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1 FX2 Overview

The Dell FX2 or FX2s is a new 2U rack-based converged computing platform that provides a greater dimension of functional flexibility, along with a higher density of processing power. The FX2 and FX2s chassis are the exact same except that the FX2 supports only Ethernet I/O Module and has no PCIe slots. The FX2s supports Ethernet as well as other I/O module options and comes with PCIe slots. The FX2 or FX2s combines the density of blades with the advantages of rack-based systems. Its modular design enables building blocks of resources that can be multiple combinations of compute and storage nodes configured in a number of variations, depending on the intended use of the platform and the amount of resource required. The following are the different components of an FX2 system:

**FC630**
The PowerEdge FC630 is a half-width shared infrastructure workhorse, with powerful processors and a huge memory footprint. It is best suited for hosting virtualization environments or running business intelligence applications and databases - making it an ideal building block for private clouds.

**FC430**
The PowerEdge FC430 is a quarter-width, half height server that is best suited for web serving and dedicated hosting, and can also perform lightweight virtualization and analytics. Its exceptionally small failure domain makes it a great choice for distributed environments that require higher reliability.

**FM120x4**
The PowerEdge FM120 microserver runs the low power Intel® Atom™ C2000 processors. Its System on a Chip (SoC) design allows it to pack four independent servers (each with 1 processor, 2 DIMMs, 2 x 1 Gb LOMs and 1-2 drives) in each half width sled, providing a high density, low cost solution that is ideal for web serving and dedicated hosting.

**1GbE Passthrough**
The 1GbE Ethernet Pass-through module is the default offering on the FX2 system. The Pass-Through Cards are defined as having no single points of failure at the Ethernet signal level. The maximum Ethernet signal pass-through is limited to 8 lanes due to the bulkhead limit of 8 RJ-45.

**10GbE Passthrough**
The 10GbE passthrough is another IOM option for the FX2 that allows greater bandwidth. Maximum Ethernet signal pass-through is still limited to 8 lanes due to the bulkhead limit of 8 RJ-45.

**FN2210S I/O Aggregator**
The PowerEdge I/O Aggregator (IOA) is an IOM that is a configurable switch with powerful options. The IOA is available with three interface formats:
- **Standard SFP+** - This format uses a fiber-optic connection and has four external 10G ports to connect to server nodes. There are totally eight ports
- **IOA Combo Card** - This format has four SFP+ ports. Two for Ethernet and two for Fibre Channel.
- **10GBaseT** - This format uses an RJ-45 connector instead of a fibre-optic transceiver.

 Depending on your system configuration, the FX2 can include up to four half-width sleds (FC630 or FM120) or eight quarter-width sleds (FC430). To function as a system, a sled is inserted into an enclosure that supports power supplies, fan modules, a single dual port Chassis Management Controller (CMC) module, and two I/O modules for external network connectivity. The power supply units, fans, CMC, KVM panel, and I/O modules are shared resources of the sleds in the PowerEdge FX2 and FX2s enclosure(s). The following figures show the view and features of the three possible system configurations compatible with the FX2 chassis. The tables list the features included on the front and back panels.

**Figure 1 Front Panel Features and Indicators (quarter-width sleds – FC430)**

![Figure 1](image1.png)

**Figure 2 Front Panel Features and Indicators (half-width sleds – FC630)**

![Figure 2](image2.png)

**Figure 3 Front Panel (half-width sleds – FM120x4)**

![Figure 3](image3.png)
Table 1  Front Panel Features

<table>
<thead>
<tr>
<th></th>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>KVM select button</td>
<td>Allows you to switch KVM connectivity between sleds.</td>
</tr>
<tr>
<td>2</td>
<td>System identification button</td>
<td>The system identification buttons on the front and back panels enable you to locate a particular server and associated PCIe cards. If you press one of these system identification buttons, the system status indicator LED on the back panel blinks continuously until you press one of the buttons again. Press the system identification button to turn on or turn off the system ID. Each time you press the button, the system status indicator LED moves to the next server and blinks.</td>
</tr>
<tr>
<td>3</td>
<td>Diagnostic indicators</td>
<td>The diagnostic LED indicators turn on to indicate the error status (temperature, I/O, electrical, and health).</td>
</tr>
<tr>
<td>4</td>
<td>Enclosure power-on indicator, power button</td>
<td>The enclosure power-on indicator turns on when the enclosure turns on. The power button controls the power supply output to the system. If enabled, press and hold the power button for five seconds to gracefully shutdown all servers. Press and hold the power button for ten seconds to force shutdown all servers.</td>
</tr>
<tr>
<td>5</td>
<td>Sleds</td>
<td>PowerEdge FX2 enclosure supports up to eight quarter-width sleds or four half-width sleds.</td>
</tr>
<tr>
<td>6</td>
<td>Video connector</td>
<td>Enables you to connect a monitor to the system.</td>
</tr>
<tr>
<td>7</td>
<td>USB connector</td>
<td>Enables you to connect a keyboard or mouse to the system.</td>
</tr>
</tbody>
</table>

Figure 4  FX2s Back Panel Features and Indicators (FC430 and FC630)
Figure 5 FX2 Back Panel Features and Indicators – No PCIe slots option (FM120x4, FC430 and FC630)

Table 2 Back Panel Features

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Serial connector</td>
</tr>
<tr>
<td>2</td>
<td>Ethernet connector Gb1</td>
</tr>
<tr>
<td>3</td>
<td>Ethernet connector STK (stack)/ Gb2</td>
</tr>
<tr>
<td>4</td>
<td>Low-profile PCIe expansion slots</td>
</tr>
<tr>
<td>5</td>
<td>Power supply (PSU1)</td>
</tr>
<tr>
<td>6</td>
<td>Power supply (PSU2)</td>
</tr>
<tr>
<td>7</td>
<td>I/O module (2)</td>
</tr>
<tr>
<td>8</td>
<td>I/O module ports</td>
</tr>
<tr>
<td>9</td>
<td>I/O module indicators</td>
</tr>
</tbody>
</table>
Management Modes: Chassis Management at Server vs. CMC

The FX2 is unique because you can manage it as a rack or a modular chassis.

Benefits of Chassis Management at Server

The shared infrastructure of the chassis can be managed by default using the server’s iDRAC. You can use the iDRAC interfaces to access the same iDRAC features included in any other Dell rack servers such as the R730 or R630, and also monitor selected shared infrastructure such as fans and power supply units. In this mode, shared infrastructure alerts are sent from each server node, so by default, alerts are received. To change your alert settings, refer to the *FX2 CMC User’s Guide*. In this default mode, there is no requirement to provide the CMC with an IP address. Managing your FX2 from the servers may speed up initial deployment by bypassing CMC configuration, but you cannot take full advantage of the CMC features. The control for allowing Chassis Management at the Server mode is located on the **Chassis Overview**: Setup **General** page of the CMC’s web interface.

Figure 6 Chassis Management Modes
Benefits of Chassis Management at the CMC

By managing the chassis with the CMC, you have the benefit of getting shared infrastructure alerts through the CMC. Instead of getting shared infrastructure alerts from each node, you can receive only one alert through the CMC for all your shared resources. You can purchase a CMC Enterprise license to access CMC’s advanced features. Using CMC, you can manage all of your servers and networking in one intuitive, easy to use web interface. You can also use the CMC to perform one-to-many firmware updates and manage server profiles, saving you time and reducing the risk of error. After you assign an IP address to the CMC, it is always available regardless of the management mode.

NOTE: If you did not initially purchase a CMC (or iDRAC) Enterprise license with your FX2, you can always purchase one at a later time. You can even request a free trial from your Account Team to experience the benefits of CMC.
2 Initial Setup and Deployment

2.1 Cabling

It is very important that you cable your FX2 correctly and safely. To cable your FX2, perform the following instructions:

**CAUTION:** Follow the instructions on the enclosure and remove the sleds and power supply units before lifting and installing the system. Reinstall the sleds and power supply units after you install the enclosure in the rack.

1. Unpack the enclosure and the sled(s) and identify each item. For more information, see the Getting Started Guide and Rack Installation Guide.

2. Install the sled(s).

3. Connect the network cable to the IOM to provide network connection to the sleds. See the figures and tables later in the document for port-mapping.

4. Connect the power supply units to a PDU using the power cables. The power is applied to the CMC automatically.

Figure 7 Back Layout of FX Chassis

![Back Layout of FX Chassis](image)

Figure 8 Front layout of FX Chassis with Quarter-width sleds

![Front layout of FX Chassis with Quarter-width sleds](image)
Figure 9 Front layout of FX Chassis with Half-width sleds

Figure 10 Front layout of FX Chassis with Full-width sleds

Figure 11 Front layout of FX Chassis with FM120x4 sleds
2.2 Configuring the Management Network

Cabling Your CMC

First, select whether you want to use your CMC’s Ethernet port for stacking (“daisy-chained”) or use the two CMC Ethernet ports in a redundant manner. See Table 4 for a chart showing the implications for both options.

Table 3  Stacking vs Redundant Network Cabling

<table>
<thead>
<tr>
<th>Stacking</th>
<th>Redundant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduces the number of networking ports that you take up at the top of the rack.</td>
<td>With multiple chassis there is more cabling required than in the stacking mode.</td>
</tr>
<tr>
<td>A single point of network failure can prevent multiple CMCs from reaching the top of rack connection.</td>
<td>The CMC has an extra connection to the network for use if the primary connection fails.</td>
</tr>
<tr>
<td>No extra setup is required because this is the default mode.</td>
<td>Must change this setting from the default mode before connecting the secondary port.</td>
</tr>
</tbody>
</table>

Which Option Should you Choose?

Stacking is best for customers who would like to take advantage of the cable consolidation feature of the FX2. You should also be comfortable accessing the system through iDRAC using an in-band agent like OpenManage Server Administrator (OMSA) or iDRAC Service Module (iSM) in the rare case of a CMC port failure, because this option does not allow redundant CMC network connections. Dell recommends that customers stack their systems to take full advantage of the cabling reduction benefits of the FX2.

Select the redundant network connection method for a more reliable connection to the management network. For this type of network connection change the default CMC setting before connecting to the network switch.

With either setting (Stacking or Redundant) you have the option to simply connect the GB1 port to the management network and the port labeled STK/GB2 should not be connected. Although this does not directly reduce cabling or provide a redundant connection, it is the quickest way to get an initial management network connection.

Stacking Configuration

See Figure 12 for a visual of how the ports should be connected for stacking.

1. Connect the GB1 port up from the first chassis to the STK/GB2 port of the second chassis
2. Connect the GB1 port of the second chassis to the STK/GB2 port of the third chassis.
3. Connect the GB1 port of the third chassis to the management network.

**CAUTION:** If you are opting to stack your CMC, you can only connect one CMC port on each chassis to the network or uplink. **Connecting both CMC network ports create a network loop when the CMC is configured for stacking.** You cannot have a redundant CMC network connection if you select to stack your chassis. However, note that you can always have access to the iDRAC management features through an in-band agent such as OMSA, even if communication through your CMC port fails. For more information about how to set up OMSA, see the *Dell Server Administrator User’s Guide* on the [OMSA Manuals](#) webpage on Dell Tech Center.

![Figure 12 CMC Stacking](image)

1 Management Network
2 CMC
**Redundant Networking Configuration**

If you select the Redundant setting, you should use the CMC serial port or the standard single network connection to GB1 for deployment first. **The second connection to the STK/GB2 port may only be made after the CMC network is configured.** Instructions for doing this are described in the following section.

### 2.3 Accessing the CMC Web Interface

**Accessing the CMC Web Interface**

At this point, it is easier to use the CMC web interface to complete the rest of the initial FX2 setup, which includes configuring and deploying iDRAC, configuring the servers, and creating server profiles. Other features explained in this document such as FlexAddress and configuring power settings, can also be accomplished using the CMC web interface. See section 2.4 for instructions about how to connect to the network.

To navigate within the CMC web interface, you can refer to a tree diagram in the left pane on the page to see their chassis groups, servers, and I/O modules. The CMC web interface also includes a bar at the top which has the following tabs: Properties, Power, Logs, Network, User Authentication, Alerts, Troubleshooting, Update, and Security. Each of the tabs and sub-tabs help you to your tasks more easily. The screenshot shows the CMC web interface General Settings page.

**Figure 13 CMC Web Interface**
Note the following:

- Throughout this document, the path to access pages is mentioned. For example, to go to the Server Profiles page, click Overview -> Setup -> Profiles. This means, in the left-pane, you must click Chassis Overview. To view more specific sub-tabs, one of which is the Profiles tab, click on the Setup tab on the Chassis Management Controller page.
- The refresh button allows you to refresh the page. You should be aware that refreshing the page using the web browser refresh may log out the system, so always use the refresh button in the CMC web interface.
- The third button in the upper right-hand corner opens the context-sensitive help page, which provides more information about certain features and settings. To access the context-sensitive help, click the question mark button at the top right of the page. The help page displays context that is relevant to the page you are currently on. This makes it easier for you to find answers to the questions quickly, rather than having to scroll through a long page.

To access the CMC web interface:

1. Open a web browser. The default certificate causes a warning on most web browsers. You can continue through to the web interface and replace the default certificate with your own certificate when possible.
2. In the address bar, type the IP address of your CMC and press Enter. This opens the CMC web interface Login page.
3. Log in with the default username and password.
   - Username: root
   - Password: calvin
4. Dell recommends you change your password after your first login, but you may continue using the default if you prefer.

### 2.4 Configuring the CMC Network

To configure the CMC Network, perform the following steps. Instructions for cabling are listed after these steps if you select a redundant configuration.

1. Configure an Ethernet port on a workstation to have a static IP address of 192.168.0.110, with a netmask of 255.255.255.0 and gateway of 192.168.0.1.
2. Connect the Ethernet port directly to the GB1 port of the CMC.
3. Open a browser window (for supported browsers see the CMC release notes) and type the default static IP address of the CMC: 192.168.0.120.
4. Log in to the CMC Web Interface as root (password “calvin”) as described in “Accessing the CMC Web Interface” section.
5. Go to the Network Configuration page at Chassis Overview -> Network -> Network as shown in Figure 3.
6. Record the MAC address.
7. Select the settings that are appropriate for your network environment and select **Apply Changes**. Your current connection to the CMC may get disconnected and may have to reconnect based on the settings you just changed.

**NOTE:** If you have chosen DHCP, the CMC must now be connected to a network with an active DHCP server, and you must either find the assigned address on the DHCP server (using the MAC address recorded in step 6) or log in to the CMC serial port (115200,8,n,1) and examine the output of the command `getniccfg -m chassis`. In the upcoming general release, the CMC network settings can also be accessible from any server console in the KVM through the iDRAC pre-boot environment HII menu under “CMC Network Settings link”

At this point, if you have chosen “Redundant” for the Management Port 2 setting (STK/GB2), you may connect the STK/GB2 port to the network. See Figure 15 for a diagram on how to cable up the ports.

---

**Figure 14 Configuring CMC Network**

![Network configuration interface](image)

Chassis Overview

Network (header tab)

Network (sub-tab)
Chassis Power Management

The FX2 or FX2s chassis power management features can be accessed through the CMC’s web interface. Log in to the web interface and go to the **Chassis Overview ➔ Power ➔Power Monitoring** page. On the **Power Monitoring** (and Budget Status) page, you can view status and statistics for the overall chassis, and also the types of individual servers selected. The **Budget/Redundancy Configuration** page (**Chassis Overview ➔ Power ➔ Configuration**) enables you to set the chassis power parameters, including chassis power capping and power supply redundancy policy.
To continue the configuration of the chassis you must apply power to the infrastructure, which turns on the IOMs and iDRACs. On or off control of the chassis is located on the separate **Chassis Overview ➔ Power ➔ Control** page. On this page, select the **Power On System** option and click **Apply**. Power is applied to the chassis infrastructure components, which initializes during the next minute.
2.5 Configuring iDRAC Networking

To setup the iDRAC management network on your servers, you can use the CMC Web Interface’s iDRAC Deploy page if you have a CMC Enterprise License. Log in to the CMC web interface and go to Server Overview → Setup → iDRAC. As you scroll down the page you can see network settings for each server. Enter the required settings on this page. Scroll to the bottom and select Apply iDRAC Network Settings to have the CMC send these settings to the iDRACs. It may take a minute for the iDRACs to incorporate the changes. To verify the current iDRAC settings click the refresh button available on top of the page.
For more information, see the *CMC User’s Guide* for the FX2/FX2s section on “Configuring iDRAC Network Settings”.

### 2.6 Accessing the Server Console

To access the server console, the servers must first be turned on using the CMC Web Interface. To turn off the servers, click **Server Overview** \(\rightarrow\) **Power** \(\rightarrow\) **Control**. On the Power Control page, select **Power On Server** from the drop-down list for the server you want to turn on, and click **Apply**. You can also select all the servers to be turned on simultaneously.

The console for the server can be accessed in several ways. There is physical KVM access from the front of the chassis (fig. 2). For more information about how to connect through physical KVM, refer to the *User’s Guide*. With an Enterprise license on the iDRAC, a more convenient method is to use the virtual KVM available from both the CMC and iDRAC Web Interface. On the CMC, for both Express and Enterprise licenses, to find the **Remote Console** button click **Server Overview** \(\rightarrow\) **Power** \(\rightarrow\) **Control**. The **Remote Console** button is next to the button for launching the iDRAC Web Interface. Selecting the **Remote Console** button directly opens a separate window in which the console is displayed. The server console is used for initial configuration of the server.
Server Profiles

After configuring a server for an operation, a CMC with an Enterprise license can record the server’s configuration settings in a profile. The profile can then be used as a standard configuration pattern for other servers. The application of a profile to a server is much simpler and faster than the configuration of individual settings.

Log in to the CMC web interface and go to Server Overview → Setup → Profiles. The Profiles page displayed enables you to create, manage, and apply profiles to the servers in this chassis. The top section has links for saving, selecting, and applying profiles, along with check boxes to select the server(s) to which the operation is immediately applied. The middle section is an inventory of the profiles currently available on the CMC SD card, including the names and descriptions that were entered when the profile was created. You can also store and retrieve profiles from a network share in this section. Further down the page is a section for the configuration of QuickDeploy. This feature automatically applies a slot-assignable profile to a server that is inserted into the chassis.
FlexAddress

The FlexAddress feature comes with the Enterprise license that eliminates the need to reconfigure Ethernet network management tools and SAN resources for each new server module you insert.

FlexAddress allows CMC to assign WWN or MAC IDs to a particular slot and override the factory IDs. Therefore, if the server module is replaced, the slot-based WWN or MAC IDs remain the same. This feature eliminates the need to reconfigure Ethernet network management tools and SAN resources for a new server module. Additionally, the override action only occurs when a server module is inserted in a FlexAddress enabled chassis, no permanent changes are made to the server module. If a
server module is moved to a chassis that does not support FlexAddress, the factory-assigned WWN or MAC IDs is used, only for the server LOMs or NDC ports. The same does not apply to the PCIe cards. For more information about Flex Address, refer to the FX2 Chassis Owner’s Manual.

2.7 Configuring an I/O Aggregator

Management Network Port

An I/O Aggregator (IOA) provides a flexible networking resource that can be configured to meet your requirements. To setup the IOA, go to I/O Module Overview → 10 GbE KR → Setup → Deploy and configure the settings for the out-of-band management interface. This networking port is available through the CMC networking connector.

VLAN Management

The CMC facilitates VLAN assignment through the IOA. Go to I/O Module Overview → Setup → VLAN Manager and note the current setup of VLANs. You can graphically select the IOA, server(s), and port ranges, and then specify VLAN tagging for that combination. The summary of the current configuration is displayed in the bottom two sections of the page.

For more information, see the CMC User’s Guide for the FX2/FX2s sections on “Managing Network Fabrics” and “Using VLAN Manager.”
Figure 21  I/O Aggregator VLAN Manager
A Additional resources

- *FX2 Chassis Owner's Manual*
- *FX2 CMC User's Guide*
- *Getting Started Guide and Rack Installation Guide*
- *Dell Server Administrator User’s Guide* on the [OMSA Manuals](OMSA Manuals) page
- *FX2 CMC RACADM Guide*
- *iDRAC with Lifecycle Controller Quick Start Guide*
- *iDRAC7 User Guide*