



# **Crestron Fusion<sup>®</sup> On-Premises Software**

## Enterprise Management Platform

Best Practices  
Crestron Electronics, Inc.

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# Contents

- Overview** **1**
  
- Configuration and Setup** **1**
  - Crestron Fusion Server Configuration..... 1
  - SQL Server® Database Configuration..... 2
  - Client Hardware Requirements..... 2
  - Crestron Fusion Web Client Workstation Requirements ..... 2
  - Microsoft Exchange Configuration..... 3
  - IBM® Software Configuration..... 3
  - R25® Web Services Database Configuration ..... 3
  - Google Calendar™ Configuration..... 3
  
- Crestron Fusion Installation** **4**
  
- Crestron Fusion Log in and Configuration** **4**
  
- Control System Programming** **5**
  
- Capture HD® System Requirements** **5**
  - Hardware Requirements ..... 5
  - Networking Requirements..... 5
  - FTP Server Requirements ..... 6
  - Transcoding Server Requirements ..... 6
  
- Transcoding** **6**
  
- Crestron PinPoint™ App** **6**
  
- Fusion Insite** **8**
  - Obtaining and Optimizing the Revit® Software File ..... 8
  - Exporting the Revit File to IFC Format ..... 8
  - Importing an IFC Building Model to Crestron Fusion ..... 8
  
- For More Information** **8**



# Crestron Fusion On-Premises Software: Enterprise Management Platform

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## Overview

The recommendations in this guide are considered best practices in preparation for the provisioning of the Crestron Fusion On-Premises (version 10.2) software. Before provisioning the Crestron Fusion server, compare the information in this guide with the proposed system to be sure the best practices are followed.

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## Configuration and Setup

### Crestron Fusion Server Configuration

The Windows® server (where Crestron Fusion is installed) should meet or exceed the configuration as follows:

- **Operating System:** Windows Server® 2008 R2, Windows Server 2012, or Windows Server 2012 R2 operating system with all of the operating system component requirements listed in the Crestron Fusion On-Premises Software Installation Guide (Doc. 7683)
- **Environment:** Java SE Runtime Environment software version 7u79 or higher (if using Fusion Insite technology)
- **Dual Processors:** Two Dual-Core Intel® Xeon® 2.8 GHz processors
- **Memory (RAM):** 8 GB, 16 GB if using Fusion Insite
- **Disk Drive:** Microsoft® corporation recommended disk drive for the operating system or 200 GB, whichever is greater
- **Network Connection:** Gb Ethernet card or better
- **Host:** Single, dedicated VM

## SQL Server® Database Configuration

The SQL Server database must be separate from the Crestron Fusion Server. Configure the SQL Server as follows:

- **SQL Server Version:** SQL Server 2008 R2 or SQL Server 2012
- **Processor:** 4 Core @ 3 GHz
- **Memory (RAM):** 16 GB
- **Network Connection:** Gb Ethernet card or better
- **Communication Protocol:** TCP only; disable named pipes on the SQL Server and do not use
- **Authentication:** Integrated Windows Authentication or SQL Authentication

If it becomes necessary to increase the size of tempdb, spread it out across multiple files or file groups.

The drive capacity should be sufficient to support 10 GB of disk space for data files and 10 GB of disk space for transaction logs.

The database administrator should implement a plan for nightly data backups. This keeps the transaction logs at an optimal size.

The Crestron Fusion database recovery model in SQL Management Studio should be set to Simple, unless the database administrator requires Full.

On a weekly basis, the database administrator should implement a maintenance plan that reorganizes indexes and updates statistics.

The database administrator should implement a plan to monitor the overall health and disk space of the SQL Server.

## Client Hardware Requirements

The Crestron Fusion client hardware requirements are as follows:

- 8 GB of RAM with at least 256 MB of graphics memory
- WebGL should work with all graphics cards that support OpenGL 2.1 (or higher). This applies mainly to all contemporary graphics cards and the latest integrated graphics chips.
- It is recommended to install the latest Windows drivers for the graphics card.

## Crestron Fusion Web Client Workstation Requirements

The Crestron Fusion web client workstation requirements are as follows:

- Screen resolution should be a minimum of 1280 x 1024 with 24-bit color quality.

The Crestron Fusion browser requirements are as follows:

- Internet Explorer® browser version 10.0 or later, if using Fusion Insite version 11 or higher (Windows operating system)
- Firefox® browser version 42.0 or later
- Chrome™ browser version 47.0 or later
- Safari® browser version 9.0.1 or later

## Microsoft Exchange Configuration

Microsoft Exchange should be configured as follows:

- **Version:** Use Microsoft Exchange 2010 or Microsoft Exchange 2013 with Exchange Web Services (EWS) Managed (preferred).
- **Server Components:** Follow the Microsoft Exchange best practices for configuration.
- **Account to access Resources:** The accounts used must have their own mailbox. Impersonation is required for Office 365® software and is recommended for on-premises installations of Exchange 2013 and higher.
- **Room Calendars:** Set up calendars as Exchange resources; validate them by adding one meeting via Microsoft Outlook® software.

## IBM® Software Configuration

IBM Domino® and IBM Notes® software should be set up with the Domino and Notes Client at version 8.5 or later. Ensure that the Domino account is set up without a mailbox, with read and write access to resource reservations, and read access to the Domino directory.

The IBM Notes client must be installed on the Crestron Fusion server, using the same service account that the Creston Fusion services uses. The IBM Domino Names database must be replicated on the Crestron Fusion server and be referenced by the Notes client application.

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**NOTE:** Refer to the Crestron True Blue Online Help for Domino and Notes (formerly Lotus Notes® software) Answer IDs.

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## R25® Web Services Database Configuration

The R25 web services database should be configured as follows:

- Do not select the **Enable New Meeting Detection** check box or the **Enable Room Actions** check box unless it is necessary.
- If the R25 Web Services Database is on the SQL Server, set the **Parameterization** option to **Forced**.
- If the R25 Web Services Database is on an Oracle® server, ensure that **Cursor Sharing** is set to **Forced**.
- Ensure that a plan to maintain the integrity of the database is in place.

## Google Calendar™ Configuration

The Google Calendar application should be configured as follows:

- The Google® API application must be activated and the Google Calendar API service on the domain must be enabled.
- The Google API console should be used to create the OAuth credentials and the Google service account.
- Each physical meeting room must have a Google room resource account.

- Security can be configured so that the room resource account calendars can be shared with the service account.

Alternately, security can be configured to globally elevate the service account privileges to avoid sharing calendars.

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## Crestron Fusion Installation

When installing Crestron Fusion, refer to the following best practices:

- The installer's account must have local Administrator rights on the Crestron Fusion Server and SQL login rights with the SysAdmin role.
- The IIS and SQL Authentication should be Windows integrated.
- The domain account under which the Crestron Fusion services run must have database owner rights on the database.
- On the Crestron Fusion Server, all services should be run under a single domain account, including the associated Web App Pools.
- SMTP Authentication is needed using the appropriate network SMTP credentials.
- The Service ID must have SMTP Send Rights.
- Firewalls and Access Control Lists should be set to permit the bidirectional flow of data on the default Crestron Fusion ports: 80, 443, 41794 to 41797, and 65206 (for EWS).
- Service Logging should be set to **Normal**.
- If the server is not on an internal network, consider setting up IIS for https only and install a certificate on the server.

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## Crestron Fusion Log in and Configuration

When logging in and configuring Crestron Fusion for the first time, use the following overall order of operations to create the following; geographic regions, tree hierarchy, asset types, roles, users, attributes (Auto-discover plays a part in this), room templates, and rooms using templates.

- When logging in for the first time, fill out the profile to include the local time zone and contact e-mail address. Select the option to receive e-mails.
- Set the web application default refresh rate to no less than 15 seconds.
- Use Active Directory Domain Groups and Domain User Accounts, if using Windows Authentication.
- Design and set up the local geographic region before adding any nodes or rooms to the database.
- Keep the tree and node hierarchy to four or five nodes deep (e.g., Continent, Country, State, City, and Building).
- Create attributes before adding rooms. Crestron® designers recommend using the Auto-discover feature of Crestron Fusion to automatically add attributes to the database.



- Create room templates suitable for the environment.
- Add rooms to the database using room templates.
- Choose the appropriate room calendar type.
- Enable database logging only for attributes needed for reporting.

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## Control System Programming

During the installation, configure the control system as follows:

- Use Symbol Crestron Fusion Room to ensure compatibility with Crestron Fusion.
- Use a 3-Series Control System® platform.
- Use Crestron modules (supplied) for device usages, help requests, scheduling, and error logging.
- Sample high-volume data before it is sent to Crestron Fusion. For example, the output of ramping analog signals, such as lighting level, can change quickly. This type of signal should be gated before it is sent to Crestron Fusion.

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**NOTE:** Processors connecting inbound to the Crestron Fusion application are automatically discovered as inactive rooms under the Root Node. Move either the room or its symbols to the appropriate destination Node or room, respectively.

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## Capture HD® System Requirements

The requirements for deploying a Capture HD recorder are as follows:

### Hardware Requirements

- For the Crestron Fusion transcoding server and the Crestron Fusion monitoring server, the SQL Server must be a separate physical server.
- There must be at least one Capture HD recorder per recorded room.
- The Capture HD recorder hostname should be edited to reflect the name of the room where it is installed (alphanumeric characters only).

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**NOTE:** The Capture file naming format is *hostname-timestamp*. Naming the Capture HD recorder to reflect the room name makes sorting the day's recordings manageable in large facilities.

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### Networking Requirements

- All servers must be in the same Active Directory domain unless an offsite LMS is used.

## FTP Server Requirements

- The FTP Server should be installed on the transcoder.
- There must be a separate FTP account for each Capture HD recorder for the best security. Each account must have write and modify permissions.

## Transcoding Server Requirements

- The transcoding load must be tailored to match the capabilities of the Transcoding Server's processor.
- The default settings for resolution and video quality must be used.

For more information on the CaptureLiveHD® system, refer to the CaptureLiveHD Design Guide (Doc. 4552).

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## Transcoding

Transcoding is a processor-intensive activity requiring the consideration of the number of threads supported by the CPU in the Transcoding Server. This information can be found on the CPU manufacturer's website.

To maximize CPU utilization, set the **Number of Concurrent Transcoding Jobs Per Server** and **Number of Threads to use for each Transcoding Job** fields on the **Media Service and Capture Devices** page of the Configuration web client.

These two settings must be based on the processing power of the server and set so that the number of threads per job multiplied by the number of jobs per server is not larger than the number of threads supported by the CPU. Therefore, if the CPU supports twelve threads, the Transcoding Server is set to process six jobs per server at two threads per job.

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## Crestron PinPoint™ App

When using the Crestron PinPoint app with Crestron Fusion, refer to the following best practices:

- Configure an Active Directory group that includes end users who are authorized to use the Crestron Beacon Setup Pro app. This enforces compliance with the license, especially if not all users in the company are using the app. Record the group name as the Security Group in Crestron Fusion Configuration under PinPoint. The Crestron PinPoint licensing typically specifies a count of licensed users of the application across their personal and company devices.
- Configure an Active Directory group that includes the users who are authorized to use the Crestron Beacon Setup Pro app. Record the group name in the Installer Security Group in Crestron Fusion Configuration under PinPoint.
- Configure the Crestron PinPoint app (client application) to access the Crestron Fusion server so that the app can perform its functions. When on-premises, Crestron PinPoint should be used over a wireless or a VPN connection to access the same network as the Crestron Fusion server, that is, unless a Crestron Fusion server to the Internet is exposed so it can receive connections via the public cellular data network.

- Enable Crestron PinPoint access to Crestron Fusion from the cellular network to establish the server on the DMZ as follows:
  - Obtain a DMZ connection to the Internet through the firewall (on-premises corporate or private hosted) on a static IP address with Port 443 (SSL) connections allowed.
  - Install an additional Crestron Fusion server (for this purpose), for security.
  - Add an SSL certificate to the server (https:// transport). This is a requirement for the Crestron PinPoint app.
  - Create a DNS using the default name fusion-mobile.company.tld (where company.tld is the same as the e-mail domain of the app users) by which the Crestron PinPoint apps can locate the Crestron Fusion server.

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**NOTE:** Refer to the Crestron Fusion online help for complete details.

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- Use multiple company.tld user email domains, if the domains are federated together in one Active Directory. Otherwise, a single company.tld user domain is supported.
- Install the Crestron PinPoint PP-100 beacons to enable the app to range the presence in individual meeting spaces. To effectively configure the beacons, review the following best practices:
  - PP-100 beacons are USB devices and are powered by a 5 V USB power supply. Use a wall charger (available from a third-party vendor) or an available USB host port to supply power to the PP-100.
  - PP-100 beacons should optimally be placed at a central point in the space, typically under the meeting table. Minimize physical obstructions, such as metal table legs or equipment racks.
  - If PP-100s are used in adjacent rooms, avoid placing them along a common wall in close proximity to each other, since PinPoint detection can occur through walls and other obstructions.
  - If PP-100s are used in two rooms that are directly above and below each other, avoid placing PP-100s close to the ceiling in the lower room.
  - The Crestron Beacon Setup Pro app helps determine if the beacon can be ranged properly in the room, and sets the transmission level to avoid overlap with other spaces.

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## Fusion Insite

When using Fusion Insite, refer to the following information:

### Obtaining and Optimizing the Revit® Software File

The building Revit file should be requested and obtained from the building managers of the customer site at least two weeks prior to the Crestron Fusion installation. This allows for sufficient time to troubleshoot any problems that may arise during the import process into Crestron Fusion. Depending on the number of elements within the file and the complexity of those geometrical elements, the file can become quite large and should be optimized before attempting to export into the IFC format.

### Exporting the Revit File to IFC Format

To export the Revit building modeling information to the Industry Foundation Classes (IFC) file format, refer to the recommendations on the [Revit website](#).

### Importing an IFC Building Model to Crestron Fusion

Import an IFC building model into Crestron Fusion, and assign it to a specific node in the Crestron Fusion tree structure using the **Floor Plan** tab on the **Add/Edit Node** dialog box of the Setup web client. Once imported, the building model can immediately be viewed from the **Fusion Insite** tab. Any user logged in with Setup access may view the **Assign Room** tab on the Room Detail overlay to map the appropriate Crestron Fusion room to a space in the model.

When adding a new floor plan file to Crestron Fusion, review the following best practices:

- Once a floor plan is imported onto a node, be aware of the following rules that govern any subsequent imports.
  - A new floor plan cannot be imported onto any higher node (ancestor) of the existing floor plan node.
  - A new floor plan cannot be imported onto any lower node (descendant) of the existing floor plan node.
  - A new floor plan can be imported only onto nodes that are the same level (sibling) as the initial floor plan node.
- An existing floor plan can be overwritten by importing a different IFC file onto the existing floor plan node. After the import is done, please take note of any new or missing IFC spaces reported on the import window. Once noted, make the appropriate room assignment changes to accommodate the new floor plan.

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## For More Information

For more information on these and other procedures in Crestron Fusion, consult the embedded help accessed from the Crestron Fusion interface, or contact the Crestron Fusion Support Group (FSG) at (855-754-5962) or e-mail [fsg@crestron.com](mailto:fsg@crestron.com).

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