Configuration for Single-WAN Routers
6300-CX

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Overview

The Accelerated 6300-CX LTE Router provides a reliable, high-speed cellular connection that is compatible with existing wireline infrastructure. While its 4G LTE speeds are capable of operating as a primary WAN uplink, the 6300-CX can also be configured as a backup. This network redundancy delivers the ultimate flexibility to minimize expenses when it comes time for upgrading equipment to the latest wireless standards.

Business continuity depends on the seamless integration of failover-connectivity solutions to prevent service interruptions. Now more than ever, contingency networks play a strategic role in sustaining business operations. Unplanned outages can cost significant time and money, frustrating employees and clients alike, which creates a negative perception that is difficult to overcome.

The vast majority of residential broadband connections grant users Internet access using a router with a coaxial WAN interface, though Ethernet-based LAN ports can often be configured to route WAN traffic as well. Pairing the Accelerated 6300-CX with a traditional, single-WAN router facilitates the best redundancy possible by allowing for cellular data (4G LTE) to bypass physical infrastructure (the coaxial-based broadband connection) and provide WAN connectivity should the primary uplink fail.

Accelerated Concepts extensively tests the 6300-CX LTE Router to ensure its interoperability with a wide variety of network appliances, including equipment provided by Frontier, Spectrum, and many other ISPs. The solution outlined in this document relies primarily upon settings controlled by the 6300-CX, minimizing any configuration requirements for the single-WAN router (to promote universal compatibility with most broadband networks).

Interoperability Matrix

This section covers interoperability information of the hardware tested for this solution. It includes the firmware versions of the device(s) as well as the date of testing.

Date	6300-CX FIrmware
12/2016	16.11.142

Caveats

The delivery of wireless services varies depending on the carrier and may lead to differences in the area of coverage, type of service (3G, 4G, LTE, etc.), available bandwidth, and IP address designation (Private or Public) among other factors. The interoperability test designed for this solution guide included LTE service, maximum coverage availability, and a public IP address assigned to each device.

The processes described herein assume the following:

- Broadband router with a single RJ45 (Ethernet) WAN interface
- Available LAN ports
- Administrative access to the broadband router's local GUI

While administration portals may vary greatly, depending on the make and model of the router being utilized, the underlying configuration remains the same.

> ❗ **NOTE:** If additional LAN ports are necessary for practical use, a switch can be introduced without requiring additional configuration. Connect the switch to an available LAN port and proceed with the processes described herein.

Accelerated 6300-CX LTE Router Setup

Initial Setup

Affix both antennas to the router and insert an activated SIM card before deploying the device. Be sure to select a location with optimal signal strength. For detailed instruction, refer to the tables that follow. Subsequent sections will outline site selection, powering options, and other device functionality.

Step-by-Step Guidance: Initial Setup

1. Insert the activated 2FF SIM card provided by your cellular network operator (putting the cut corner in first with metal contacts facing down). The card clicks into place when completely inserted.
2. Attach the two included antennas; both should be installed for optimal operation. Do this by gripping the metal connector section with your thumb and forefinger, tightening until secure. Do not tighten the antenna by holding any part of the plastic antenna housing.
3. To determine the optimal location for the 6300-CX, please see the "Site Survey" section.
4. Refer to the section(s) for Remote or Direct Power Installations when ready to connect the 6300-CX to the permanent power supply unit. <!--[endif]-->
5. The 6300-CX uses DHCP with IP Passthrough by default, which satisfies the setup requirements for most environments. If required, please use Accelerated View™ or the 6300-CX local GUI to configure the 6300-CX for router mode.
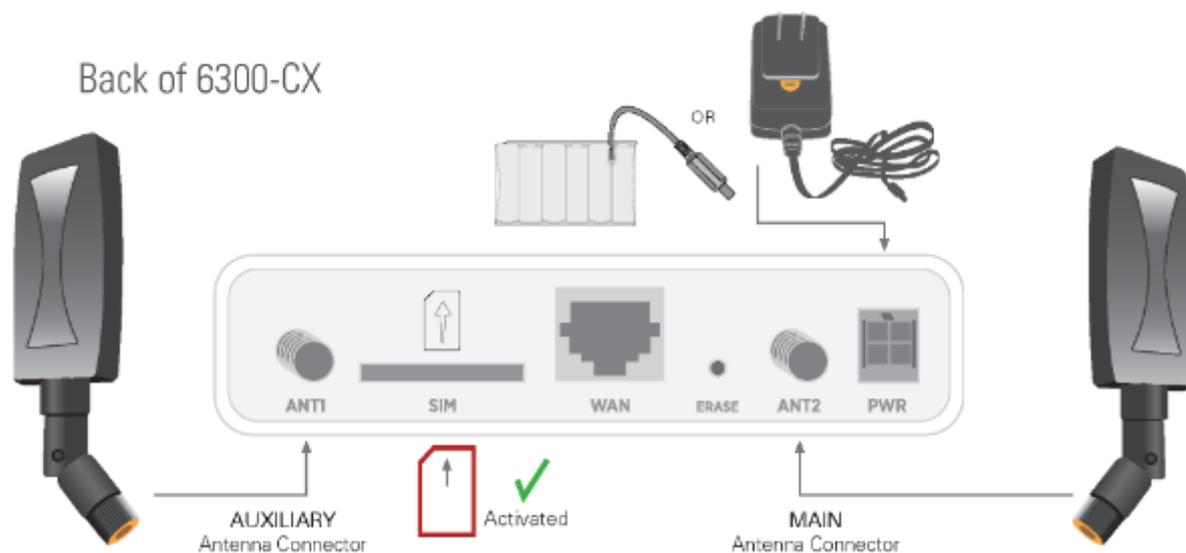
Site Survey

If you are unsure of the available cellular signal strength, or are choosing between several locations, please follow the instructions to identify the ideal installation site.

Step-by-Step Guidance: Site Survey

1. After following steps 1 and 2 in the "Initial Setup" section, connect the battery pack to temporarily power the Accelerated 6300-CX. The charge lasts two to four hours – it is not rechargeable and should be properly disposed of after use.
2. Move the 6300-CX to different locations within your site to determine the best compromise between signal strength and installation constraints. Since cellular signal strength may fluctuate, it is important to **wait at each**

location for 1 minute while observing the signal strength indicator on the front of the device. Minimum cellular signal strength for operation is 2 bars (3+ is preferred).

3. After determining the optimal location, remove the battery pack and connect the main power supply unit or Ethernet cable connected to the PoE injector (per the power option outlined below).

Remote Power Installation – Powering Option #1

The included Power-over-Ethernet (PoE) injector allows the device to be positioned away from power outlets to simplify its installation needs. The adaptor consolidates the DC power and Ethernet connections so that both can be run to the 6300-CX via a single Ethernet cable. Distances of 300 ft have been tested on CAT6 and 250 ft on CAT5e. Note that cable conditions and the number of splices will impact actual distance.

Step-by-Step Guidance: Remote Power Installation

1. Plug the 6300-CX's power supply unit (PSU) into an AC power outlet.
2. Connect the end of the PSU into the DC input (4 pin connector) of the PoE injector.
3. Insert the male RJ45 connector of the PoE injector cable into the broadband router.
4. Connect an Ethernet cable from the RJ45 socket on the PoE injector cable to the Ethernet port of the 6300-CX. (See diagram.)
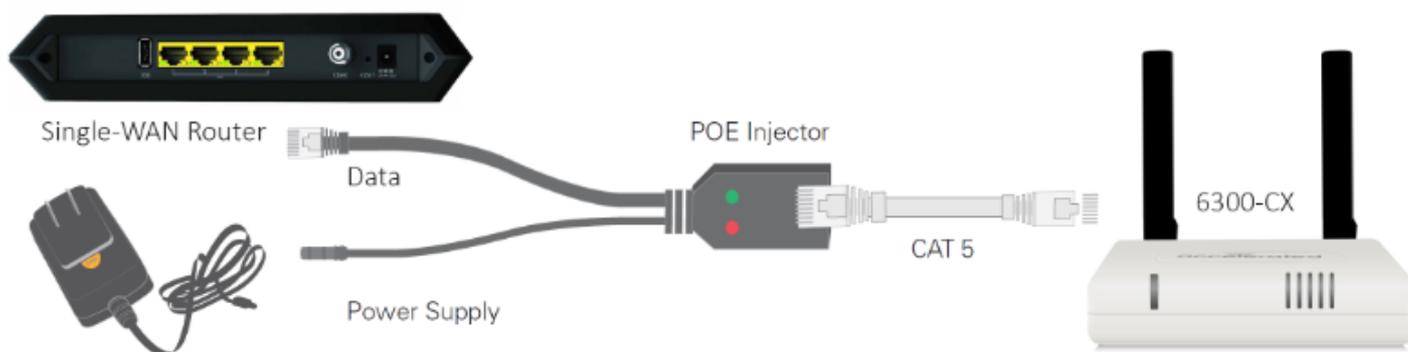

Direct Power Installation – Powering Option #2

If you plan to collocate the 6300-CX with the MX device, you can directly power the 6300-CX without the PoE cable.

Step-by-Step Guidance: Direct Power Installation

> *NOTE: A single-WAN router will not delineate between primary and secondary ports. This will be handled during device configuration.*
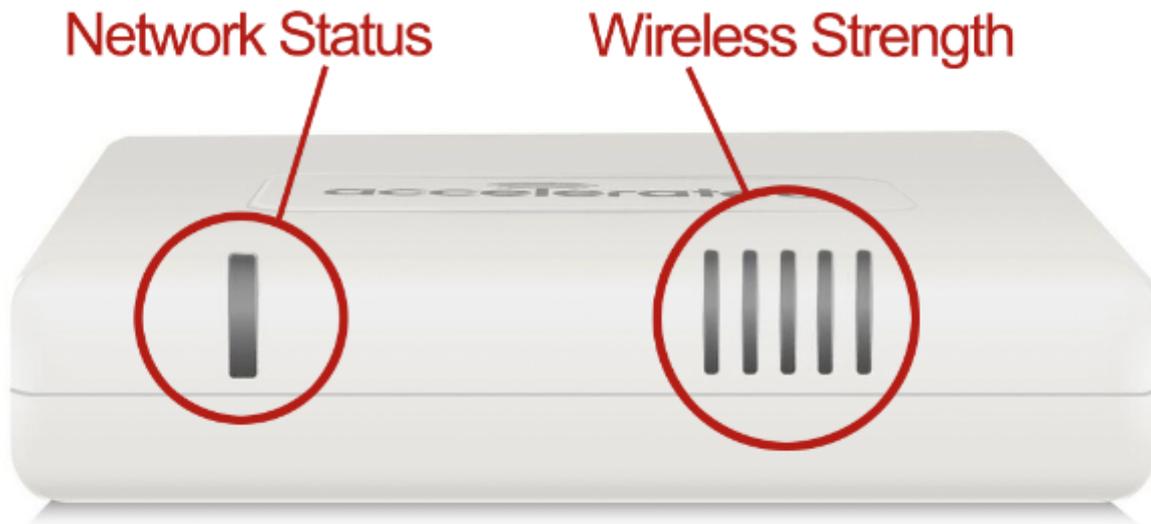>
> 1. Use an Ethernet cable to connect the 6300-CX to the router using the primary WAN port (to use the cellular network as the primary connection) or the secondary WAN port (to configure a failover).
> 2. Plug the 6300-CX power supply unit (PSU) into an AC power outlet.
> 3. Connect the PSU into the 4-pin power connector of the 6300-CX. (See diagram.)
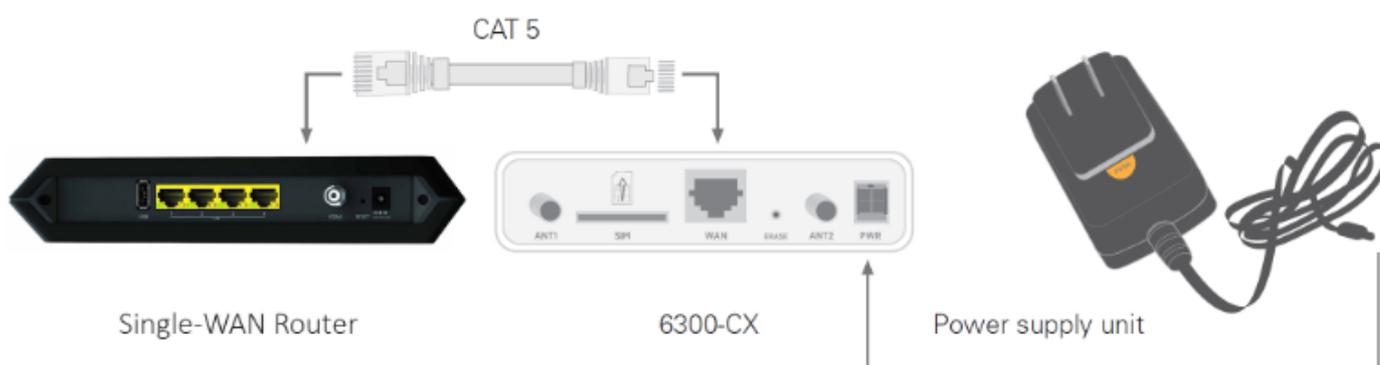
Understanding the 6300-CX LEDs

Once power has been established, your device will initialize and attempt to connect to the network. Device initialization may take 30-60 seconds. Indicator lights on the **Wireless Strength Indicator** show you the cellular network signal strength. The **Network Status Light** on the front left of the device displays connectivity information.

Please visit **accelerated.com** for additional information and troubleshooting tips.

Network Status LED

Color	Description
Solid Yellow	Initializing or starting up.
Flashing Yellow	In the process of connecting to the cellular network and to a device on its Ethernet port.
Flashing White	Has an Ethernet connection and is in the process of connecting to the cellular network.
Flashing Green	Connected to 2G or 3G and is in the process of connecting to a device on its Ethernet port (or nothing is connected to the port).
Solid Green	Connected to 2G or 3G and also has an Ethernet connection.
Flashing Blue	Connected to 4G LTE and in the process of connecting to a device on its Ethernet port.
Solid Blue	Connected to 4G LTE and also has an Ethernet connection.
Alternating Red/ Yellow	Upgrading firmware. **WARNING: DO NOT POWER OFF DURING FIRMWARE UPGRADE.**

Wireless Strength LEDs

Signal Bars	Weighted dBm	Signal Strength %	Quality
	-113 to -99	0 - 23%	Bad
	-98 to -87	24 - 42%	Marginal
	-86 to -76	43 - 61%	OK
	-75 to -64	62 - 80%	Good
	-63 to -51	81 - 100%	Excellent

Single-WAN Router Configuration with the 6300-CX

Disable DHCP for the Single-WAN Router

Dynamic Host Configuration Protocol (DHCP) allows routers to assign IP addresses on a first-come, first-serve basis while also ensuring each device has a unique IP. Thanks to DHCP, routers can grant simultaneous Internet access to multiple devices using a single WAN interface. It is strongly encouraged that networks have only one active DHCP server at any given time or else overlapping IP addresses may be assigned to connected equipment. When integrating the Accelerated 6300-CX LTE Router as part of a single-WAN solution, the 6300-CX can act as the DHCP server even while using the wireline connection as its primary WAN route. Most of this configuration occurs within the CX's administration portal though the first step is always making sure the broadband router's DHCP services are disabled within the local GUI.

```
Ethernet adapter Ethernet:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::3c79:bc65:72e8:2fb9%15
   IPv4 Address. . . . . . . . . . . : 172.16.3.80
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : 172.16.3.1
```

Proprietary GUIs will vary depending on the make and model of the single-WAN router, though the overall configuration remains the same. First, identify where the TCP/IP or LAN settings are located, and then navigate to the DHCP properties. These options are sometimes included as part of the device's "advanced" functionality and may not be directly accessible until advanced configuration is enabled. Note that devices connected to the router will lose Internet access after DHCP is disabled until the 6300-CX is configured per the steps outlined in the next section. The router's local GUI may take a minute or two to refresh as its DHCP settings are updated.

Please refer to the documentation included with the single-WAN router for a walkthrough of its configuration menu.

Step-by-Step Guidance: Disabling DHCP for the Single-WAN Router

1. Using a web browser, navigate to the single-WAN router's local GUI. This is most often the same address as the **Default Gateway.**

2. Identify the menu option that houses TCP/IP or LAN settings.

3. Disable the router's DHCP-Server functionality.

4. Finalize the configuration by clicking the "apply" or "save" button.

5. Wait for the device to reboot before continuing.

! **NOTE:** Without DHCP enabled, the router will reboot and can still be reached via the local GUI through connected devices will no longer receive an IP address automatically (until the 6300-CX is configured per this document).

Enable Router Mode on the Accelerated 6300-CX

With DHCP routing disabled on the single-WAN device, the Accelerated 6300-CX must be configured to take over the assignment of IP addresses. It cannot do so, however, until IP Passthrough is disabled on the Accelerated device. Reconfiguring the 6300-CX in this manner places the CX in "Router Mode." The settings outlined below should be

applied from the Configuration tab of Accelerated View™ although local administration is also possible if the need arises.
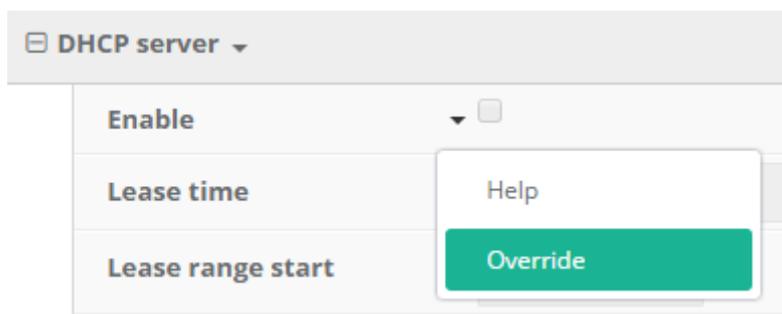
Please refer to the 6300-CX User Manual for an in-depth walkthrough of both remote and local administration.

Step-by-Step Guidance: Enable Router Mode on the 6300-CX

1. Sign in to Accelerated View and locate the 6300-CX by entering its **MAC address** in the **Search** field. The MAC address is a 12-character code included on the 6300-CX's bottom label.
2. Click on link in the **MAC** column to bring up the device's profile.
3. Navigate to the **Configuration** tab.
4. When configuring Accelerated devices, it is best to utilize **Group Configuration** profiles so that settings can be centrally stored and later applied to additional devices. Click the **Edit group configuration** link to proceed with the device setup.
5. **Settings** in Accelerated View are categorized and nested according to their scope of configuration. The "-->" symbol denotes nested categories. **Network --> Interfaces --> LAN**, for example, points to the **LAN** menu nested inside the **Interfaces** section within the **Network** category:
6. **Modem --> Passthrough:** deselect the **Enable** checkbox
7. **Network --> Interfaces --> LAN:** select the **Enable** checkbox
8. **Network --> Interfaces --> LAN --> IPv4:** set **Interface type** to **Static IP address**
9. **Network --> Interfaces --> LAN --> IPv4:** specify the **Address** of the LAN DHCP network as X.X.X.65/26 [*]
10. **Network --> Interfaces --> LAN --> IPv4 --> DHCP server:** select the **Enable** checkbox and set the **lease range** to **start** at 66 and **end** at 126
11. **Network --> Interfaces --> LAN --> IPv4 --> DNS servers:** enter a pair of DNS servers to use by clicking the **Add** button; 8.8.8.8 and 4.2.2.4 are suitable defaults if no specific DNS address is preferred
12. Click **Update** to finalize the new settings.
13. To apply the new settings immediately, reboot the CX or reference the step-by-step guidance for [issuing remote commands](#).

*The first three values of the IP address <u>MUST</u> match those belonging to the single-WAN router's default gateway. The fourth value corresponds to the lease range; use the values provided above unless otherwise notified.

❗ Devices sync with Accelerated View once a day by default; pending configuration updates will apply at this time.

Changes made to a group configuration are applied to ALL devices assigned to that group. To adjust settings for individual devices, select the **Override** button from the pull-down menu situated next to each field/ setting in question and make any necessary changes without editing the group config.

Add a New WAN Interface

The Accelerated 6300-CX can be configured to interface with additional uplinks outside of the connectivity established by its cellular modem. When deployed with a single-WAN broadband modem, the 6300-CX is capable of acting as the network's DHCP server while still leveraging the coaxial WAN interface as its primary means of Internet access. The cellular connection then serves as a failover uplink that only becomes active if the broadband connection becomes unavailable. This functionality requires the creation of a new WAN interface in Accelerated View™.

Please refer to the 6300-CX User Manual for an in-depth walkthrough of both remote and local administration.

Step-by-Step Guidance: Adding a New WAN Interface

1. Sign in to Accelerated View and locate the 6300-CX by entering its **MAC address** in the **Search** field.
2. Click on link in the **MAC** column to bring up the device's profile.
3. Navigate to the **Configuration** tab.
4. When configuring Accelerated devices, it is best to utilize **Group Configuration** profiles so that settings can be centrally stored and later applied to additional devices. Click the **Edit group configuration** link to proceed with the device setup.
5. **Settings** in Accelerated View are categorized and nested according to their scope of configuration. To create a new interface, first expand the **Network** menu and then expand the **Interface** section.
6. Use the **Add Interface** field to enter a name for the connection coming from the single-WAN router (e.g. "Primary WAN").
7. Set the **Zone** to "External" and the **Device** to "LAN" using the corresponding menu selections.
8. The **Default gateway** will be the same IP address used to connect to the single-WAN router (when disabling DHCP on the device as explained on page 6 of this document).
9. In the **Address** field, enter X.X.X.2/27*
10. Set the **Metric** to 1. The 6300-CX attempts to connect to the Internet using its active WAN uplink with the lowest metric value first before failing over to the cellular connection, which has a higher metric.
11. Click **Update** to finalize the new settings.
12. To apply the new settings immediately, reboot the CX or reference the step-by-step guidance for [issuing remote commands](#).

*The first three values of the IP address <u>MUST</u> match those belonging to the single-WAN router's default gateway. The fourth value corresponds to the lease range; use the values provided above unless otherwise notified.

> ❗ Devices sync with Accelerated View once a day by default; pending configuration updates will apply at this time.
>
> Changes made to a group configuration are applied to ALL devices assigned to that group. To adjust settings for individual devices, select the **Override** button from the pull-down menu situated next to each field/ setting in question and make any necessary changes without editing the group config.

Initialize Active Recovery

Active Recovery allows the 6300-CX to recognize when an interface has reconnected to the Internet in order to failback to the intended primary uplink. Connections can be monitored by a handful of preconfigured testing conditions, though the most common choice is to perform a ping test. Once the router recognizes that connectivity has been restored, based off of user-defined success conditions, the device can be configured to automatically restart the interface. The 6300-CX will then utilize the active WAN connection with the lowest metric value, per

Please refer to the [6300-CX User Manual](#) for an in-depth walkthrough of both remote and local administration.

Step-by-Step Guidance: Initializing Active Recovery

1. Sign in to Accelerated View and locate the 6300-CX by entering its **MAC address** in the **Search** field.

2. Click on link in the **MAC** column to bring up the device's profile.

3. Navigate to the **Configuration** tab.

4. When configuring Accelerated devices, it is best to utilize **Group Configuration** profiles so that settings can be centrally stored and later applied to additional devices. Click the **Edit group configuration** link to proceed with the device setup.

5. **Settings** in Accelerated View are categorized and nested according to their scope of configuration. To create a new interface, first expand the **Network** menu and then expand the **Interface** section.

6. Expand the **WAN** interface (created per the previous page of this document) and expand **Active Recovery**.

7. Select the **Enable** and **Restart interface** checkboxes both must be checked.

8. Set the **Interval** to 1m or however often the 6300-CX should check on the interface.

9. Adjust the **Success condition** and its corresponding **Attempts** and **Response timeout** if necessary.

10. Expand **Test targets** and click the **Add** button.

11. Set the **Test type** to "Ping test" and point the **Ping host** to 8.8.8.8

12. Click the **Add** button.

13. Set the **Test type** to "DNS Test" and point the **DNS server** to 8.8.4.4 - **Note:** 2 different tests are recommended to prevent false positives.

14. Click **Update** to finalize the new settings.

15. To apply the new settings immediately, reboot the CX or reference the step-by-step guidance for issuing remote commands.

*The first three values of the IP address <u>MUST</u> match those belonging to the single-WAN router's default gateway. The fourth value corresponds to the lease range; use the values provided above unless otherwise notified.

🛈 *NOTE: Best practices dictate that redundant tests (with divergent failure conditions) will be the best way to ensure proper connectivity monitoring/active recovery. With only a single test type, false positives could be reported.*

🛈 Devices sync with Accelerated View once a day by default; pending configuration updates will apply at this time.

Changes made to a group configuration are applied to ALL devices assigned to that group. To adjust settings for individual devices, select the **Override** button from the pull-down menu situated next to each field/ setting in question and make any necessary changes without editing the group config.