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<tr>
<td>Customer</td>
<td>The user of the Bloomberg Professional® service.</td>
</tr>
<tr>
<td>MPXY&lt;GO</td>
<td>Function that starts and monitors the media multicast.</td>
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<tr>
<td>Multicast</td>
<td>Communication between a single device and multiple members of a device group.</td>
</tr>
<tr>
<td>Stream/Streaming Data</td>
<td>Media sent from the Bloomberg network to the customer network. This is measured in kbps.</td>
</tr>
<tr>
<td>Tail circuit</td>
<td>The network line connecting a customer network to the Bloomberg network.</td>
</tr>
<tr>
<td>Unicast</td>
<td>The traditional one-to-one connection between a Bloomberg Professional® Terminal and the Bloomberg network for sending and receiving data.</td>
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NOTE: Live Bloomberg media broadcasts will be delayed due to streaming technology.

What is MProxy?
MProxy is Bloomberg’s proprietary multicast server solution. This solution enables a Bloomberg customer to multicast Bloomberg channels within the customer’s network.

The MProxy allows other Bloomberg Professional® service users, within the customer multicast enabled network, to connect and receive Bloomberg channels. MProxy utilizes only a single bandwidth feed for each channel connection, even when multiple Bloomberg Professional® service users play the same channel.
Traditionally, a customer’s Bloomberg Professional® service connects directly to the Bloomberg network to play a channel. This utilizes a separate bandwidth feed for each connection, even when multiple Bloomberg Professional® service users play the same channel.

**How does MProxy Work?**

The following section outlines the MProxy features:

- Part of the Bloomberg Professional® service
- Takes place within a customer network
- Receives a proprietary Bloomberg stream
- A single bandwidth feed serves any number of users
- Uses very little CPU resources (typically less than 2-3% of the CPU)
- Bloomberg manages and controls the MProxy software
- The customer provides and manages the PC that MProxy runs on
Requirements
The requirements for MProxy are the same as the customer site desktop requirements for receiving the Bloomberg Professional® service. Use the function BBPC<GO> for a full listing of Bloomberg Professional® service requirements. Additionally, the following requirements must be implemented:

- The customer must enable multicast in order to use MProxy.
  The customer must provide a range of multicast addresses. Bloomberg recommends a c-class mask of multicast addresses. The customer also must provide two ports: one listening port and one multicasting port.
- To receive MProxy transmission, all local routers must be IGMP enabled within the same network.
- Bloomberg highly recommends setting up the MProxy component on a dedicated terminal.
- Bloomberg also recommends that the MProxy terminal be setup for Auto-Login, and the MProxy software configured to Auto-Start.

Installation and Configuration
The Bloomberg Professional® service includes the MProxy server component. Enabling the MProxy requires specific permissions and a specific configuration.

With the proper permissions and configuration, the customer’s Bloomberg Professional® service becomes a distribution point for the customer network. The Bloomberg Professional® service is then effectively an MProxy.

Configuration occurs when the customer informs Bloomberg, which multicast addresses to use for the MProxy. Bloomberg recommends a c-class mask (255.255.255.0), class D multicast addresses with an IP range of 255 addresses, one for each channel in the event a c-class range is not available. The customer can provide Bloomberg with discrete IP address for up to 120 streaming channels and one control group; Bloomberg creates and manages the configuration files. The customer also needs to provide two ports: one listening port and one multicasting port. The listensing port is for communication between MProxy terminal and other Bloomberg Professional® service users; the multicasting port is used by MProxy terminal to multicast data to other Bloomberg Professional® users through multicast addresses.

Network Architecture
The following section details the traditional Unicast architecture of streaming media, and how the MProxy communicates with the Bloomberg network and operates within a customer’s network.

Traditional Unicast
Traditionally, the transmission of each channel between the Bloomberg Professional® service, and the Bloomberg network utilizes the customer’s tail circuit.

For example, a customer has twenty Bloomberg Professional® service users and each user plays the same Bloomberg channel. The customer utilizes the tail circuit for twenty streams (up to 200 kbps each) or approximately 4 MB. This may potentially introduce additional load on the tail circuit, as well as, the customer’s LAN.
Figure 2 provides an overview of the traditional Unicast customer configuration.

**MProxy**
MProxy can be enabled on one or more dedicated Bloomberg Professional® services for receiving and distributing Bloomberg media channels. Bloomberg configures the MProxy to allow connections of other Bloomberg Professional® service users from within the multicast network.

When a Bloomberg Professional® service user within the customer network requests a Bloomberg channel, the MProxy handles the request by obtaining the stream from the Bloomberg media servers and making it available to the requester.
Figure 3 provides an overview of the MProxy customer configuration.

If the multiple Bloomberg Professional® service users, within the same network, request the same channel, they access the stream that is being multicast by the MProxy. In this event, the connection utilizes the tail circuit and LAN bandwidth only once for the multiple requests.

For example, a customer has twenty Bloomberg Professional® service users, and each user plays the same Bloomberg channel. The MProxy handles all the requests, and allows the users to play the same stream simultaneously by utilizing a single bandwidth feed.

Table 1, for illustration purposes only, compares the total amount of bandwidth utilization between a traditional Unicast and MProxy when twenty Bloomberg Professional® service users view the same channel.
Table 1: Bandwidth utilization comparison between traditional Unicast and MProxy

<table>
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<tr>
<th>Variables</th>
<th>Traditional Unicast</th>
<th>MProxy</th>
</tr>
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<tbody>
<tr>
<td>Number of users</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Bandwidth per channel</td>
<td>Up to 200 kbps</td>
<td>Up to 200 kbps</td>
</tr>
<tr>
<td>Total amount of bandwidth utilized by twenty users playing the same channel</td>
<td>Up to 4 Mb</td>
<td>Up to 200 kbps</td>
</tr>
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For redundancy and load balancing purposes, Bloomberg recommends that customers configure multiple dedicated Bloomberg Professional® services as MProxys.

**Load Balancing and Failover**

**Customer WAN network, MProxy and Disaster Recovery**

In the event of a multi-homed customer network that is WAN enabled, the customer has the ability to choose either local only or cross-site distribution topologies.

For example, a customer has offices in both New York and London, and the offices are connected via a multicast enabled WAN. If the customer chooses local only topology, the office in New York receives a multicast signal that originates only from the New York network. If the customer chooses cross-site topology, then the New York office can receive a multicast signal from either the New York or London network.

These options allow for load balancing and redundancy (as in the case of disaster recovery) between separate locations.

**Load Balancing**

In the event that the customer installs multiple MProxys, Bloomberg load balances channel requests between the available servers.

**Failover with Load Balanced MProxys**

In the event that an MProxy fails, the channels currently playing are automatically transferred to another MProxy; see Figure 4. In most cases, customers experience minimal disruption.

The control group (which controls up to 120 streaming channels) is used for communication between clustered MProxys, as well as, between MProxys and Bloomberg terminals.

Clustered MProxys must be able to join the control group in order to exchange heartbeat information. Refer to how a failover appears in MPXY for more details.
Failover without load balanced MProxys
In the event of a failure when there is only a single MProxy, the Bloomberg Professional® service can be configured to revert to the traditional Unicast model.
Monitoring MProxy using the MPXY<GO> function

MPXY<GO> is the function to start and monitor the MProxy. This function only works on a Bloomberg Professional® service that has been configured as an MProxy.

NOTE: If the customer runs MPXY<GO> on a non-configured MProxy, an MPXY<GO> screen appears, except it is non-functional.

Figure 5 details a functional MPXY<GO> screen.

Figure 5: Functional MPXY<GO> screen

<table>
<thead>
<tr>
<th>Number of Users</th>
<th>The total number of Bloomberg Professional® service users playing the channels available on all MProxys within the customer’s network.</th>
</tr>
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<tr>
<td>Number of Channels</td>
<td>The number of channels currently connected to the Bloomberg network via the individual MProxy server.</td>
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Figure 6 shows how multiple MProxys within the same network are displayed.

Note: The MPXY<GO> displays are on separate Bloomberg terminals, but for purposes of documentation, they are shown side-by-side; see Figure 6.

Figure 6: Multiple MProxys within the same network

On any MProxys setup, the total number of users playing the channels is the same on all MPXY<GO> displays. Figure 7 details how the MPXY<GO> on both MProxys display the same number of users playing channels during the same time period.
Number of users playing the channels are the same for the same period of time (1/1/06:36 - 1/7/08:36)

![Diagram showing number of users playing the channels for two proxies, Mproxy One and Mproxy Two.](image)

Figure 7: Number of users playing the channels

MPXY<GO> displays the number of channels for only the individual MProxy, not for the total number of channels being played for the entire customer network; see Figure 8.
How a Failover appears in MPXY<GO>

In the event a MProxy fails, the number of channels on the MPXY<GO> graph of the failed MProxy goes to zero, while the number of channels on the MPXY<GO> graph for the remaining MProxy increases by the number of channels moved over from the failed MProxy.

For example, Figure 9 shows the numbers of channels displayed for an active MProxy. MProxy One serves one channel, while MProxy Two serves six channels.

Figure 10 shows what happens if MProxy Two fails.

MProxy One increases by the number of channels moved over from failed MProxy Two. MProxy One now has seven channels, while MProxy Two has zero channels.