



## **Connection Broker**

**Where Virtual Desktops Meet Real Business**

# **Multiple Display Support**

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## Patents

Leostream products are patent pending.

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# Multiple Display Support

## Overview

Leostream's support for multiple displays provides your end users with true multi-monitor behavior when they log into their remote sessions, including:

- Splitting or spanning remote desktop connections over multiple monitors.
- Restricting the taskbar to the primary monitor.
- Centering the Microsoft® Windows® login and logout dialogs, along with most message boxes, in the middle of the primary monitor.
- Maximizing application windows intuitively. For example, if the user places the majority of an application window within one monitor, maximizing the windows fills that monitor. If, on the other hand, the window is resized to cover a large percentage of two monitors, maximizing the windows fills both monitors.
- Positioning and resizing application windows dragged between monitors, based on the size of the new monitor.
- Returning to single monitor mode if the extra monitors are disconnected from the client.

Multiple display support is available for clients that are attached to multiple monitors with the following characteristics.

- All monitors are arranged horizontally.
- The primary monitor is the left-most monitor.
- All monitors in the layout have the same resolution.
- There are between 2 and 16 monitors.

The remote session can be invoked with any remote viewer protocol, including Microsoft RDP, Citrix® ICA, HP® RGS, etc.

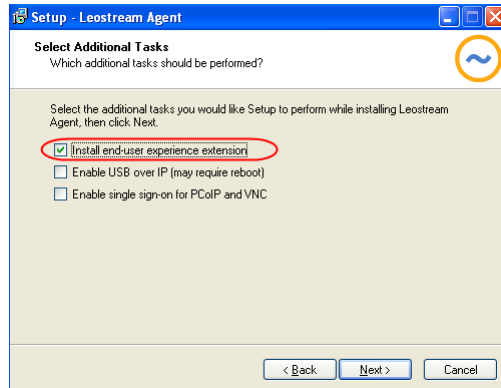
## System Requirements

In order to use the Leostream multiple display feature, you must be using Connection Broker 6.x. In addition, you must install Leostream Agent 4.2 or higher on every remote machine connected to by clients with multiple monitors



Leostream does not currently support multiple displays when connecting to Linux® desktops.

To enable the multiple display support, install the Leostream Agent with the **Install end-user experience extension** task selected, as shown in the following figure.



## Configuring Your Connection Broker

To roll-out multiple display support to your end users, you must do the following:

1. Install the Leostream Agent on each remote desktop that will be connected to a client with multiple monitors.
2. Ensure that any Connection Broker policies used by clients with multiple monitors contain correctly configured remote viewer protocols. See [Setting Remote Viewer Protocol Configurations](#) for more information.
3. In the Connection Broker, define common monitor layouts and assign them to clients.

A *monitor layout* describes a common monitor configuration; for example, two monitors that sit side-by-side. When you create the monitor layout, you assign it to clients based on the client's attributes, similar to creating Connection Broker Locations.

When a user logs in through a client with attributes that match a particular monitor layout, the Connection Broker assigns that monitor layer to the client, and communicates that monitor layout to the Leostream Agent. The Leostream Agent on the remote desktop then handles positioning and resizing of application windows, including the Windows Taskbar, within the monitors in the layout.

## Setting Remote Viewer Protocol Configurations

When building protocol plans for connecting from clients with multiple monitors to remote desktops, ensure that the correct command line or configuration files are set.

### Microsoft RDP

In the **Leostream Connect and Thin Clients Writing to Leostream API** section of a protocol plan, ensure that the configuration file in the **RDP** sub-section contains the following line:

```
span monitors:i:{LEO_SPAN}
```

The Leostream multiple display feature requires a spanned RDP session. The Connection Broker replaces the `LEO_SPAN` dynamic tag with 1 if the client is assigned a monitor layout, and with 0 if the client is not assigned a monitor layout or opts out of Leostream multiple-monitor support.

Alternatively, if all users of this protocol plan have multiple-monitors, you could hard-code this line to:

```
span monitors:i:1
```

### Sun uttsc

In the **Leostream Connect and Thin Clients Writing to Leostream API** section of a protocol plan, ensure that the command line parameters in the **Sun Ray** sub-section includes the `-m` parameter, so the session spans multiple monitors.

### Wyse Thin Clients

For Wyse thin clients that support dual heads, for example, the V10L, ensure that the **Desktop configuration file** in the **Wyse Configuration** section of the protocol plan contains the following parameter:

```
Fullscreen={LEO_FULLSCREEN}
```

Wyse thin clients with dual-head support span the remote session across both monitors when the `Fullscreen` parameter is set to `yes`. Otherwise, when `Fullscreen` is set to `no`, the remote session runs in a windowed screen.

The Connection Broker replaces the `LEO_FULLSCREEN` dynamic tag with `yes` if the client is assigned a monitor layout, and with `no` if the client is not assigned a monitor layout or opts out of Leostream multiple-monitor support.

Alternatively, if all users of this protocol plan have multiple-monitors, you could hard-code this line to:

```
Fullscreen=yes
```

### HP SAM Clients

HP SAM clients connecting to remote desktops using HP RGS provide native multi-monitor support. However, the default HP SAM configuration file does not provide multi-monitor support.

To provide multi-monitor support, in the **HP SAM Configuration** section of the protocol plan, modify the configuration file, as follows:

1. Modify the `Span` and `Display` settings in the `<Policy>` section, as follows:

```
<Span "V=1" O="0" />  
<Display FS="1" X="-1" Y="-1" Depth="-1" Stretch="0" O="0" />
```

2. Add the following lines to the `<DynamicPolicy>` section.

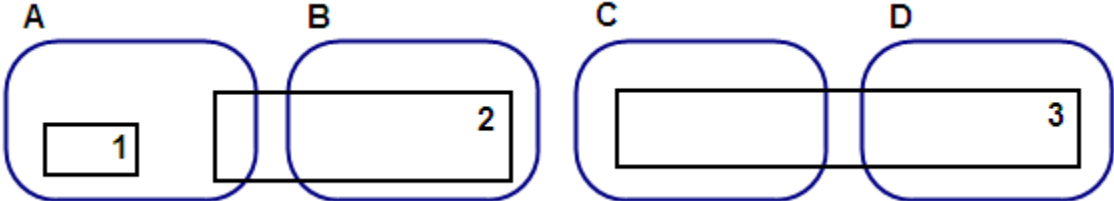
```
<DynamicPolicy>Rgreceiver.IsMatchReceiverResolutionEnabled.IsMutable=0</DynamicPolicy>  
<DynamicPolicy>Rgreceiver.IsMatchReceiverResolutionEnabled=1</DynamicPolicy>  
<DynamicPolicy>Rgreceiver.IsMatchReceiverPhysicalDisplaysEnabled.IsMutable=0</DynamicPolicy>  
<DynamicPolicy>Rgreceiver.IsMatchReceiverPhysicalDisplaysEnabled=1</DynamicPolicy>
```

3. If your RGS session opens with borders, ensure the `IsBordersEnabled` parameter is set to zero:

```
<DynamicPolicy>Rgreceiver.IsBordersEnabled=0</DynamicPolicy>
```

## Maximizing Windows over Multiple Displays

The Leostream Agent intelligently maximizes application windows based on their location across all monitors. For example, consider the four monitors arranged side by side, depicted in the following figure.



The monitors are lettered A, B, C, and D. The numbered rectangles inside the monitors represent application windows. When an end user maximizes each of the application windows, the Leostream Agent sizes the windows to fill the monitors, as follows.

- Application 1:** Fills monitor A
- Application 2:** Fills monitor B
- Application 3:** Fills monitors C and D

When the Leostream Agent detects that an application covers the majority of multiple monitors, it will maximize the application to fill all of those monitors.

## Creating Monitor Layouts

To begin using multi-monitor support, define the typical monitor layouts used by your end users. You then use these monitor layouts to define groups of clients with a similar monitor configuration. If these clients connect to desktops with an installed Leostream Agent, the end user experiences the Leostream multiple display behavior.

## Defining Monitor Layouts

To define a monitor layout, go to the > **Clients** > **Monitor Layouts** page, shown in the following figure.

Actions	Name	Number of Monitors	Number of Clients	Minimum Screen Width	Order
Edit	Dual Monitor	2	2	900	1

This page lists all monitor layouts you previously define. By default, the Connection Broker does not contain any monitor layouts; all clients adhere to the display settings specified for the remote viewer protocol in the protocol plan used to connect to the user’s desktop. For example, if the user’s protocol plan selects RDP, and the configuration file sets the `span_monitors` option to 1, the Connection Broker always spans the remote session across the user’s monitors.

To create a monitor layout:

1. Click the **Create Monitor Layout** link. The **Create Monitor Layout** form, shown below, opens.

**Create Monitor Layout**

Name:

**Display Options**

Number of monitors (assumes horizontal layout):

Assume single monitor if screen width is less than  pixels  
Width of the smallest monitor in pixels for this layout.

Lock taskbar to a primary monitor

Applications to exclude:

A comma-separated list of applications to exclude from multi-monitor support, i.e. sidebar.exe, GoogleDesktop.exe

**Attribute Selection**

Client attribute	Conditional	Value
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>

The Clients must match any of the attribute rules (OR)  
 The Clients must match all of the attribute rules (AND)

**Other**

Monitor Layout Order:

The first monitor layout that matches the client is used at connection time

Active monitor layout

Notes:

2. Enter a name for the layout in the **Name** edit field.
3. From the **Number of monitors** drop-down menu, select the number of monitors attached to clients in this layout.
4. In the **Assume single monitor if screen width is less than** edit field, enter the width (in pixels) of the smallest resolution monitor in this layout. For example, if clients in this group are attached to monitors with a resolution of 1200x800, enter 1210. If the client is attached to two monitors, the total width is 2400 and the Connection Broker applies the monitor layout. If, however, one of the monitors is disconnected, the client has a total display width of 1200. The Connection Broker sees that this value is less than the threshold of 1210 and switches to a single monitor layout.
5. Select the **Lock taskbar to a primary monitor** option to restrict the Windows task bar to span across only the primary (or left-most) monitor. If this option is not selected, the task bar spans across all monitors.
6. By default, Leostream controls the positioning of all application windows. If you do not want Leostream to control the windows for particular applications, enter the process name for these applications, separated by commas, into the **Applications to exclude** edit field. All windows associated with these processes will position, maximize, and resize as usual in a spanned remote session.
7. If you have multiple monitor layouts, use the **Monitor Layout Order** drop-down menu to reorder the layouts. If this is your first monitor layout, the form does not include the **Monitor Layout Order** drop-down menu.
 

The Connection Broker applies monitor layouts in the order they are listed in the **> Clients > Monitor Layouts** page. When an end user logs in, the Connection Broker assigns the client to the first monitor layout that matches the client's attributes.
8. Uncheck the **Active monitor layout** option if you want to disable this monitor layout, so the Connection Broker will not apply it to any clients, but do not want to delete the monitor layout.
9. Click **Save**.

## Assigning Monitor Layouts to Clients

Use the **Attribute Selection** section of the **Create Monitor Layout** form to assign monitor layouts to clients. Each row in the **Attribute Selection** section reads as a rule that defines clients assigned to this monitor layout.

1. Select an attribute from the **Client attribute** drop-down menu, shown in the following figure.

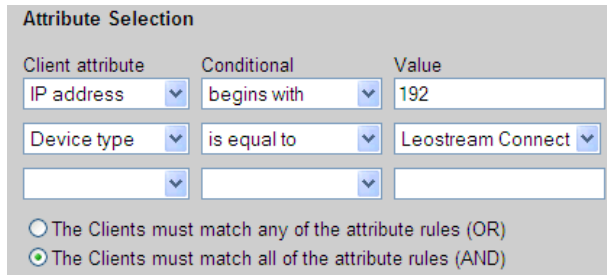
The screenshot shows a form titled "Attribute Selection" with three columns: "Client attribute", "Conditional", and "Value". The "Client attribute" column has a dropdown menu open, listing various attributes: Certificate host, Certificate user, Device name, Device type, HTTP header, IP address, MAC address, Manufacturer, Serial number, and Version. The "Conditional" column has three dropdown menus, and the "Value" column has three text input fields. Below the dropdown menu, there are two lines of text: "match any of the attribute rules (OR)" and "match all of the attribute rules (AND)".

2. Select a logic condition from the **Conditional** drop-down menu.
3. Enter or select the appropriate **Value** for this rule.
4. Create up to two additional rules in the remaining rows.

## Creating Monitor Layouts

5. Indicate if the client can match any rule (OR) or must match all rules (AND), in order to be assigned to this monitor layout.
6. Click **Save**.

For example, the following figure shows how to apply a monitor layout to all Leostream Connect clients with an IP address that begins with 192.



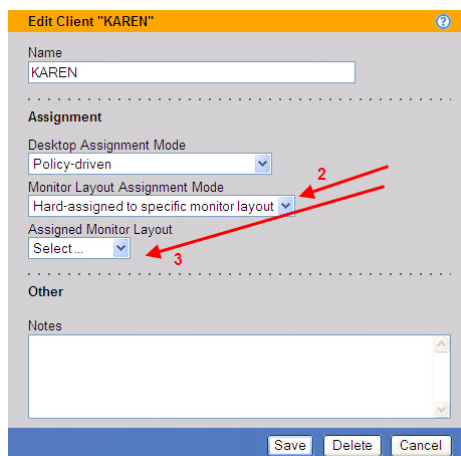
The image shows a dialog box titled "Attribute Selection" with three columns: "Client attribute", "Conditional", and "Value". The first row has "IP address" in the first column, "begins with" in the second, and "192" in the third. The second row has "Device type" in the first column, "is equal to" in the second, and "Leostream Connect" in the third. Below the rows are two radio buttons: "The Clients must match any of the attribute rules (OR)" and "The Clients must match all of the attribute rules (AND)".

After all of your monitor layouts are defined and assigned to clients, and the Leostream Agents are installed, you are finished configuring your Connection Broker to provide multiple monitor support.

## Hard-Assigning a Monitor Layout to a Client


In some cases, you may need to hard-assign a particular monitor layout to a client, or specify that a client does not support multiple monitors. To hard assign a monitor layout to a client:

1. On the > **Clients** > **Clients** page, select the **Edit** action for appropriate client. The **Edit Client** form opens.
2. In the **Assignment** section, select Hard-assigned to a specific monitor layout from the **Monitor Layout Assignment Mode** drop-down menu.
3. Select the appropriate monitor layout from the **Assigned Monitor Layout** drop-down menu, as shown in the following figure.



The image shows the "Edit Client 'KAREN'" form. The "Name" field contains "KAREN". In the "Assignment" section, "Desktop Assignment Mode" is set to "Policy-driven". "Monitor Layout Assignment Mode" is set to "Hard-assigned to specific monitor layout". "Assigned Monitor Layout" is set to "Select...". Red arrows point to the "Monitor Layout Assignment Mode" and "Assigned Monitor Layout" fields. At the bottom are "Save", "Delete", and "Cancel" buttons.

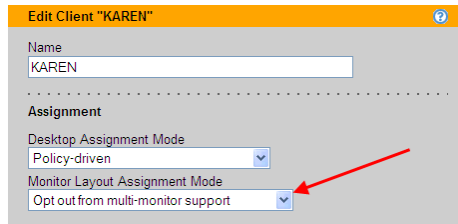
4. Click **Save** on the **Edit Client** page.

 Ensure that the Leostream Agent is installed on all desktops that may be connected to by a client with a hard-assigned monitor layout.

## Opting Out of Multi-Monitor Support

If you want to ensure that a particular client is never assigned a monitor layout, you can opt out as follows:

1. On the > **Clients** > **Clients** page, select the **Edit** action for appropriate client. The **Edit Client** form opens.
2. In the **Assignment** section, select Opt out from multi-monitor support from the **Monitor Layout Assignment Mode** drop-down menu, as shown in the following figure.



The screenshot shows the 'Edit Client' form for client 'KAREN'. The form has a yellow header bar with the text 'Edit Client "KAREN"' and a help icon. Below the header, there is a 'Name' field with the value 'KAREN'. The 'Assignment' section contains two dropdown menus: 'Desktop Assignment Mode' set to 'Policy-driven' and 'Monitor Layout Assignment Mode' set to 'Opt out from multi-monitor support'. A red arrow points to the 'Monitor Layout Assignment Mode' dropdown menu.

3. Click **Save** on the **Edit Client** page.

When a client with no multi-monitor support connects to a remote desktop, the remote viewer configuration file determines the resolution and number of monitors supported in the remote viewing session. For example, you can manually include the following line in your RDP Configuration file to span multiple monitors.

```
span monitors:i:1
```

However, in this case, the Leostream Agent will not handle positioning and resizing of application windows.