Crestron Fusion® Software Dashboard

Enterprise Management Platform

Reference Guide

Crestron Electronics, Inc.

The product warranty can be found at www.crestron.com/legal/sales-terms-conditions-warranties.

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This document was written by the Technical Publications department at Crestron.

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Crestron® Fusion Software Dashboard

Introduction

The ability to create custom, interactive visualizations of data captured by Crestron Fusion is now available through the integration of the Crestron Fusion database with the Microsoft Power BI® business intelligence tool. This document guides the user through the data capture process in three parts.

The first part, "The Crestron Fusion Schema," outlines the schema used by the Crestron Fusion Database. The intent of publishing the schema is to make it easy to locate the data and tables appropriate to retrieving, displaying, and analyzing Crestron Fusion logged data.

The second part, "The Power BI Template - Crestron Fusion Visualization Logic," is a guide to working with Power BI and the Crestron Fusion database.

The third part, "The Crestron Fusion Report Readiness Tool", provides instructions for using the simple included program to analyze an existing Crestron Fusion database for data presence and integrity required for reporting.

Prerequisites

This document is intended for the user with a working knowledge of and experience using SQL.

Reporting success depends upon consistent data collection and accurate data. Following the SSI model in programming ensures that data will be present and properly formatted for report and BI delivery. To help validate the data, please use the Report Readiness Tool.

Disclaimer

Crestron does not support destructive editing, including any write or execute operations that alter the data or existing schema in any way. Please contact FSG for assistance with database analysis, repair, or any data shaping. The schema may change from one version of Crestron Fusion to the next. Verify that any upgrades will not affect existing reports before installing new versions of Crestron Fusion.

The Creston Fusion Schema

The Crestron Fusion database contains hundreds of tables for use by the application. This document does not intend to explain all of the tables. Instead, the focus is on the tables, relationships, and data that are used for logging and reporting.

General Schema Information

The following are guidelines used to generate and store data in the Crestron Fusion database.

- Microsoft® SQL Windows® application is the only database package supported
- All LogTimeStamp entries are in UTC
- All meeting start- and end-times are in UTC
- IDs are typically assigned by the program via RVI files or are automatically generated by Crestron Fusion
- RVI (RoomView Information) files

Core Tables

The following tables contain the property values for the primary objects in Crestron Fusion, such as rooms and assets.

The tables typically include a GUID field that is the Primary Key (PK) for the table. The core tables also include the friendly name for the object, such as the name of the room.

Core tables are related to other tables by associating, or mapping, the GUIDs to each other. For example, the CRV_RoomMeetingMap includes the RoomID and associated MeetingID for the meetings in that room. The mapping tables are not typically required for reporting and are outside the scope of this document.

The following tables constitute the core tables:

- CRV_Rooms: contains all of the room records
- CRV_Attributes: contains all possible signals in the deployment
  Attributes may be part of all, some, or none of the rooms.
- CRV_Assets: contains all of the assets in the deployment
  There are three types of assets: programmed, network, and inventory. Network assets include any asset that Crestron Fusion can connect to directly, like scheduling panels including TMPC-4SM, TSS-752, TSW-760 models. This also includes third-party Crestron connected displays, and Crestron RL systems.
- CRV_Processors: contains all of the processors added to the deployment
  Typically, there is one processor per room. The association between a room and a processor is indirect through the symbol. A working, connected room in Crestron Fusion has three parts: a room definition, a processor, and a symbol. The symbol, representing the Crestron Fusion hooks in a program, is always associated with a processor and cannot exist in the database without the corresponding processor record. Once the symbol is assigned to a room, the association between the room and processor is made and signal status becomes visible in the monitoring interface.
- CRV_Symbols: contains all of the symbols in the deployment
  A symbol is included in the program running on a processor. A symbol cannot exist in the deployment without a processor. There can be multiple symbols per processor but typically, there is one per room per processor.
- CRV_Tree: contains all of the node records for the nodes defined in the tree.

Log Data Tables

The log data tables contain the stored attribute (signal) values collected over time. Storage is based on the attribute logging rules set in the Crestron Fusion web client. Attributes are logged only when they change state, or when a Crestron Fusion connection is made to the control system or device. Crestron Fusion connection is established when a device or control system is started, when a program is loaded or restarted, or when the network connection is reestablished after an interruption.

The following tables represent where log data is stored:

- CRV_AttributeLog: tracks signal/attribute changes at the Room level
- CRV_SignalLog: tracks signal changes at the symbol level. A room can have multiple symbols
- CRV_ErrorLog: is used for error notifications sent to Crestron Fusion
- CRV_UsageLog: is used for Device Usage, Display Usage, System Usage, and Room Usage (ROOM_OCCUPANCY)
- CRV_LogTextLog: is used for custom application that need to store data, may not be used
- CRV_HelpRequest: is not used
- CRV_HelpRequests: contains help ticket records of the help requests opened in each room
- CRV_HelpRequestMessages: is not used
- CRV_HelpResolutionSteps: contains the resolution notes when the ticket is closed
- CRV_HelpResponses: contains responses, and the time/date of each, to the opened help request tickets for each room

Meeting Data Tables

A room defined in Crestron Fusion is typically associated with a scheduling application to provide meeting information that is used for automation and reporting. Crestron Fusion stores elements of the meeting, including subject, organizer, start time, and end time. Additional information is also retained; including meetings made from a scheduling panel, unattended meetings, and cancelled meetings.

The following tables include the relevant meeting data used for reporting:

- CRV_Meeting
- CRV_MeetingInstance
- CRV_MeetingActivity

Live/Current Value Tables

The following tables display the current value of any attribute (signal):

- CRV_RoomAttributeValues
- CRV_SymbolAttributeValues

Core Table Details

The structure of the core tables is described below, including field names, field descriptions and sample SQL queries to gather the most relevant reporting data.

NOTE: In the following tables, rows with green, bolded text are useful for reporting.

CRV_Rooms

CRV_Rooms contain all of the room records.

CRV_Rooms

KEY	NAME	TYPE	SIZE	NULL	DESCRIPTION
PK	RoomID	varchar	50	not null	Unique identifier (GUID)
-	RoomName	nvarchar	128	not null	Friendly room name as defined in Crestron Fusion or associated RVI file
-	RoomDescription	nvarchar	max	null	
-	RoomAlias	nvarchar	255	null	
-	RoomLocation	nvarchar	255	null	Used for Room Booking Wizard, Outlook® software Add-in and PinPoint™ app
-	RoomGroupwareURL	nvarchar	256	null	
-	RoomGroupwareUsername	nvarchar	128	null	
-	RoomGroupwarePassword	nvarchar	350	null	
-	RoomGroupwareUserDomain	nvarchar	128	null	
-	EControlLink,	nvarchar	255	null	
-	WebCamLink	nvarchar	255	null	
-	LocalOffsetIndex	int		null	
-	SecurityMaskInfo	nvarchar	max	null	
-	Created	datetime		not null	Date the record was created
-	LastModified	datetime		not null	Date the record was last changed
-	SendMeetingInvite	char	1	null	
-	GroupwareProviderType	nchar	25	null	The scheduling provider type for the room: Internal, EWS, EWSManaged, External, Google® software, etc.
-	SMTPAddress	nvarchar	512	null	Email address for the resource calendar
FK	GroupID	nvarchar	50	null	Group that the room is assigned to

(Continued on following page)

CRV_Rooms (continued)

KEY	NAME	TYPE	SIZE	NULL	DESCRIPTION
FK	ServerID	nvarchar	50	null	Server that the room is assigned to
-	AssignedToSignalService	bit		null	
-	AssignedToScheduleService	bit		null	
-	TimeZoneID	nvarchar	55	null	
-	Type	nvarchar	10	null	
-	AutoDiscovered	bit		null	
-	RoomAutomationDataChanged	bit		null	
-	TimeClockEventDataChanged	bit		null	
-	Latitude	float		null	
-	Longitude	float		null	
-	TrueUpEarliest	datetime		null	
-	TrueUpLatest	datetime		null	
-	InheritLatitudeLingitude	bit		null	
-	LastCalendarUpdated	datetime		null	
-	AdjacentLocation	nvarchar	255	null	Used for PinPoint app
FK	EndPointType	nvarchar	50	null	
-	AirMediaInfo	varchar	max	null	Used for PinPoint app
-	Capacity	int		null	
FK	RoomCategory	nvarchar	50	null	Lists the room type (Huddle, Conference, etc.). Default list included with Crestron Fusion, but is easily customizable. Required for many visualizations

Use the following SQL query to add this table to the Power Bi data set:

```
SELECT RoomID, RoomName, RoomLocation, GroupwareProviderType, SMTPAddress,
GroupID, ServerID, Latitude, Longitude, AdjacentLocation, AirMediaInfo, Capacity,
RoomCategory FROM CRV_Rooms
```

CRV_Attributes

CRV_Attributes contain all possible signals in the deployment. Attributes may be part of all, some, or none of the rooms.

CRV_Attributes

KEY	NAME	TYPE	SIZE	NULL	DESCRIPTION
PK	AttributeID	varchar	50	not null	Unique identifier (GUID)
-	AttributeName	nvarchar	128	not null	Friendly attribute name as defined in Crestron Fusion or associated RVI file
-	AttributeType	char	1	not null	"D", "A", or "S" - Digital, analog, or serial
-	DefaultJoin	int		not null	
-	DefaultSlot	varchar	20	not null	
FK	GraphicSetID	varchar	50	Null	
-	XMLName	nvarchar	128	not null	
-	DefaultMinValue	int		Null	
-	DefaultMaxValue	int		Null	
-	DefaultIOMask	int		not null	
-	LogicalOperator	nvarchar	128	Null	
-	Reserved	char	1	Null	
-	ButtonOnText	nvarchar	128	Null	
-	ButtonOffText	nvarchar	128	Null	
-	ButtonChangeText	nvarchar	128	Null	
-	LogAttributedb	char	1	Null	
-	LogAttributeNTEvent	char	1	null	
-	LogCriteria	nvarchar	max	null	
-	SecurityMaskInfo	nvarchar	max	null	
-	Created	datetime		null	
-	LastModified	datetime		null	
-	TargetAttributeID	varchar	50	null	
-	DefaultAttribute	char	1	null	

Use the following SQL query to add this table to the Power Bi data set:

```
SELECT AttributeID, AttributeName, AttributeType FROM CRV_Attributes
```

CRV_Assets

There are three categories of assets in Crestron Fusion based on their connection properties.

- Network Connected Assets are devices that Crestron Fusion can connect to directly without a control system. An associated driver defines the attributes (signals) that convey status and data to Crestron Fusion.
- Programmed Assets are assets defined in a program, typically conveyed to Crestron Fusion through an RVI file transfer. Crestron Fusion cannot directly connect to programmed assets; instead, Crestron Fusion receives status and data for programmed assets via the program running on the system where the asset is connected
- Asset connection type “None” are assets used for inventory tracking.

CRV_Assets

KEY	NAME	TYPE	SIZE	NULL	DESCRIPTION
PK, FK	AssetID	varchar	50	not null	Unique identifier
-	AssetName	nvarchar	255	not null	Friendly asset name as defined in Crestron Fusion or associated RVI file
-	SerialNumber	nvarchar	255	null	
FK	AssetTypeID	varchar	50	not null	Category that this asset is assigned to - used for reports
-	AssetTag	nvarchar	255	null	
-	MACAddress	nvarchar	20	null	
-	DateOfPurchase	datetime		null	
-	WarrantyExpiration	datetime		null	
-	Make	nvarchar	255	null	
-	Model	nvarchar	255	null	
-	Notes	nvarchar	Max	null	
-	LifeSpanYears	Int		null	
-	IPAddress	nvarchar	255	null	
FK	MaintenanceContractID	nvarchar	50	null	
-	ServiceInterval	Int		null	
-	ServiceIntervalIncrement	nvarchar	50	null	
-	LastService	datetime		null	
-	SecurityMaskInfo	nvarchar	Max	null	
-	Created	datetime		null	
-	LastModified	nvarchar	50	null	
-	RoomConfigured	char	1	null	

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CRV_Assets (Continued)

KEY	NAME	TYPE	SIZE	NULL	DESCRIPTION
FK	DriverID	varchar	50	null	Associated driver for Network connected assets
-	ConnType	nvarchar	255	null	Programmed assets = “Symbol”, Network assets = “ActiveCNX”, or “None”
-	Port	Int		null	
-	Password	nvarchar	350	null	
-	UseSSL	char	1	null	
-	Status	nvarchar	50	null	
FK	SymbolID	varchar	50	null	
-	SymbolSlotNumber	varchar	20	null	
-	IPID	Int		not null	
-	HostServer	varchar	255	null	
-	ConnectionDirection	nvarchar	255	null	
-	Key	nvarchar	50	null	
-	LastBootDate	datetime		null	If available, the last time the asset was started
-	FirmwareVersion	nvarchar	50	null	If available, the firmware version of that device
-	FirmwareVersionDateTime	datetime		null	If available the date of the current firmware version
-	ConnectionDirection	nvarchar	50	null	“Inbound”, “Outbound”, “None”

Use the following SQL query to add this table to the Power Bi data set:

```
SELECT AssetID, AssetName, AssetTypeID, Make, Model, LifeSpanYears, IPAddress,
DriverID, ConnType, SymbolID FROM CRV_Assets
```

CRV_Processors

Processors connect to Crestron Fusion in one of two directions:

- Crestron Fusion-to-Device - Crestron Fusion initiates the connection to the device and retrieves the RVI file.
- Device-to-Crestron Fusion - the device initiates a connection to Crestron Fusion, registers itself, and sends an RVI file defining the room, assets, and attributes that Crestron Fusion will expect.

CRV_Processors

KEY	NAME	TYPE	SIZE	NULL	DESCRIPTION
PK	ProcessorID	varchar	50	not null	Unique Identifier
-	ConnectionInfo	nvarchar	256	not null	IPAddress of the processor
-	CIPPort	int		not null	
-	SecuritCIPPort	int		not null	
-	ProcessorName	nvarchar	128	null	Friendly name of the processor
-	Location	nvarchar	128	null	
-	UserName	nvarchar	64	null	
-	UserPassword	nvarchar	350	null	
-	XMLFileDate	datetime		null	
-	SecurityMaskInfo	nvarchar	max	null	
-	Created	datetime		not null	
-	LastModified	datetime		not null	
-	MACAddress	nvarchar	20	null	MAC address of the processor
-	Make	nvarchar	255	null	
-	Model	nvarchar	255	null	
-	HostServer	nvarchar	255	null	
-	Key	nvarchar	50	null	
-	LastBootDate	datetime		null	Last time the system was started
-	FirmwareVersion	nvarchar	50	null	
-	FirmwareVersionDateTime	datetime		null	
-	ConnectionDirection	nvarchar	50	null	“Inbound”, “Outbound”, “None”

Use the following SQL query to add this table to the Power Bi data set:

```
SELECT ProcessorID, ProcessorName, Make, Model, LastBootdate, FirmwareVersion,
FirmwareVersionDateTime, MACAddress, ConnectionInfo, ConnectionDirection FROM
CRV_Processors
```

CRV_Symbols

CRV_Symbols contain all of the symbols in the deployment. A symbol is included in the program running on a processor. A symbol cannot exist in the deployment without a processor. There can be multiple symbols per processor, but typically, there is one per room per processor.

CRV_Symbols

KEY	NAME	TYPE	SIZE	NULL	DESCRIPTION
PK	SymbolID	varchar	50	not null	Unique Identifier for the symbol from RVI or assigned by Crestron Fusion
FK	ProcessorID	varchar	50	not null	The ID of the processor running the program that defines the symbol
-	IPID	int		not null	
-	UseSSL	char	1	null	
-	RoomID	varchar	50	null	The ID of the room where the symbol is associated
-	Version	int		not null	Version of the Crestron Fusion symbol in the program 6, 7, or 8
-	SymbolName	nvarchar	128	null	The friendly name of the symbol
-	XMLName	nvarchar	128	null	
-	AutoDiscover	char	1	null	
-	SecurityMaskInfo	nvarchar	max	null	
-	Created	datetime		not null	
-	LastModified	datetime		not null	
-	HostServer	nvarchar	255	null	

Use the following SQL query to add this table to the Power Bi data set:

```
SELECT SymbolID, ProcessorID, RoomID, SymbolName FROM CRV_Symbols
```

CRV_Tree

CRV_Tree contains all of the node records for the nodes defined in the tree.

CRV_Tree

KEY	NAME	TYPE	SIZE	NULL	DESCRIPTION
PK, FK	TreeNodeID	varchar	50	not null	Unique identifier. Default IDs are ROOT, ROOMS, DISCOVEREDOBJECTS
	ParentNodeID	varchar	50	not null	Unique identifier of the node above in the tree
	Name	nvarchar	128	not null	Friendly attribute name as defined in Crestron Fusion. Default names are ROOT,ROOMS, DISCOVEREDOBJECTS
	SecurityMaskInfo	nvarchar	max	null	
	Created	datetime		not null	
	LastModified	datetime		not null	
	Bluetooth_uuid	varchar	50	null	Populated if a Beacon is associated with the room
	Bluetooth_majorID	Int		null	Populated if a Beacon is associated with the room

Log Data Table Details

The structure of the log data tables is described below, including field names, field descriptions and sample SQL queries to gather the most relevant reporting data.

CRV_AttributeLog

The CRV_AttributeLog tracks signal/attribute changes at the Room level.

CRV_AttributeLog

KEY	NAME	TYPE	SIZE	NULL	DESCRIPTION
-	LogID	varchar	50	not null	
-	AttributeID	varchar	50	not null	
-	RoomID	varchar	50	not null	
-	LogTimeStamp	Datetime		not null	
-	DigitalValue	Char	1	null	
-	AnalogValue	int		null	
-	SerialValue	nvarchar	255	null	
-	xFerStatus	varchar	16	null	

Use the following SQL query to add this table to the Power Bi data set:

```
SELECT AttributeID, RoomID, LogTimeStamp, DigitalValue, AnalogValue, SerialValue
FROM CRV_AttributeLog
```

CRV_SignalLog

The CRV_SignalLog tracks signal changes at the symbol level. A room can have multiple symbols.

CRV_SignalLog

KEY	NAME	TYPE		SIZE	NULL	DESCRIPTION
-	LogID	varchar		50	not null	
-	SignalID	varchar		50	not null	
-	LogTimeStamp	Datetime			not null	
-	DigitalValue	Char		1	null	
-	AnalogValue	int			null	
-	SerialValue	nvarchar		255	null	
-	xFerStatus	varchar		16	null	

Use the following SQL query to add this table to the Power Bi data set:

```
SELECT SignalID, LogTimeStamp, DigitalValue, AnalogValue, SerialValue FROM
CRV_SignalLog
```

CRV_ErrorLog

The CRV_ErrorLog reports error notifications sent to Crestron Fusion.

CRV_ErrorLog

KEY	NAME	TYPE	SIZE	NULL	DESCRIPTION
-	LogID	varchar	50	not null	
-	LogTimeStamp	datetime		not null	
-	LogAction	nvarchar	255	null	
-	RoomID	varchar	50	not null	
-	Severity	Char	1	null	
-	Message	nvarchar	max	null	
-	ErrorID	nvarchar	50	null	
-	Data1	nvarchar	50	null	
-	Data2	nvarchar	50	null	
-	xFerStatus	varchar	16	null	

Use the following SQL query to add this table to the Power Bi data set:

```
SELECT LogTimeStamp, RoomID, Severity, Message FROM CRV_ErrorLog
```

CRV_UsageLog

The CRV_UsageLog is used for Device Usage, Display Usage, System Usage, and Room Usage (ROOM_OCCUPANCY).

CRV_UsageLog

KEY	NAME	TYPE	SIZE	NULL	DESCRIPTION
-	LogID	varchar	50	not null	Unique identifier for the log entry
-	LogTimeStamp	datetime		not null	UTC time the record was created
-	RoomID	varchar	50	not null	Identifies the room recording the usage entry
-	DataType	nvarchar	255	not null	USAGE for devices; CALL for call statistics
-	Data1	nvarchar	255	null	TIME or
-	Data2	nvarchar	255	null	Asset Type
-	Data3	nvarchar	255	null	Asset Name
-	Data4	nvarchar	255	null	Last Number dialed for call statistics can be “Success” or “Failed”; “-“ for device usage.
-	Data5	Int		null	Minutes of usage or call time
-	Data6	nvarchar	255	not null	Call Status for call statistics; “-“ for device usage
-	Data7	nvarchar	255	null	“-“ future use
-	Data8	nvarchar	255	null	“-“ future use
-	xFerStatus	varchar	16	null	

Use the following SQL query to add this table to the Power Bi data set:

```
SELECT LogTimeStamp, RoomID, DataType, Data1, Data2 'Asset Type', Data3 'Asset
Name', Data4 'Last Number', Data5 'Usage Minutes', Data6, Data7, Data8 FROM
CRV_UsageLog
```

CRV_LogTextLog

LogText is a reserved table for custom applications that require storing data in a dedicated SQL table. The LogText table has room for up to five custom fields.

CRV_LogTextLog

KEY	NAME	TYPE	SIZE	NULL	DESCRIPTION
-	LogID	varchar	50	not null	
-	LogTimeStamp	datetime		null	
-	RoomID	varchar	50	null	Identifies the room recording the log entry
-	Message	nvarchar	100	null	Custom field
-	Data1	nvarchar	50	null	Custom field
-	Data2	nvarchar	50	null	Custom field
-	Data3	nvarchar	50	null	Custom field
-	Data4	nvarchar	50	null	Custom field
-	xFerStatus	varchar	16	null	

Use the following SQL query to add this table to the Power Bi data set:

```
SELECT LogTimeStamp, RoomID, Message, Data1, Data2, Data3, Data4 FROM
CRV_LogTextLog
```

Help Desk Data Table Details

NOTE: CRV_HelpRequest is not used.

The structure of the help desk data tables is described below, including field names, field descriptions and sample SQL queries to gather the most relevant reporting data.

CRV_HelpRequests

Contains help ticket records of the help requests opened in each room

CRV_HelpRequests

KEY	NAME	TYPE	SIZE	NULL	DESCRIPTION
PK	HelpRequestID	varchar	50	not null	Unique Identifier for the request
PK,FK	RoomID	varchar	50	not null	Identifies the room originating the ticket
-	Message	nvarchar	max	null	Details of the request
-	MeetingID	nvarchar	50	null	Not used
-	Organizer	nvarchar	255	null	Not used
-	Status	nvarchar	10	null	
-	Type	nvarchar	10	null	
-	Severity	Int		null	
-	OpenedDate	datetime		null	Date the help ticket was opened
-	ClosedDate	datetime		null	Date the help ticket was closed
-	Created	datetime		null	Date the record was created
-	LastModified	datetime		null	Date the record was modified
-	SymbolID	nvarchar	20	null	The symbol that the request came through
-	HelpRequestStyle	nvarchar	10	null	

CRV_HelpResolutionSteps

CRV_HelpResolutionSteps contain the resolution notes when the ticket is closed.

CRV_HelpResolutionSteps

KEY	NAME	TYPE	SIZE	NULL	DESCRIPTION
PK	HelpResolutionID	varchar	50	not null	
PK	RoomID	varchar	50	not null	Identifies the room originating the ticket
PK	HelpRequestID	varchar	50	not null	
-	Resolution	nvarchar	max	null	
-	UserID	nvarchar	50	null	
-	ResolutionDate	datetime		null	
-	Created	datetime		null	
-	LastModified	datetime		null	

CRV_HelpResponses

CRV_HelpResponses contain responses, and the time/date of each, to the opened help request tickets for each room

CRV_HelpResponses

KEY	NAME	TYPE	SIZE	NULL	DESCRIPTION
PK	HelpResponseID	varchar	50	not null	Unique identifier for the response
PK	RoomID	varchar	50	not null	Identifies the room receiving the response
PK	HelpRequestID	varchar	50	not null	The ID of the request that invoked the response
-	Response	nvarchar	max	null	The message sent
-	UserID	nvarchar	50	null	The Crestron Fusion user sending the response
-	ResponseDate	datetime		null	Date the response was sent
-	Created	datetime		null	Date the DB record was created
-	LastModified	datetime		null	Date the DB record was last changed

NOTE: This query combines relevant data from the three Help Desk Data tables.

```
SELECT r.RoomName, r.RoomID, h.OpenedDate, h.Message, rsp.ResponseDate,
rsp.Response, hrs.ResolutionDate, hrs.Resolution, hrs.ResolutionDate, hrs.UserID
FROM CRV_HelpRequests h       JOIN CRV_Rooms r ON h.RoomID = r.RoomID       JOIN
CRV_HelpResolutionSteps hrs ON h.HelpRequestID = hrs.HelpRequestID       LEFT
OUTER JOIN CRV_HelpResponses rsp ON h.HelpRequestID = rsp.HelpRequestID
```

Meeting Data Table Details

The structure of the meeting data tables is described below, including field names, field descriptions and sample SQL queries to gather the most relevant reporting data.

NOTE: References to iTunes® software indicate field names in the database where Itunes configuration information is stored. Crestron Fusion supports publishing to itunesU for CaptureHD applications.

CRV_Meeting

The CRV_Meeting table contains a copy of the meeting records discovered from the scheduling provider via browsing, scheduling panel operations, or the backfill process.

The subject and organizer for the meeting are stored here, in addition to the start and end time.

For recurring meetings, the CRV_Meeting table only contains root meeting and the recurrence pattern, not the specific instances. The instances are stored in the CRV_MeetingInstance table.

CRV_Meeting

KEY	NAME	TYPE	SIZE	NULL	DESCRIPTION
PK	MeetingID	varchar	50	not null	Unique Identifier assigned by Crestron Fusion
-	MeetingComment	nvarchar	max	null	
-	Created	datetime		not null	
-	LastModified	datetime		not null	
-	isEditable	char	1	not null	
-	isEvent	char	1	null	
-	Organizer	nvarchar	255	null	Organizer defined in the meeting metadata
-	XMLInfo	nvarchar	max	null	
-	MeetingInviteSent	char	1	null	
-	StartTime	datetime		null	Scheduled Start time of the meeting
-	EndTime	datetime		null	Scheduled End time of the meeting
-	Recurrence	nvarchar	1000	null	
-	Subject	nvarchar	250	null	Subject of the meeting
-	Location	nvarchar	250	null	
-	RecurrenceEnd	datetime		not null	
-	RecurrenceCount	int		null	
-	TimeZoneID	nvarchar	255	null	Time zone of the Crestron Fusion user as set in their profile
-	RecordFlag	bit		not null	

(Continued on following page)

CRV_Meeting (continued)

KEY	NAME	TYPE	SIZE	NULL	DESCRIPTION
-	LiveStreaming	bit		not null	
-	RecordingPassword	nvarchar	20	null	
-	BeginCaptureMinutes	int		null	
-	EndCaptureMinutes	int		null	
FK	ProfileID	uniqueidentifier		null	
-	CaptureSize	nvarchar	20	null	
-	LiveStreamingAddress	varchar	20	null	
-	NotifiyOrganizer	bit		null	
-	LastDemoCreated	datetime		null	
-	ItunesAuthor	nvarchar	50	null	
-	ItunesCategories	nvarchar	max	null	
-	ItunesKeywords	nvarchar	50	null	
-	ItunesSubtitle	nvarchar	50	null	
-	ItunesSummary	nvarchar	max	null	
-	ItunesImage	nvarchar	250	null	
-	RssCategories	nvarchar	250	null	
-	ItunesUCategory	nvarchar	10	null	
-	GroupwareMeetingID	varchar	500	not null	Unique Identifier for Exchange meetings defined in Exchange
-	GroupwareAltID	varchar	500	not null	

CRV_MeetingInstance

Use this table for calculating total meeting times.

The CRV_MeetingInstance table contains a record of each individual instance in a recurring meeting as well as a record of any non-recurring single meeting. The subject and organizer are stored in the CRV_Meeting table. The tables are related by the MeetingID field. Each instance of a recurring meeting has the same MeetingID, but each instance of the recurrence has a unique InstanceID. Crestron Fusion keeps a more accurate record of meetings than the scheduling provider. If the organizer deletes a completed meeting after the end time, the record is lost from the scheduling provider forever. Crestron Fusion, however, maintains the record and tags those meetings as “DeletedFromProvider”, a flag that is found in the CRV_MeetingInstance table.

CRV_MeetingInstance

KEY	NAME	TYPE	SIZE	NULL	DESCRIPTION
FK	RoomID	varchar	50	not null	Room identifier for the location of the meeting
FK	MeetingID	varchar	50	not null	MeetingID of the parent meeting record. There may be multiple instances for a recurring meeting that will all have the same MeetingID
-	InstanceID	varchar	500	null	Identifier for the current instance
PK	SeqNumber	int		not null	Unique number to identify the sequence of meetings in a recurring meeting. Relates to the Meeting Activity table.
-	IsAdHoc	bit		not null	Not used
-	Created	datetime		not null	
-	LastModified	datetime		not null	
-	StartTime	datetime		not null	Scheduled start time of the meeting
-	EndTime	datetime		not null	Scheduled end time of the meeting
-	OriginalStartTime	datetime		not null	
-	OriginalEndTime	datetime		not null	
-	Occurred	bit		not null	Indicates that the meeting occurred at the scheduled time.
-	DurationMinutes	int		null	
-	DeletedFromProvider	bit		not null	Flag indicates a meeting deleted from the provider after it occurred. Crestron Fusion keeps a record of this for reporting purposes.
-	Subject	nvarchar	250	null	
-	AltID	varchar	500	null	

CRV_MeetingActivity

The CRV_MeetingActivity table includes additional information about meetings that have been processed or manipulated after the initial booking.

CRV_MeetingActivity

KEY	NAME	TYPE	SIZE	NULL	DESCRIPTION
FK	InstanceSeqNumber	int		not null	Corresponds to the SeqNumber in the MeetingInstance table
-	ActivityType	varchar	20	not null	
-	ActivitySubType	varchar	20	not null	“Declined”, “DeclinedWarning”, CheckInFailed”, CheckinFailedWarning”, “Trimmed”
-	ActivitySource	varchar	20	not null	
-	TimeOfActivity	datetime		not null	
-	Message	nvarchar	max	null	

Use the following SQL query to add this table to the Power Bi data set:

NOTE: This query combines relevant data from the above three meeting tables.

```
SELECT R.RoomName, I.RoomID, M.MeetingID, I.InstanceID, M.Organizer, I.Subject,
I.StartTime, M.StartTime, I.EndTime, M.EndTime, M.GroupwareMeetingID,
M.GroupwareAltID, M.Recurrence, M.RecurrenceEnd, M.RecurrenceCount, I.IsAdHoc,
I.Occurred, I.DeletedFromProvider, A.ActivitySource, A.ActivityType,
A.ActivitySubType, A.Message, A.TimeOfActivity FROM CRV_Meeting MJOIN
CRV_MeetingInstance I ON M.MeetingID = I.MeetingID JOIN CRV_MeetingActivity A ON
I.SeqNumber = A.InstanceSeqNumber JOIN CRV_Rooms R ON I.RoomID = R.RoomID
```

Other Pertinent Meeting Info

The CRV_MeetingActivity table is where Ad Hoc, No Show, End Early, and Extend Meeting information is stored.

The ActivitySource field has the following possible values:

- Device - meeting data processed by a device like a scheduling panel
- WebClient - meeting data processed by the Crestron Fusion web client
- CheckEmails - meeting data processed by Backfill
- Notification - indicates that this activity was generated by a EWS notification.
- Crestron PinPoint™ - meeting data processed by the Crestron PinPoint app

The ActivitySubType field has the following possible values:

- Unknown
- Extended - meetings that have been extended
- CheckinFailed
- Declined – meetings identified as no show
- Removed - meetings that have been deleted
- Reserved - meetings scheduled from the touch panel
- DeclinedWarning - recurring meetings that have a second consecutive no show and Crestron Fusion has sent a warning
- CheckinFailedWarning
- Trimmed – meetings that have been trimmed due to an end meeting early event
- WebClient – operation was performed by the Crestron Fusion web client

The ActivityType field has the following possible values:

- Added
- Deleted
- Updated

To find “Ad Hoc” meetings, use the following query:

```
SELECT * FROM CRV_MeetingActivity
WHERE ActivitySource='Device' AND ActivitySubType ='Reserved'
```

In some cases, the subject may identify Ad Hoc meetings. This may be “Default Subject,” “Ad Hoc Meeting,” “Walk-up Meeting,” or anything else defined as the default meeting subject. If this is a consistent value, identify ad hoc meetings by filtering the subject in the CRV_Meeting table.

To find No Show meetings, use the following query:

```
SELECT * FROM CRV_MeetingActivity
WHERE ActivitySubType ='Declined' OR ActivitySubType ='DeclinedWarning' OR
ActivitySubType ='CheckinFailed' OR ActivitySubType ='CheckinFailedWarning'
```

Live Value Table Details

The structure of the live value tables is described below, including field names, field descriptions and sample SQL queries to gather the most relevant reporting data.

CRV_RoomAttributeValues

This table contains the attribute values for the room. There may be several similar attributes (signals) from different devices aggregated for the room based on logic rules set in the Crestron Fusion setup web client.

CRV_RoomAttributeValues

KEY	NAME	TYPE	SIZE	NULL	DESCRIPTION
PK,FK	RoomID	varchar	50	not null	
PK,FK	AttributeID	varchar	50	not null	
-	RawAnalogValue	int		null	
-	ScaledAnalogValue	int		null	
-	ScaledAnalogValueMin	int		null	
-	ScaledAnalogValueMax	int		null	
-	RawDigitalValue	int		null	
-	ScaledDigitalVaue	int		null	
-	RawSerialValue	nvarchar	max	null	
-	ScaledSerialValue	nvarchar	max	null	
-	ScaleGraphicIndex	int		null	
-	SignalLastReceived	datetime		null	

Use the following SQL query to add this table to the Power Bi data set:

```
SELECT RoomID, AttributeID, ScaledAnalogValue, ScaledDigitalValue,
ScaledSerialValue, SignalLastReceived FROM CRV_RoomAttributeValues
```

CRV_SymbolAttributeValues

This table provides the individual values of every attribute in the database. In most cases, these will be the same as the values in the CRV_RoomAttributeValues table. In some cases where the room program contains multiple “Fusion Room” definitions in a single room, this table can be used to locate the individual values that are summarized in the CRV_RoomAttributeValues table.

CRV_SymbolAttributeValues

KEY	NAME	TYPE	SIZE	NULL	DESCRIPTION
PK,FK	SymbolID	varchar	50	not null	
PK,FK	AttributeID	varchar	50	not null	
-	RawAnalogValue	int		null	
-	ScaledAnalogValue	int		null	
-	ScaledAnalogValueMin	int		null	
-	ScaledAnalogValueMax	int		null	
-	RawDigitalValue	int		null	
-	ScaledDigitalVaue	int		null	
-	RawSerialValue	nvarchar	max	null	
-	ScaledSerialValue	nvarchar	max	null	
-	ScaleGraphicIndex	int		null	
-	SignalLastReceived	datetime		null	

To view information concerning current room status, that is, if a room is booked, occupied, in-use, or any combination of those states, use the following SQL queries stored in the live data tables:

```
SELECT a.AttributeName, r.RoomName, v.ScaledDigitalValue FROM
CRV_RoomAttributeValues v

JOIN CRV_Attributes a ON v.AttributeID = a.AttributeID

JOIN CRV_Rooms r ON v.RoomID = r.RoomID

WHERE a.AttributeName ='Room Occupied' OR a.AttributeName = 'Meeting in Progress'
OR a.AttributeName = 'System Power'
```

The Power BI Template - Crestron Fusion Visualization Logic

The spaces in a building or campus have behaviors that vary based on the available technology, associated calendars, and business rules dictating who can book the space. A space may have an associated calendar from one of several scheduling providers, or may have no calendar defined. If a space includes an occupancy sensor, there must be a processor to relay the sensor status to the Crestron Fusion software. A processor may also be programmed to track the status of the other devices and sensors in the room.

For example, rooms might consist of the following (the distributed Power BI template uses these room types and business rules and is based on the Crestron Tower public demo at https://fitc-publicdemo.crestronfusion.com. Contact fsg@crestron.com for access to the demo):

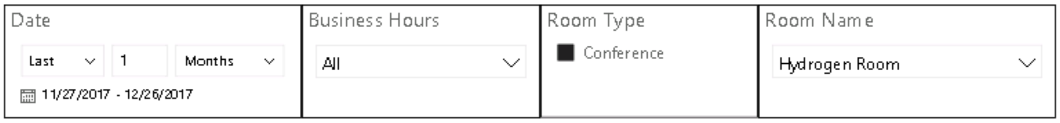
Room Types and Business Rules for the Crestron Tower

ROOM TYPE	CALENDAR	BUSINESS RULE	PROCESSOR/ SYMBOL	OCCUPANCY
Conference Room	Yes	Anyone can book; No Ad Hoc bookings allowed; No Show enabled	Yes	Yes
Huddle Room	Yes	Anyone can book; Ad Hoc bookings allowed; No Show not enabled	Yes	Yes
Office	Yes	Shows the room owner's calendar.	Yes	Yes
Data Center	Yes	Monitor Status, Schedule automation events only	Yes	
Classroom	Yes	Anyone can book	Yes	Yes
Retail	Yes	Schedule automation events only	Yes	No
Open Office Area	Yes	Schedule automation events only	Yes	No
Common Area (includes vestibules, bathrooms, corridors, stairwells)	No	Not currently managed	No	No

Based on these rules, visualizations that include rooms that "anyone" can schedule, described as "bookable" rooms, are limited to Conference Rooms, Huddle Rooms, and Classrooms. Visualizations that show system usage or occupancy, with no scheduling, include a broader subset of rooms with devices monitored by Crestron Fusion. When System Power is on in these rooms, they are "in-use."

Filters

The report data filters typically include date, hour, room type (category), and room name. Not all visualizations include all of the filters, but they can be added if desired.



Date

Last 1 Months

11/27/2017 - 12/26/2017

Business Hours

All

Room Type

■ Conference

Room Name

Hydrogen Room

Report Tabs

The first four tabs show status using current data as of the last refresh time.

1. Current Status Overview

    - There are several gauges on the first tab in the report provided with the template. The room counts depicted by the various gauges and controls vary depending on the data depicted.

        - Monitored Rooms - Rooms that include a processor sending data to the Crestron Fusion application.
        - Rooms Bookable by Anyone - Rooms with calendars that are available for anyone to book. This differs from an office or other space that may have a calendar but is not available to book.

    - Accessing the report does not automatically refresh the dataset.

    - The Last Refresh UTC message indicates the last time the data refreshed to the Power BI service. The data refreshes on demand by invoking a context menu entry from the dataset, or on a schedule defined in the Power BI service.

Last Refresh

12/4/2017 3:46:27 PM

For any report that has been published to the Power BI Service, the time will be UTC. In the Power BI Desktop application, the time will be based on the local system time.

- The data is from the SSI attributes for “Room Occupied,” “Meeting in Progress,” and “System Power,” values stored in the CRV_RoomAttributeValues table.

- Scheduled Rooms - The SSI model includes a digital signal that reports a value of “1” when there is a meeting in progress in that room. “Scheduled Rooms” only include rooms with a scheduling provider defined (other than the “NonBookable” provider), and must include the signal (attribute) “Meeting in Progress.”

    - A room is scheduled when the SSI signal “Meeting in Progress” =1

        - Percent of scheduled rooms = (scheduled rooms) / (rooms with calendars) * 100

    - Occupied Rooms = A room is occupied when the SSI signal “RoomOccupied” =1

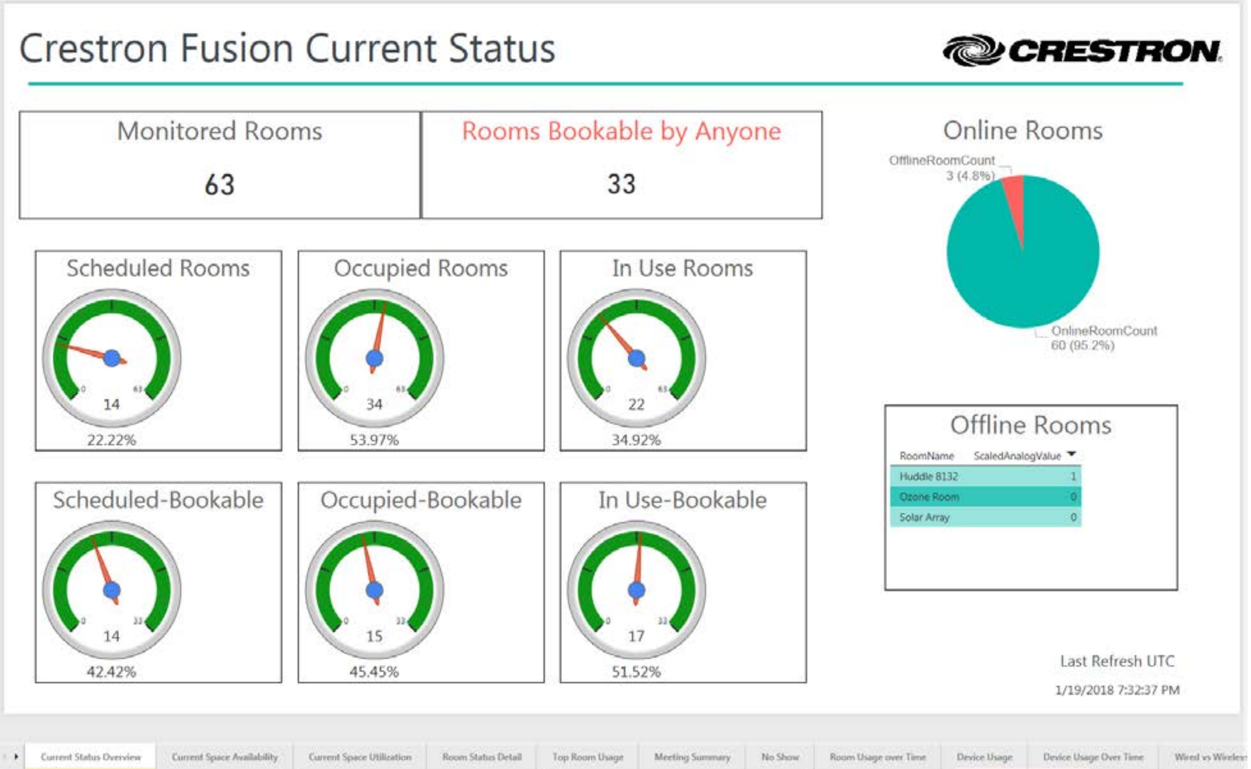
        - Percent of occupied rooms = (occupied rooms) / (rooms with occupancy) * 100

    - In Use Room = A room is in use when the SSI signal “SystemPower” = 1

        - Percent of in-use rooms = (in use rooms) / (rooms with system power) * 100

    - Occupied/Scheduled - What percentage of occupancy of scheduled rooms?

        - Percent of occupied rooms that are scheduled = (occupied rooms)/(scheduled rooms) * 100



Crestron Fusion Current Status

Monitored Rooms: 63

Rooms Bookable by Anyone: 33

Scheduled Rooms: 14, 22.22%

Occupied Rooms: 34, 53.97%

In Use Rooms: 22, 34.92%

Scheduled-Bookable: 14, 42.42%

Occupied-Bookable: 15, 45.45%

In Use-Bookable: 17, 51.52%

Online Rooms

OfflineRoomCount 3 (4.8%)

OnlineRoomCount 60 (95.2%)

Offline Rooms

RoomName	ScaledAnalogValue ▼
Huddle 8132	1
Ozone Room	0
Solar Array	0

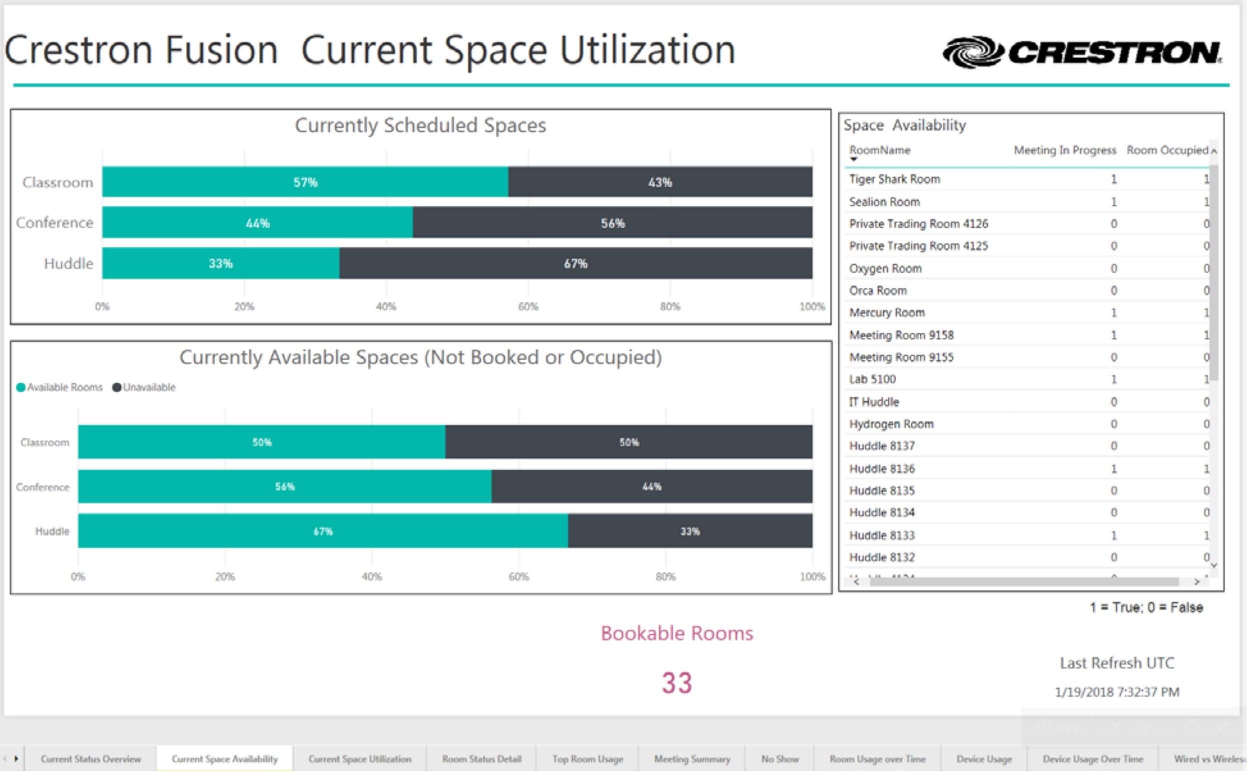
Last Refresh UTC

1/19/2018 7:32:37 PM

2. Current Space Utilization

   There are two visualizations on this tab of the report focused on the “Bookable Rooms,” rooms available for anyone to book. Of that set of rooms, Currently Scheduled Spaces shows the percentage of each room type that is scheduled as compared to that of unscheduled rooms on a 100% scale. Currently Available Spaces looks at both the scheduled status as well as the occupied status (as squatters that have not booked the space may occupy some rooms) and shows the percentage of rooms that are actually available, either not booked or not occupied. This shows the true availability of shared spaces.

   The data is from the SSI attributes for “Room Occupied” and “Meeting in Progress” values stored in the CRV_RoomAttributeValues table.



Crestron Fusion Current Space Utilization

Space Availability

RoomName	Meeting In Progress	Room Occupied
Tiger Shark Room	1	1
Sealion Room	1	1
Private Trading Room 4126	0	0
Private Trading Room 4125	0	0
Oxygen Room	0	0
Orca Room	0	0
Mercury Room	1	1
Meeting Room 9158	1	1
Meeting Room 9155	0	0
Lab 5100	1	1
IT Huddle	0	0
Hydrogen Room	0	0
Huddle 8137	0	0
Huddle 8136	1	1
Huddle 8135	0	0
Huddle 8134	0	0
Huddle 8133	1	1
Huddle 8132	0	0

1 = True; 0 = False

Bookable Rooms

33

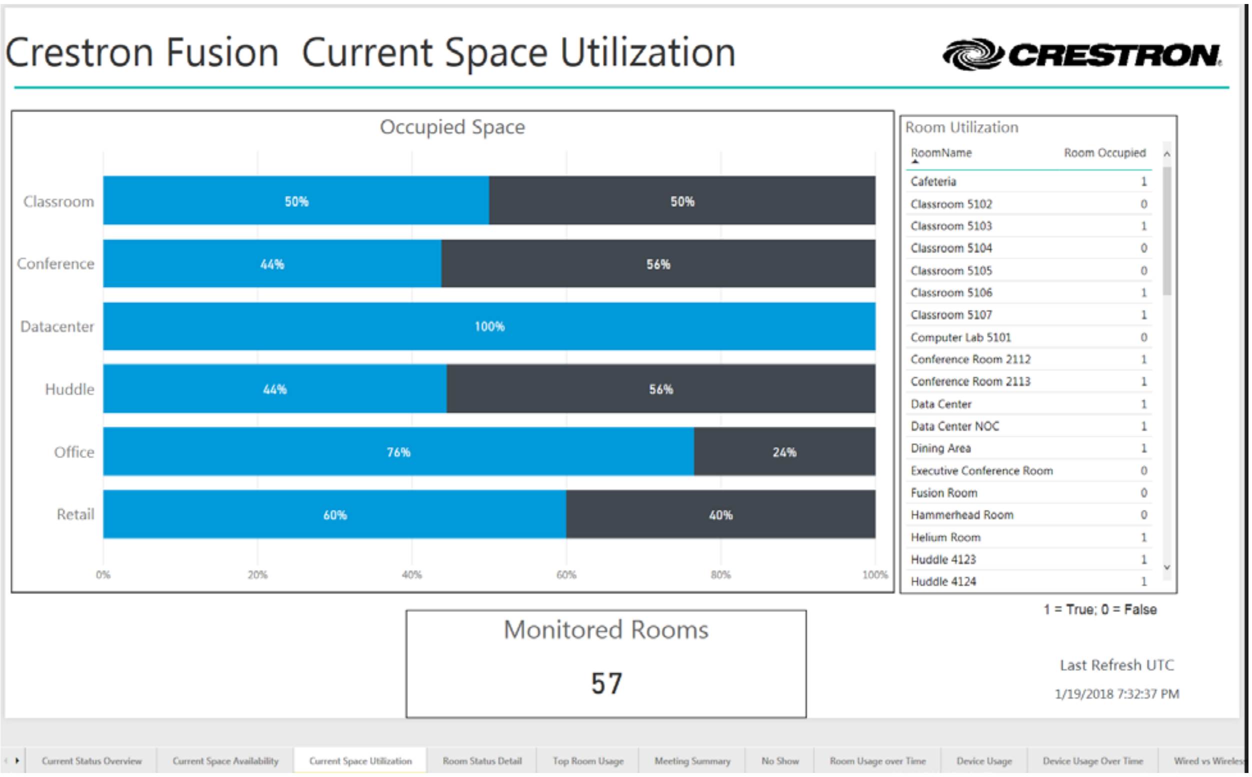
Last Refresh UTC

1/19/2018 7:32:37 PM

3. Current Space Utilization

The visualization on this tab is focused on the “Monitored Rooms.” Monitored Rooms have systems connected to Crestron Fusion that report occupancy. The visualization shows the currently occupied spaces compared to the unoccupied spaces. The table shows occupancy for each room indicated by a “1” (occupied) or a “0” (unoccupied).

The data is from the SSI attribute for “Room Occupied,” values stored in the CRV_RoomAttributeValues table.



Crestron Fusion Current Space Utilization

Room Utilization

RoomName	Room Occupied
Cafeteria	1
Classroom 5102	0
Classroom 5103	1
Classroom 5104	0
Classroom 5105	0
Classroom 5106	1
Classroom 5107	1
Computer Lab 5101	0
Conference Room 2112	1
Conference Room 2113	1
Data Center	1
Data Center NOC	1
Dining Area	1
Executive Conference Room	0
Fusion Room	0
Hammerhead Room	0
Helium Room	1
Huddle 4123	1
Huddle 4124	1

1 = True; 0 = False

Monitored Rooms

57

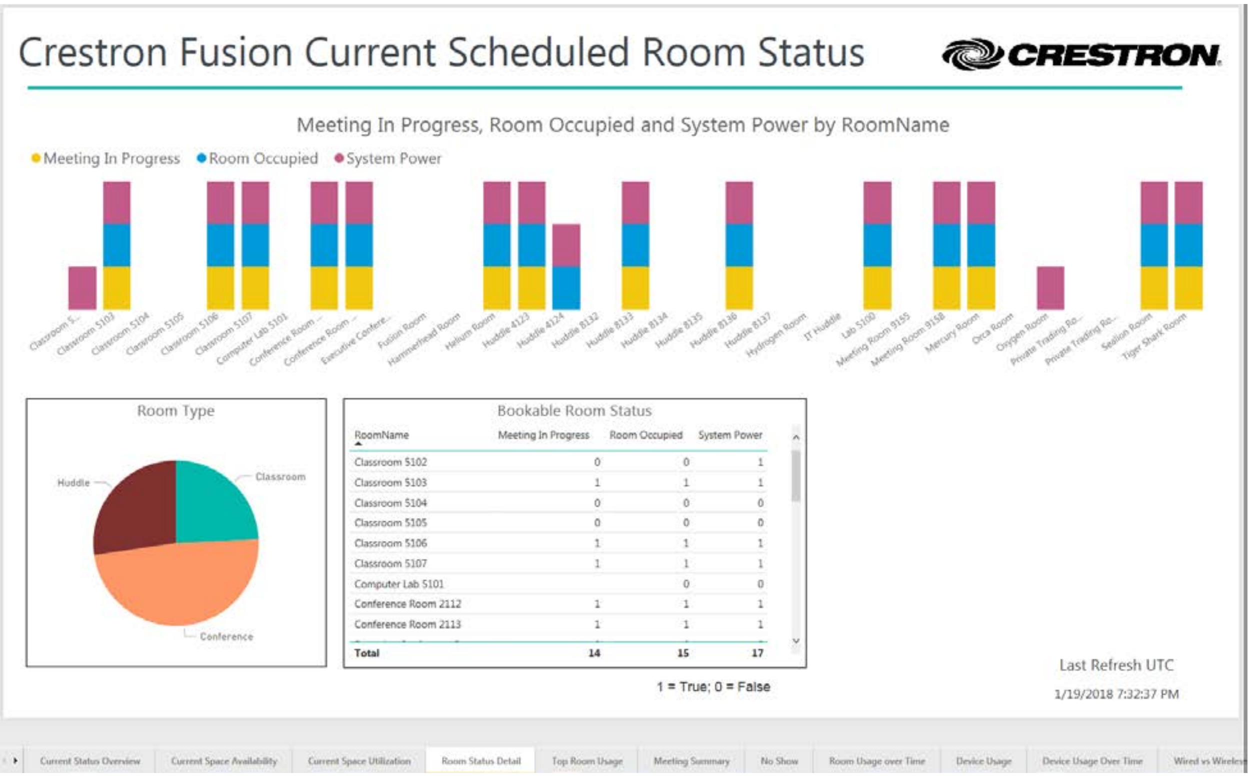
Last Refresh UTC

1/19/2018 7:32:37 PM

4. Current Scheduled Room Status

   This tab in the report contains status on both the space and the technology, including booking, occupancy, and rooms in use. At a glance, identify rooms occupied but not booked, rooms booked but not occupied, and rooms with systems on but vacant. The table shows the room-by-room status for each attribute with a corresponding “1” or “0”. In the table, an empty field indicates that signal is not present in the application and is not available for that room.

   The data is from the SSI attributes for “Room Occupied,” “Meeting in Progress,” and “System Power” values stored in the CRV_RoomAttributeValues table.



Bookable Room Status

RoomName	Meeting In Progress	Room Occupied	System Power
Classroom 5102	0	0	1
Classroom 5103	1	1	1
Classroom 5104	0	0	0
Classroom 5105	0	0	0
Classroom 5106	1	1	1
Classroom 5107	1	1	1
Computer Lab 5101		0	0
Conference Room 2112	1	1	1
Conference Room 2113	1	1	1
Total	**14**	**15**	**17**

1 = True; 0 = False

Last Refresh UTC

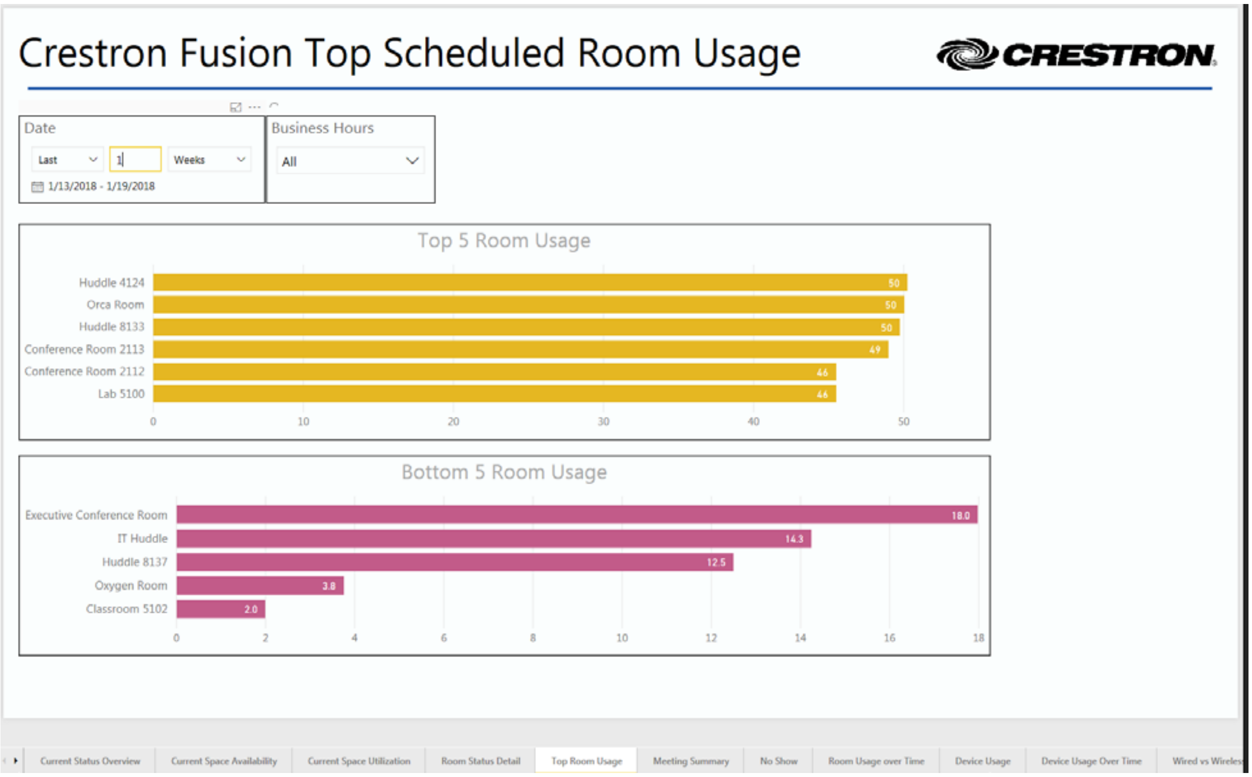
1/19/2018 7:32:37 PM

The remaining tabs focus on historic data for both spaces and technology used in those spaces.

5. Top Scheduled Room Usage

   Top 5 Rooms and Bottom 5 Rooms draw data from the room’s calendar. Only the shared rooms, bookable by anyone, are included in this report.

   In this template based on the Crestron Tower, bookable rooms are of the Classroom, Conference, and Huddle room categories (room types). Different databases and Crestron Fusion deployments may follow different business rules for space usage, and may use different Room Types. Templates may need an initial filter adjustment to align the reports with business data.



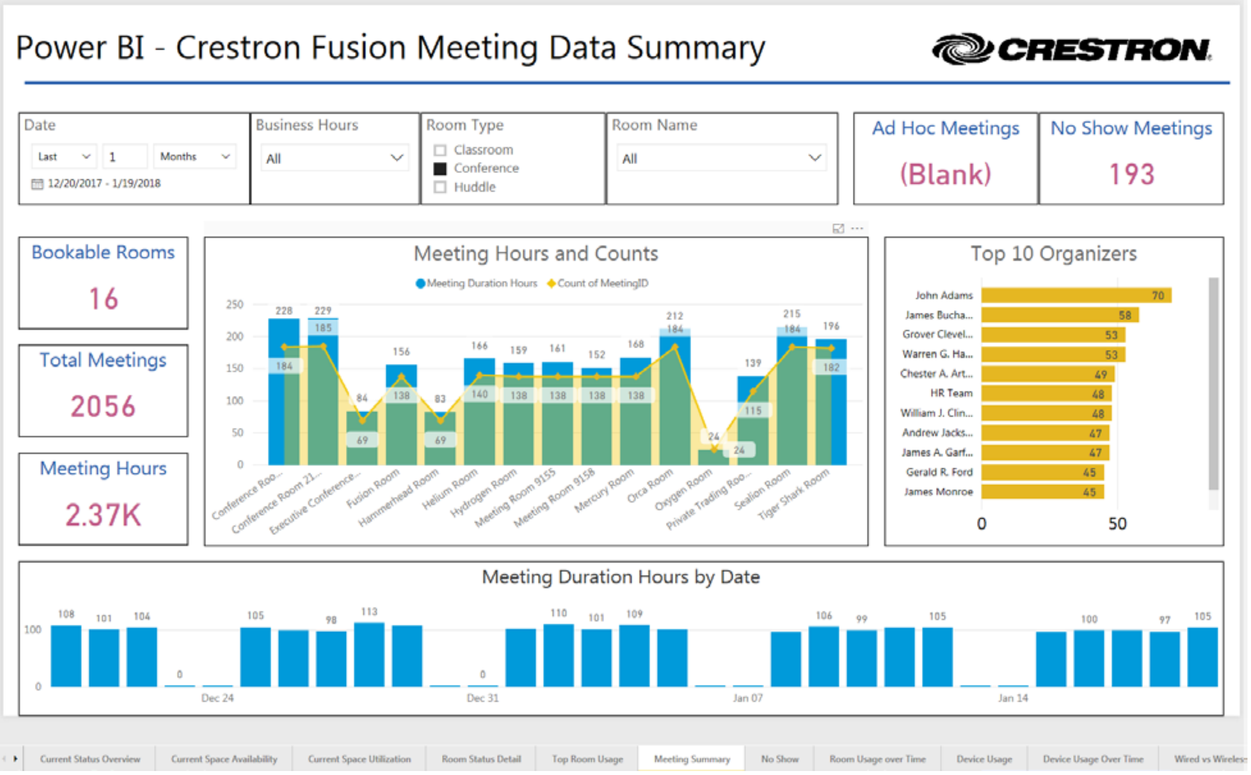
Crestron Fusion Top Scheduled Room Usage

Date: Last 1 Weeks
1/13/2018 - 1/19/2018

Business Hours: All

6. Meeting Data Summary

This tab in the report shows an overview of meeting and scheduling history.



Power BI - Crestron Fusion Meeting Data Summary

Date: Last 1 Months
12/20/2017 - 1/19/2018

Business Hours: All

Room Type:
□ Classroom
■ Conference
□ Huddle

Room Name: All

Ad Hoc Meetings: (Blank)

No Show Meetings: 193

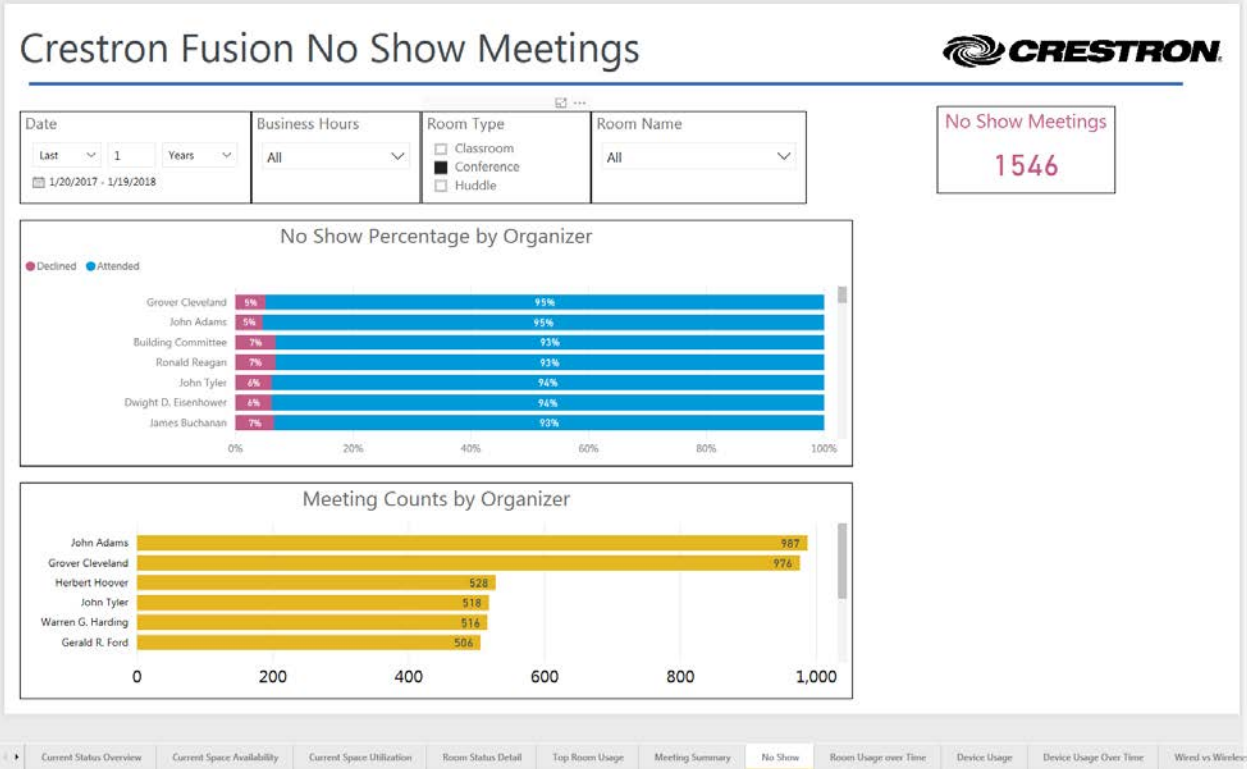
Bookable Rooms: 16

Total Meetings: 2056

Meeting Hours: 2.37K

7. No Show Meetings

The No Show tab presents data regarding organizer activities: how many meetings each organizer creates and the percentage of those meetings that nobody attends, “No Show” meetings. The data is from the Meeting table (organizer), the Meeting Activity table (no-show records), and the Meeting Instance table (meeting counts). The raw No Show meeting count derives from the ActivitySubType field of the Meeting Activity table. The ActivitySubType field may contain one of four possible values indicating a No Show: “Declined,” “DeclinedWarning,” “CheckinFailed,” or “CheckinFailedWarning.”



Crestron Fusion No Show Meetings

Date: Last 1 Years
1/20/2017 - 1/19/2018

Business Hours: All

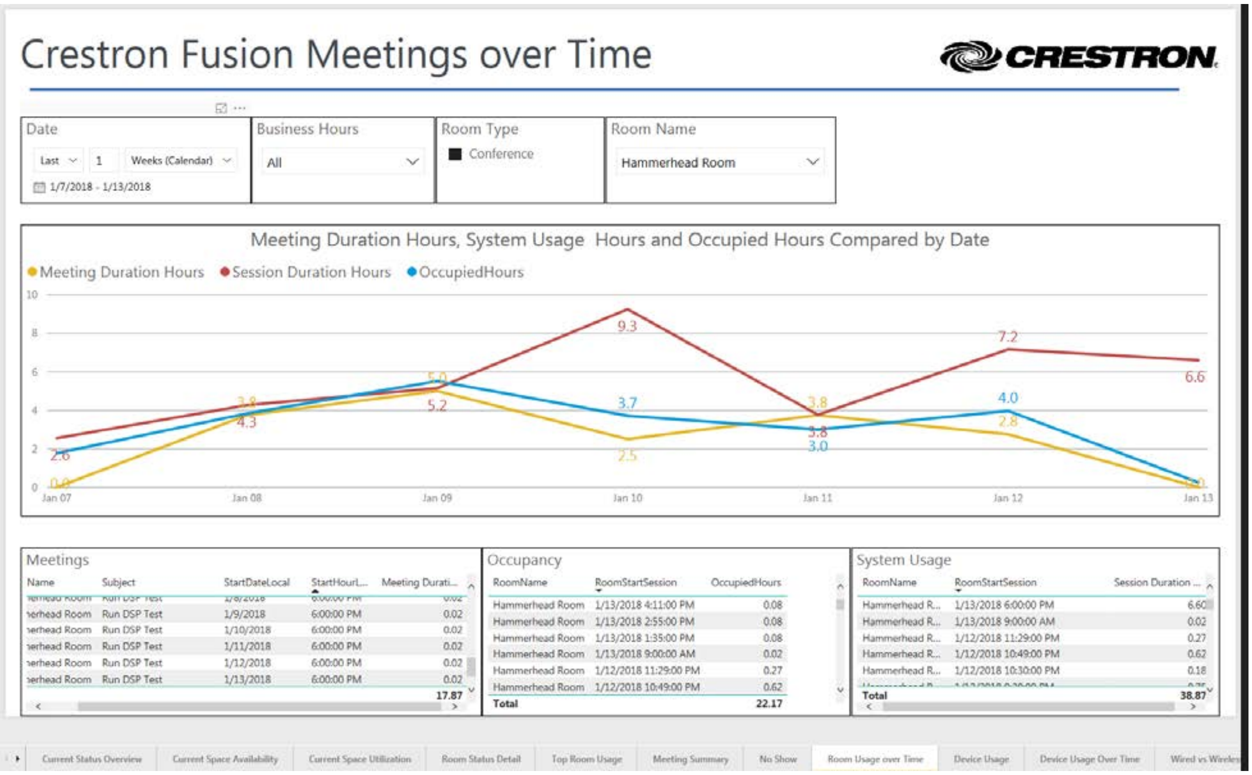
Room Type:
- □ Classroom
- ■ Conference
- □ Huddle

Room Name: All

No Show Meetings
1546

8. Meetings over Time

   This tab includes a line chart comparing meeting duration hours, occupied hours, and hours of system usage over time. Tables for each category show the individual session details. The visualization allows a quick determination of rooms that have squatters (room users that have not booked the space), technology that has been left on, meetings that are not attended. The data is from the UsageLog (system usage), MeetingInstance (meeting durations), and Occupancy (occupancy durations) tables in the dataset.



Crestron Fusion Meetings over Time

Date: Last 1 Weeks (Calendar) — 1/7/2018 - 1/13/2018

Business Hours: All

Room Type: ■ Conference

Room Name: Hammerhead Room

Meetings

Name	Subject	StartDateLocal	StartHourL...	Meeting Durati...
ıerhead Room	Run DSP Test	1/9/2018	6:00:00 PM	0.02
ıerhead Room	Run DSP Test	1/10/2018	6:00:00 PM	0.02
ıerhead Room	Run DSP Test	1/11/2018	6:00:00 PM	0.02
ıerhead Room	Run DSP Test	1/12/2018	6:00:00 PM	0.02
ıerhead Room	Run DSP Test	1/13/2018	6:00:00 PM	0.02
				17.87

Occupancy

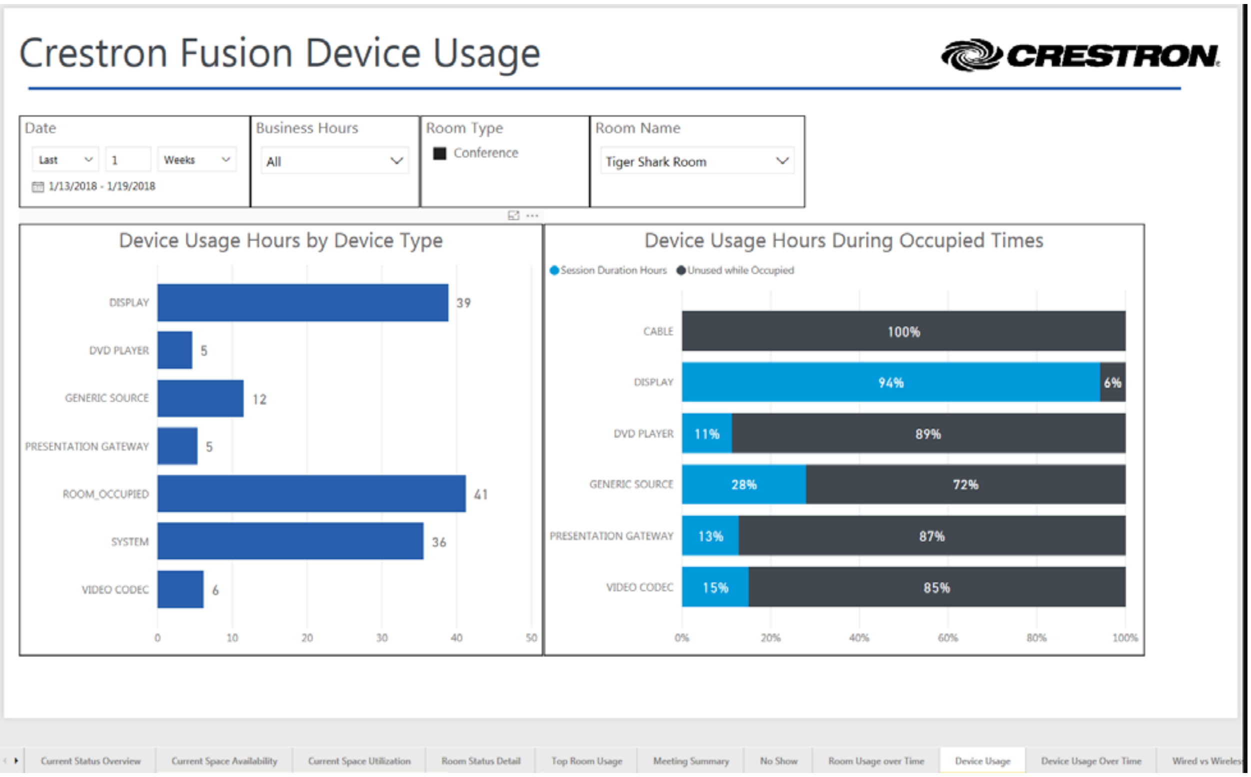
RoomName	RoomStartSession	OccupiedHours
Hammerhead Room	1/13/2018 4:11:00 PM	0.08
Hammerhead Room	1/13/2018 2:55:00 PM	0.08
Hammerhead Room	1/13/2018 1:35:00 PM	0.08
Hammerhead Room	1/13/2018 9:00:00 AM	0.02
Hammerhead Room	1/12/2018 11:29:00 PM	0.27
Hammerhead Room	1/12/2018 10:49:00 PM	0.62
Total		22.17

System Usage

RoomName	RoomStartSession	Session Duration ...
Hammerhead R...	1/13/2018 6:00:00 PM	6.60
Hammerhead R...	1/13/2018 9:00:00 AM	0.02
Hammerhead R...	1/12/2018 11:29:00 PM	0.27
Hammerhead R...	1/12/2018 10:49:00 PM	0.62
Hammerhead R...	1/12/2018 10:30:00 PM	0.18
Total		38.87

9. Device Usage

This report tab shows devices in use in occupied spaces, as well as an overall comparison of device type usage showing the most used devices. The data is from the UsageLog table in the dataset.



Crestron Fusion Device Usage

Date: Last 1 Weeks
1/13/2018 - 1/19/2018

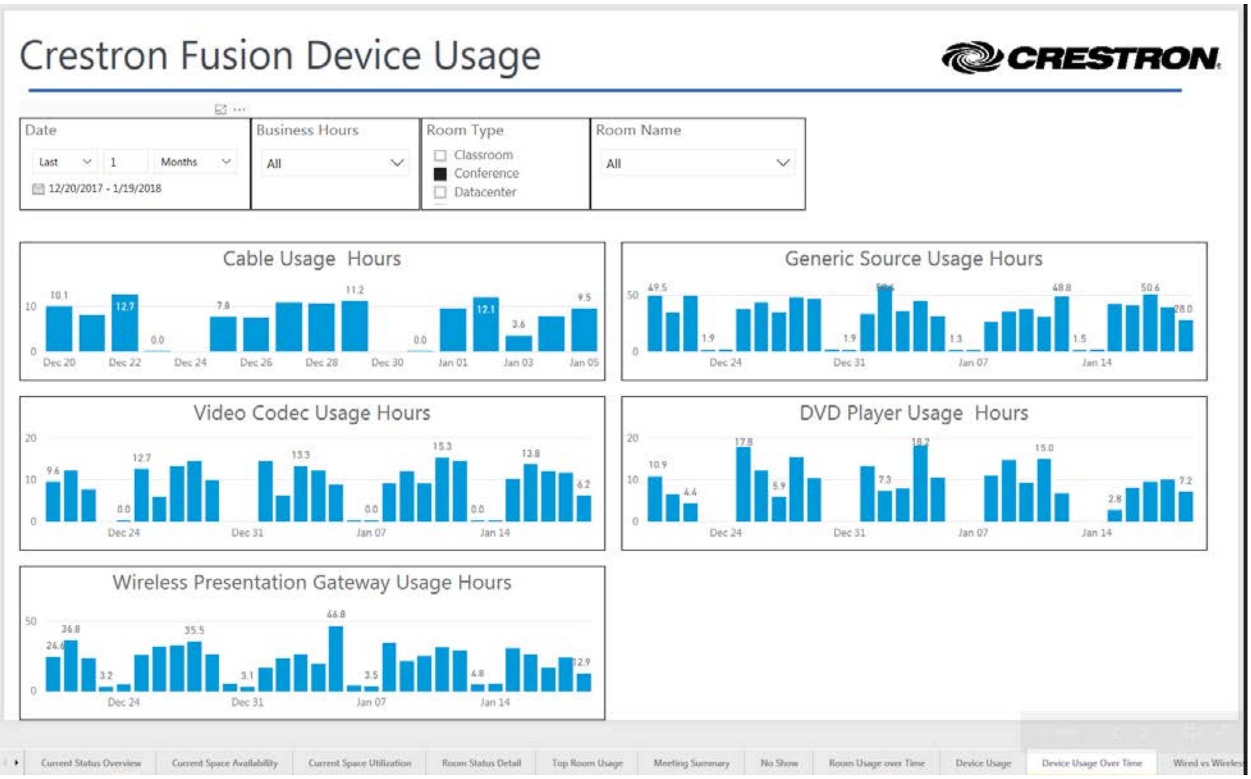
Business Hours: All

Room Type: ■ Conference

Room Name: Tiger Shark Room

10. Device Usage over Time

    This tab in the report continues to focus on device usage, in this case with a visualization showing usage over time. Compare each asset type in its own bar graph to help identify trends. Data is from the UsageLog table in the dataset. Add or remove visualizations based on the unique asset types in the database.



Crestron Fusion Device Usage

Date: Last 1 Months
12/20/2017 - 1/19/2018

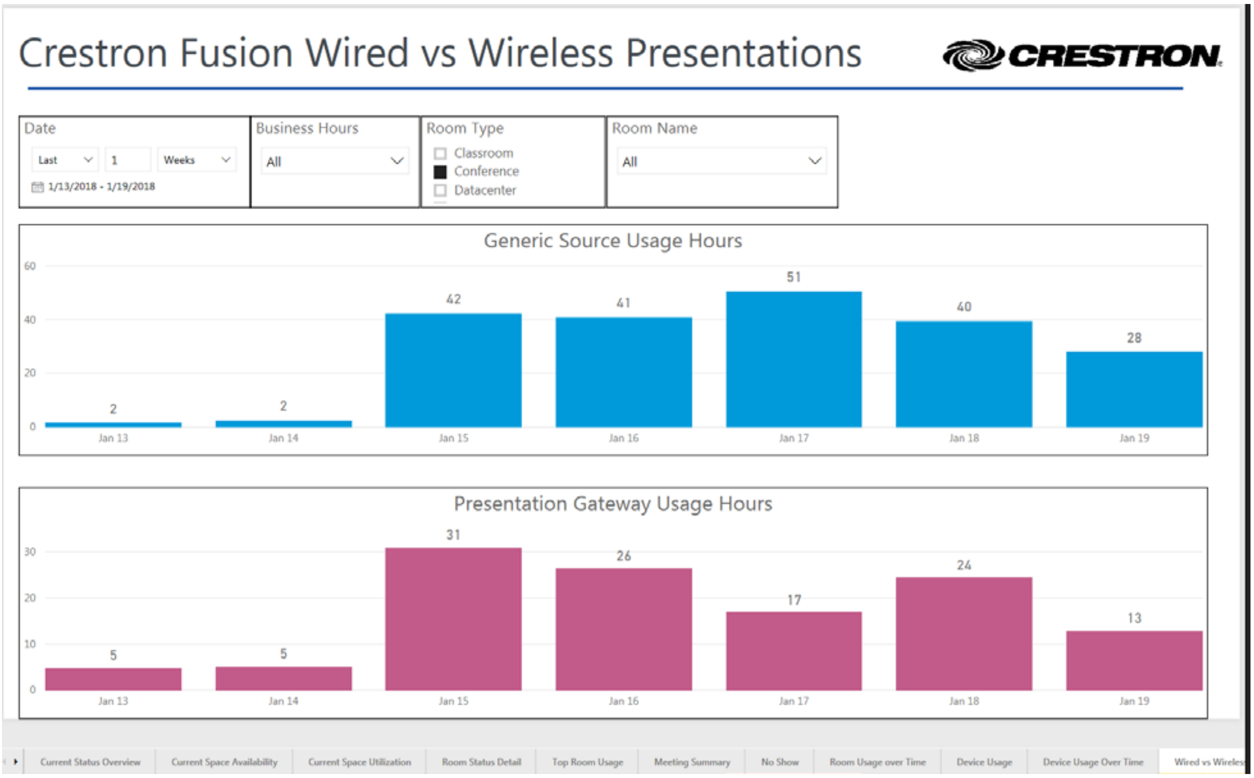
Business Hours: All

Room Type:
□ Classroom
■ Conference
□ Datacenter

Room Name: All

11. Wired vs. Wireless Presentations

Compare usage of the wired connections in the room to the wireless presentation gateways. These visualizations are similar to Device Usage over Time, but here the focus is specifically on presentations, which may need adjustment per the database. Data is from the UsageLog table in the dataset.



Crestron Fusion Wired vs Wireless Presentations

Date: Last 1 Weeks
1/13/2018 - 1/19/2018

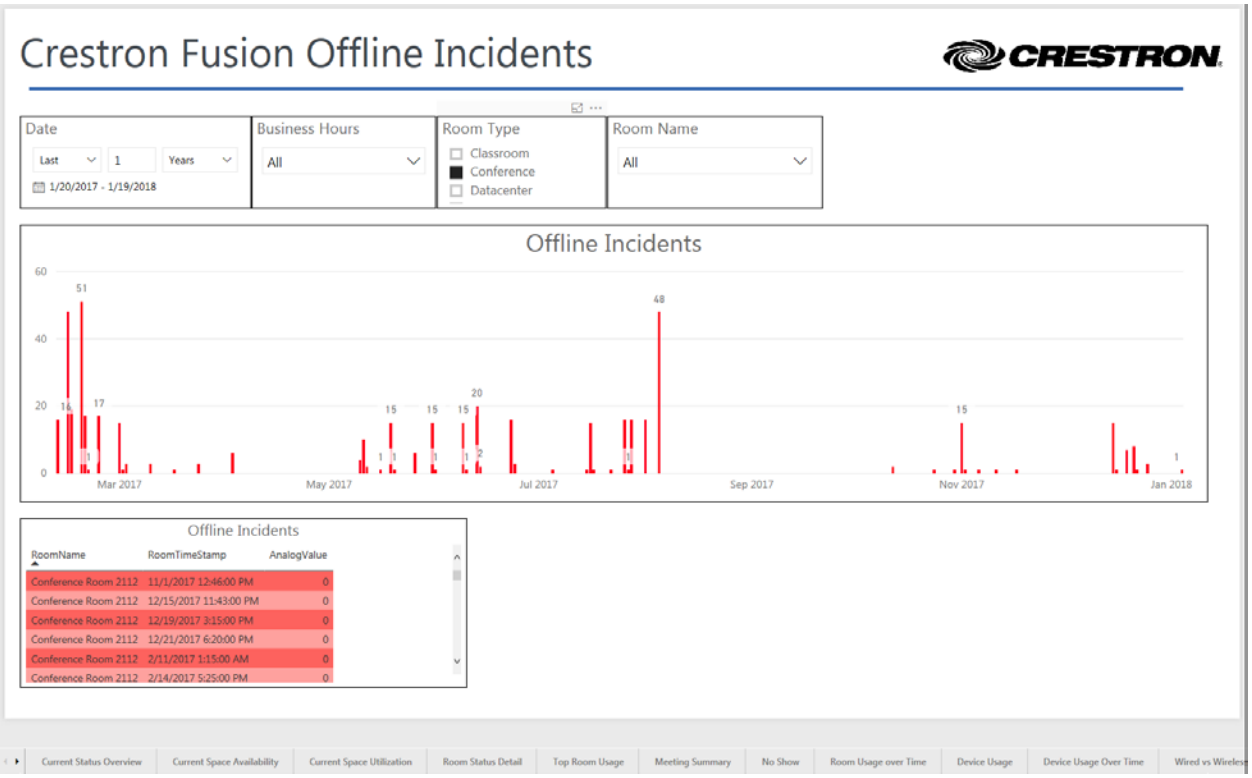
Business Hours: All

Room Type
□ Classroom
■ Conference
□ Datacenter

Room Name: All

12. Offline Incidents

    See the history of device connections over time. This visualization is a derivative of the ONLINE_STATUS attribute history in the AttributeLog table. A supporting table visualization shows the room, time, and date of each offline incident.



Crestron Fusion Offline Incidents

Date: Last 1 Years
1/20/2017 - 1/19/2018

Business Hours: All

Room Type
□ Classroom
■ Conference
□ Datacenter

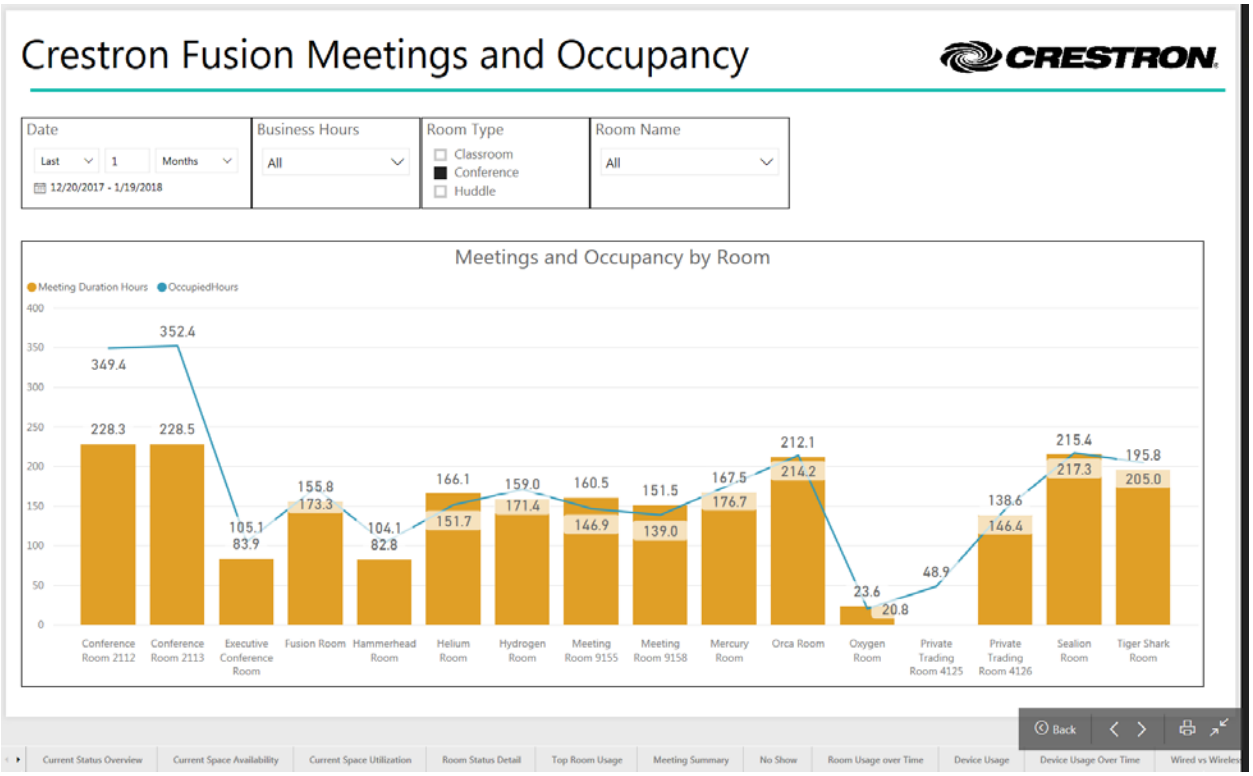
Room Name: All

Offline Incidents

RoomName	RoomTimeStamp	AnalogValue
Conference Room 2112	11/1/2017 12:46:00 PM	0
Conference Room 2112	12/15/2017 11:43:00 PM	0
Conference Room 2112	12/19/2017 3:15:00 PM	0
Conference Room 2112	12/21/2017 6:20:00 PM	0
Conference Room 2112	2/11/2017 1:15:00 AM	0
Conference Room 2112	2/14/2017 5:25:00 PM	0

13. Meetings and Occupancy

Compare meeting durations to occupancy durations by room. This is similar to the room usage over time but compares data across rooms. At a glance, see the most used rooms and least used rooms, as well as the rooms that have squatters or have unattended meetings. Data is from the Occupancy table and the MeetingInstance table in the dataset.



Crestron Fusion Meetings and Occupancy

Date: Last 1 Months, 12/20/2017 - 1/19/2018

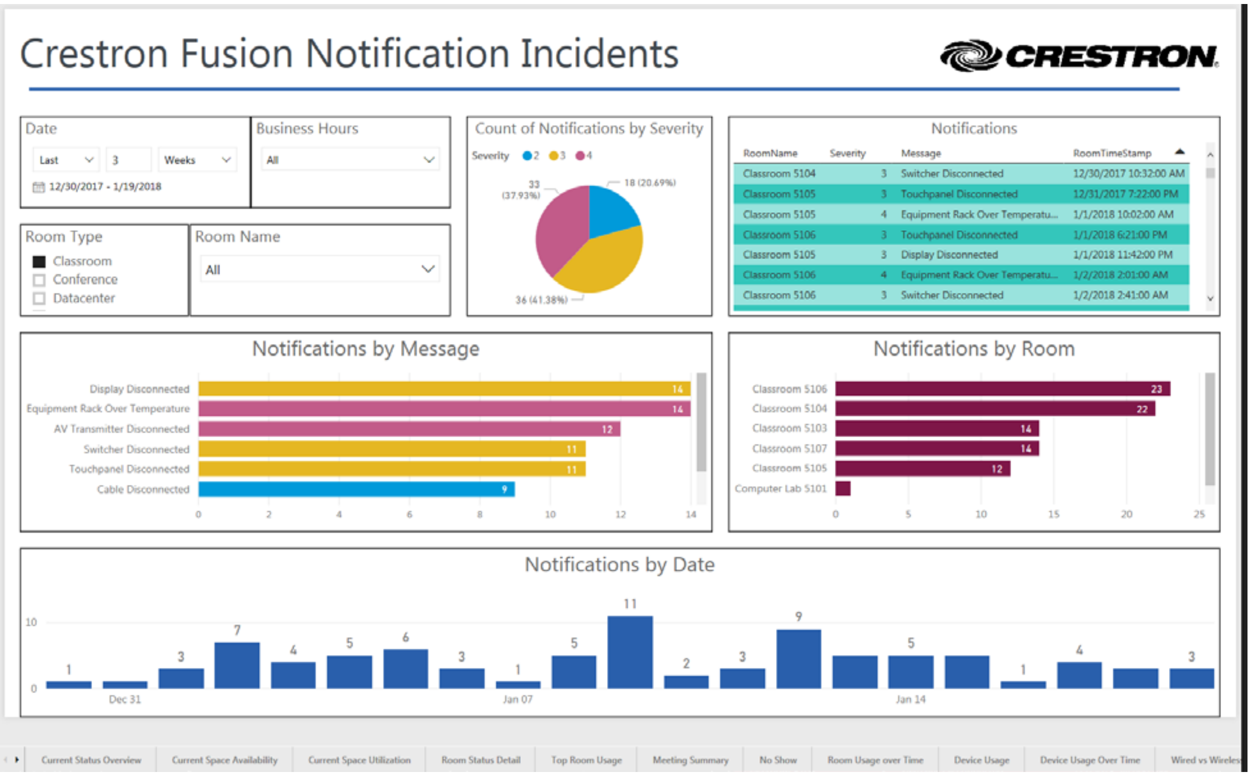
Business Hours: All

Room Type:
□ Classroom
■ Conference
□ Huddle

Room Name: All

14. Notification Incidents

    This tab presents several historical views of notifications forwarded to Crestron Fusion by programmed monitoring. Visualizations include Notifications by Room, Notifications by Message, and Notifications by Date. Filter by severity. By default, the report only looks at warnings and critical and fatal notifications, but it can easily include notices if required. All visualizations use data from the ErrorLog table.



Crestron Fusion Notification Incidents

Date: Last 3 Weeks
12/30/2017 - 1/19/2018

Business Hours: All

Room Type
■ Classroom
□ Conference
□ Datacenter

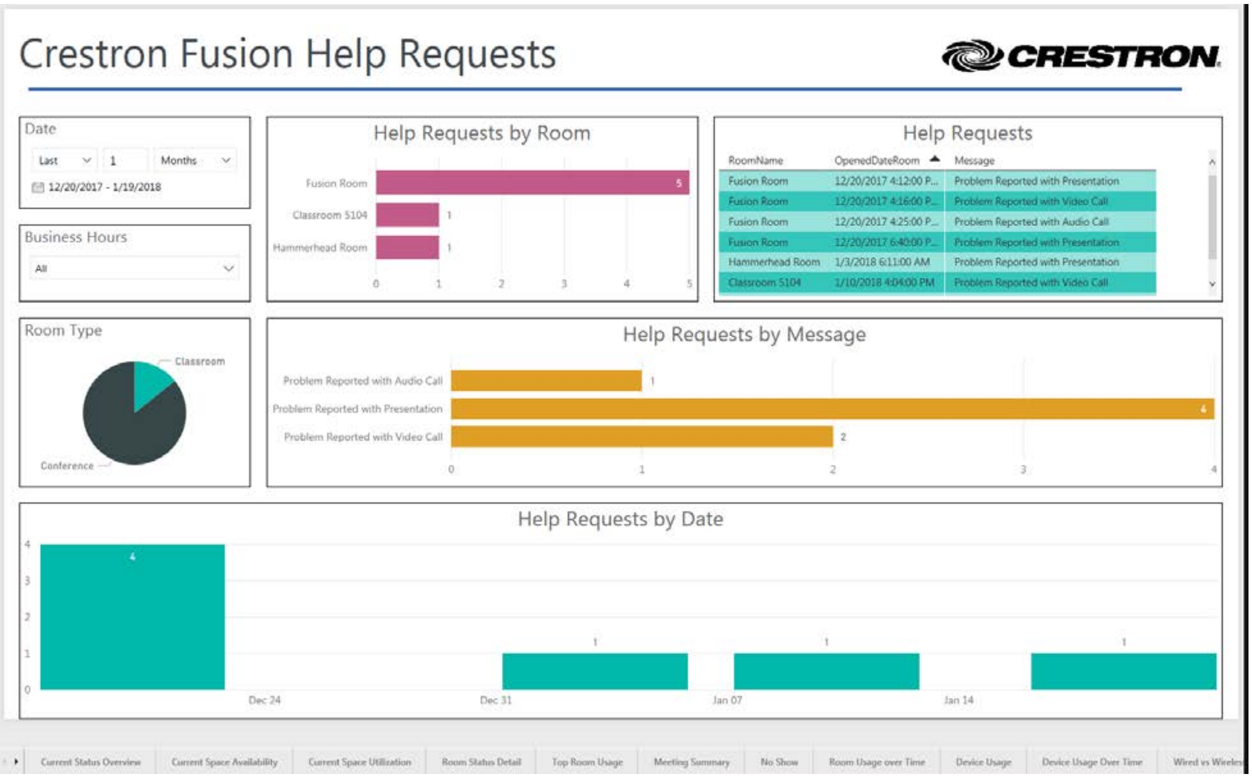
Room Name: All

Notifications

RoomName	Severity	Message	RoomTimeStamp
Classroom 5104	3	Switcher Disconnected	12/30/2017 10:32:00 AM
Classroom 5105	3	Touchpanel Disconnected	12/31/2017 7:22:00 PM
Classroom 5105	4	Equipment Rack Over Temperatu...	1/1/2018 10:02:00 AM
Classroom 5106	3	Touchpanel Disconnected	1/1/2018 6:21:00 PM
Classroom 5105	3	Display Disconnected	1/1/2018 11:42:00 PM
Classroom 5106	4	Equipment Rack Over Temperatu...	1/2/2018 2:01:00 AM
Classroom 5106	3	Switcher Disconnected	1/2/2018 2:41:00 AM

15. Help Requests

    Similar to the Notification History, the Help Requests tab shows historical views of help requests sent to Crestron Fusion by room users. Visualizations include Help Requests by Room, Help Requests by Message, and Help Requests by Date. An additional visual allows filtering by room type to identify the rooms that may be the most troublesome. Data is based on the Help Requests table in the dataset.



Crestron Fusion Help Requests

Date

Last 1 Months

12/20/2017 - 1/19/2018

Business Hours

All

Help Requests

RoomName	OpenedDateRoom ▲	Message
Fusion Room	12/20/2017 4:12:00 P...	Problem Reported with Presentation
Fusion Room	12/20/2017 4:16:00 P...	Problem Reported with Video Call
Fusion Room	12/20/2017 4:25:00 P...	Problem Reported with Audio Call
Fusion Room	12/20/2017 6:40:00 P...	Problem Reported with Presentation
Hammerhead Room	1/3/2018 6:11:00 AM	Problem Reported with Presentation
Classroom 5104	1/10/2018 4:04:00 PM	Problem Reported with Video Call

Getting Started with Power BI

The following sections provide a starting point for understanding and using Microsoft Power BI with the Crestron Fusion database and the Power BI template provided. For more in-depth information, please follow the links to related Microsoft documentation. There is an abundance of information available on every Power BI topic freely available on the Internet.

- Overview: Power BI Desktop and Power BI Service
- Installing and Using the Power BI Template (.pbit)
- Installing the Power BI On-Premises Gateway
- Datasets: Importing Data
- Relationships
- Modifying/Customizing Tables
- Working with Date/Time/Time Zone
- Filtering Techniques
- Building a Dashboard
- Sharing Reports and Dashboards

Overview: Power BI Desktop and Power BI Service

Microsoft Power BI has two components. The Power BI service is available at https://powerbi.microsoft.com. To use the service, sign up for a Power BI Pro account. The Power BI Desktop application is available at https://powerbi.microsoft.com/en-us/desktop/ as a free download.

The basic steps to use Power BI Service and Desktop with Crestron Fusion are the following:

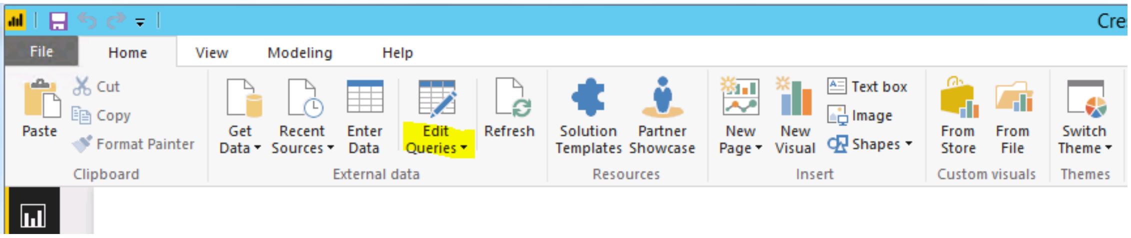
1. Download and install the Power BI Desktop application.
2. Import data into Power BI Desktop application to build the dataset and create reports from that dataset.
3. Publish the dataset and report(s) to the Power BI Service
4. Download and install a Data Gateway to allow the Power BI Service to connect periodically to the Crestron Fusion SQL database.
5. Set a refresh schedule to keep the dataset current.
6. Edit the reports, create new visualizations, or build dashboards using the Power BI Desktop or the Power BI Service.
7. Share dashboards with others.

Basic building blocks in Power BI are the following:

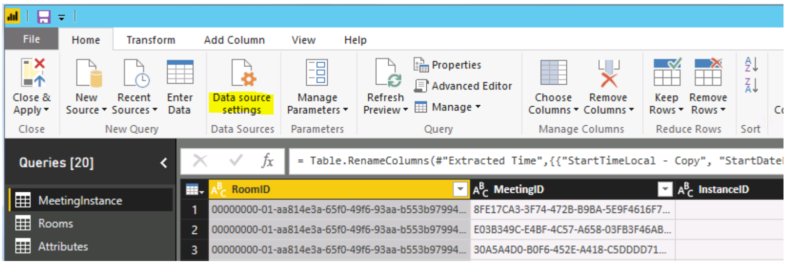
- Visualizations
- Datasets
- Reports
- Dashboards
- Tiles

Installing and Using the Power BI Template

1. Load the .pbit template file into Power BI Desktop.
2. Click on **Edit Queries**.



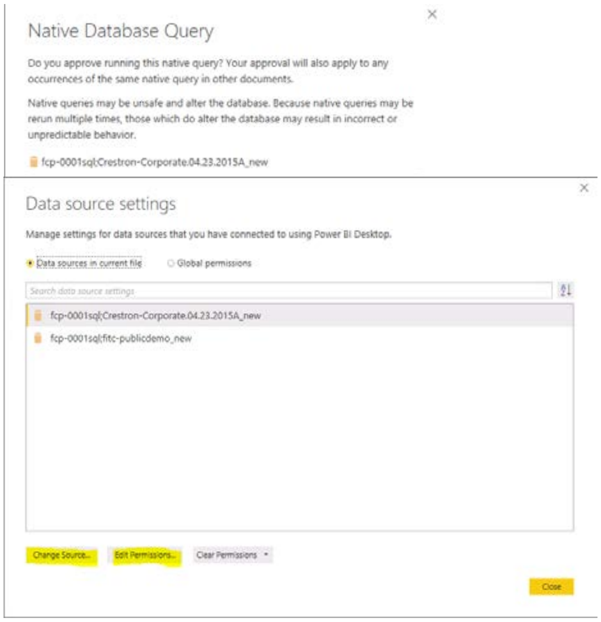
3. From the Query Editor, select **Data source settings**.



```
= Table.RenameColumns(#"Extracted Time",{{"StartTimeLocal - Copy", "StartDatel
```

	RoomID	MeetingID	InstanceID
1	00000000-01-aa814e3a-65f0-49f6-93aa-b553b97994...	8FE17CA3-3F74-472B-B9BA-5E9F4616F7...	
2	00000000-01-aa814e3a-65f0-49f6-93aa-b553b97994...	E03B349C-E4BF-4C57-A658-03FB3F46AB...	
3	00000000-01-aa814e3a-65f0-49f6-93aa-b553b97994...	30A5A4D0-B0F6-452E-A418-C5DDDD71...	

4. Select the **Change Source** button to add the database settings. Select the **Edit Permissions** button to add credentials with at least read-only permissions to the database.
5. When the permissions are applied, Power BI Desktop will prompt for permission to run the queries that populate the datasets. Click **RUN** for each prompt to allow the queries to execute.



Native Database Query

Do you approve running this native query? Your approval will also apply to any occurrences of the same native query in other documents.

Native queries may be unsafe and alter the database. Because native queries may be rerun multiple times, those which do alter the database may result in incorrect or unpredictable behavior.

fcp-0001sql;Crestron-Corporate.04.23.2015A_new

Data source settings

Manage settings for data sources that you have connected to using Power BI Desktop.

● Data sources in current file ○ Global permissions

fcp-0001sql;Crestron-Corporate.04.23.2015A_new
fcp-0001sql;fitc-publicdemo_new

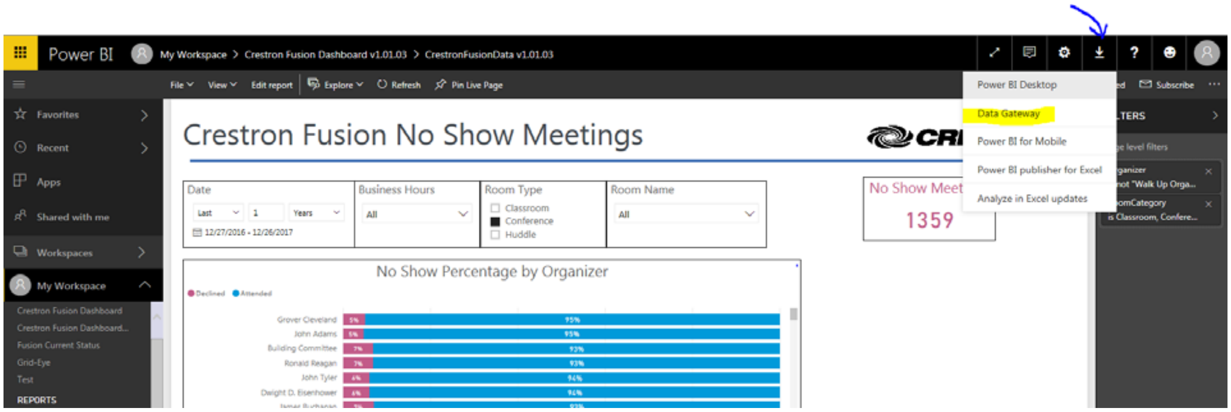
Installing the Power BI On-Premises Gateway

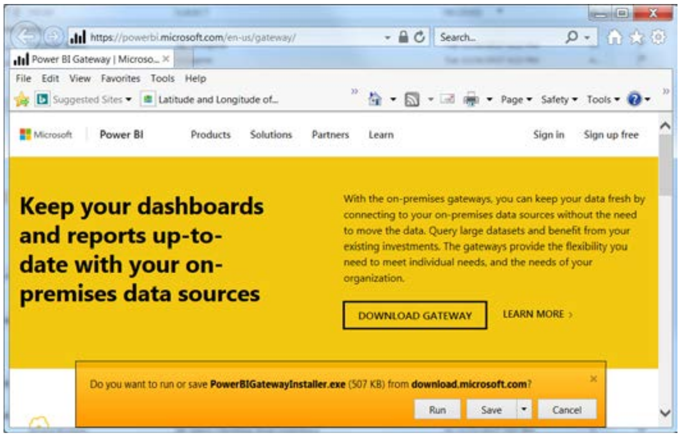
The on-premises gateway connects the Power BI service to the Crestron Fusion database. Using the gateway to make the connection avoids the need to open firewall ports. The gateway does not provide a constant, direct access to the database. Instead, the Power Bi service will periodically connect to the database according to a user-defined schedule or on-demand based on a user action.

Install the gateway directly on the SQL Server® software or another system that can access the SQL server. The Crestron Fusion application server is an ideal location for the gateway.

1. Download the gateway. Access the download site by clicking the **download** icon in the top right of the Power BI service interface.

   Alternatively, go directly to https://powerbi.microsoft.com/en-us/gateway/ and click the DOWNLOAD GATEWAY button.



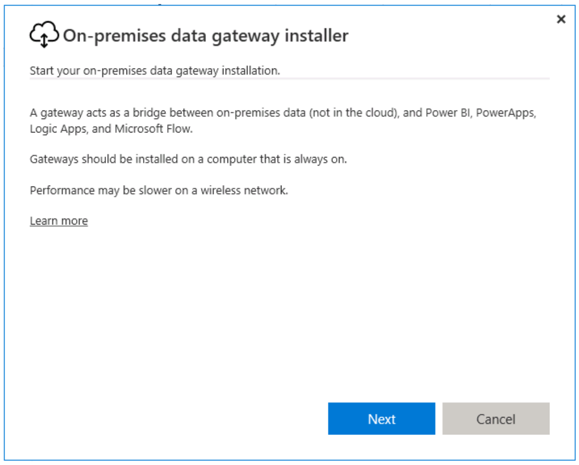


Keep your dashboards and reports up-to-date with your on-premises data sources

With the on-premises gateways, you can keep your data fresh by connecting to your on-premises data sources without the need to move the data. Query large datasets and benefit from your existing investments. The gateways provide the flexibility you need to meet individual needs, and the needs of your organization.

Do you want to run or save **PowerBIGatewayInstaller.exe** (507 KB) from **download.microsoft.com**?

2. Save the file to the system that will host the gateway, typically a Crestron Fusion application server.



On-premises data gateway installer

Start your on-premises data gateway installation.

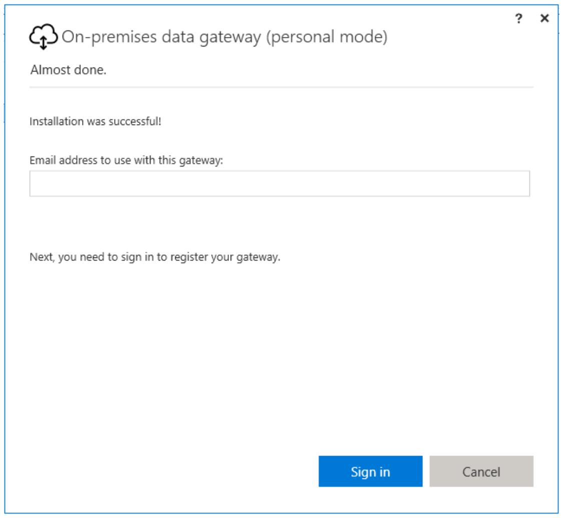
A gateway acts as a bridge between on-premises data (not in the cloud), and Power BI, PowerApps, Logic Apps, and Microsoft Flow.

Gateways should be installed on a computer that is always on.

Performance may be slower on a wireless network.

3. Locate and run the PowerBIGatewayInstaller.exe file. Choose the On-premises data gateway (personal mode). If prompted, accept and install the Microsoft.NET framework installation (may require a reboot).

4. Register the gateway using the email address for your Power BI Pro account and sign in:



On-premises data gateway (personal mode)

Almost done.

Installation was successful!

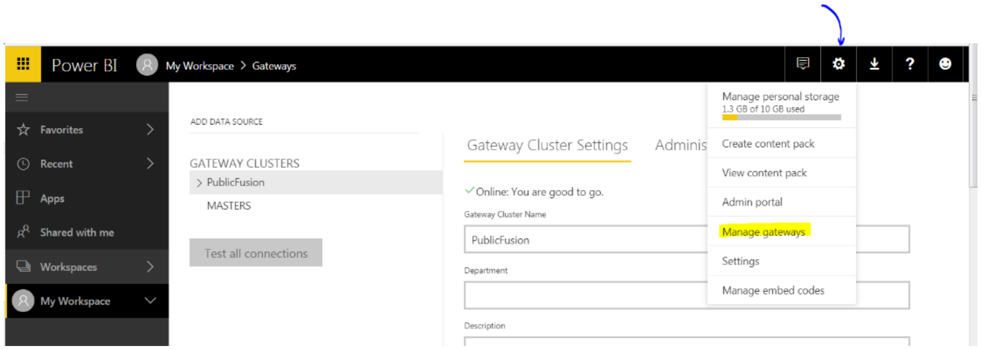
Email address to use with this gateway:

Next, you need to sign in to register your gateway.

When complete, the gateway shows as “Ready” in the dialogue.

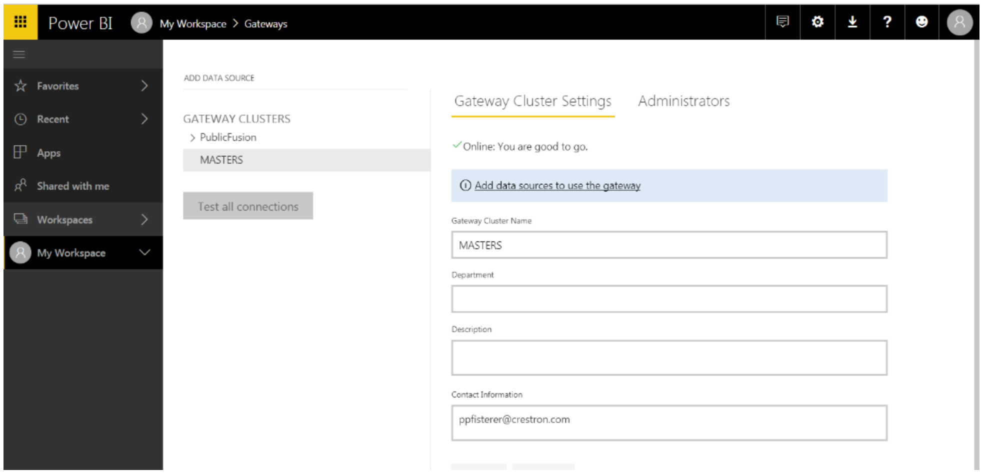
5. Log in to the Power BI Pro service to associate the previously published dataset with the new gateway.

6. Choose **Manage gateways** from the settings drop-down menu. Select the name of the Gateway to associate it with a data source.



✓Online: You are good to go.

Gateway Cluster Name: PublicFusion



✓Online: You are good to go.

Gateway Cluster Name: MASTERS

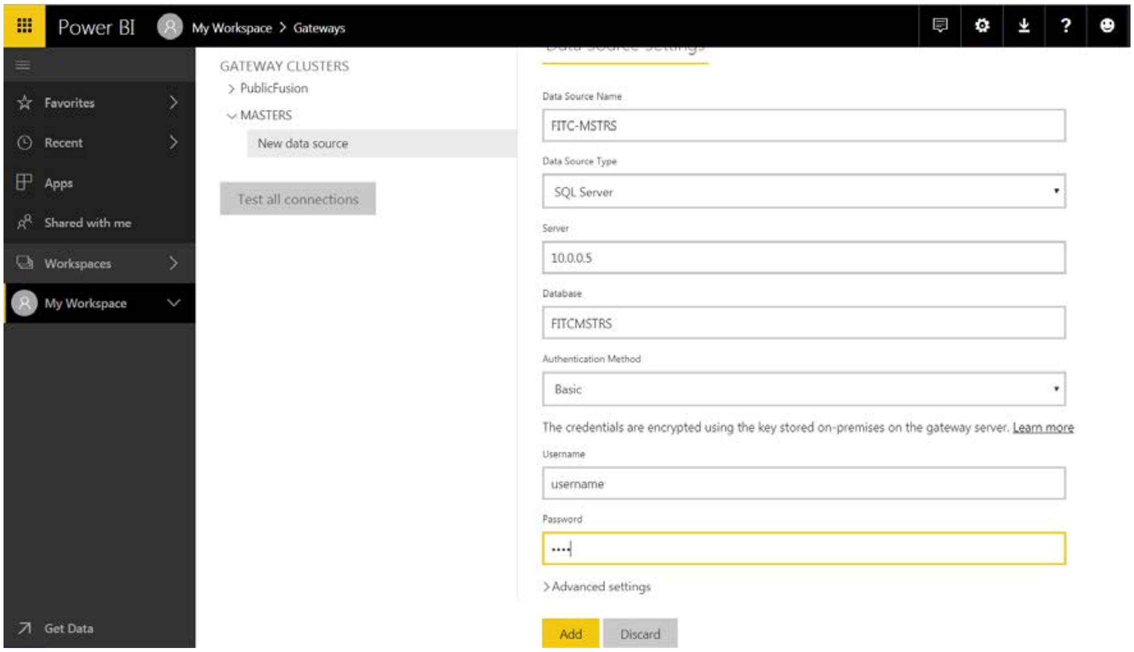
Department:

Description:

Contact Information: ppfisterer@crestron.com

7. Click **Add data sources to use the gateway**. Select **SQL Server** as the Data Source Type and enter the information to connect to the Crestron Fusion Database. Use Basic Authentication if SQL credentials are used or Windows® Authentication for domain credentials.

8. Click the **Add** button. Look for Connection Successful in the response screen.



Data Source Name: FITC-MSTRS

Data Source Type: SQL Server

Server: 10.0.0.5

Database: FITCMSTRS

Authentication Method: Basic

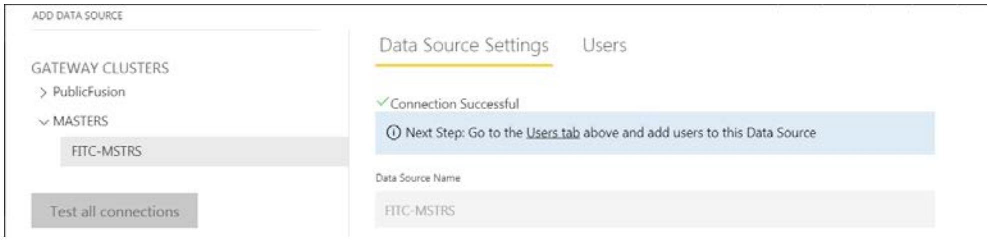
The credentials are encrypted using the key stored on-premises on the gateway server. Learn more

Username: username

Password: ····

> Advanced settings

The Gateway is set up and working.

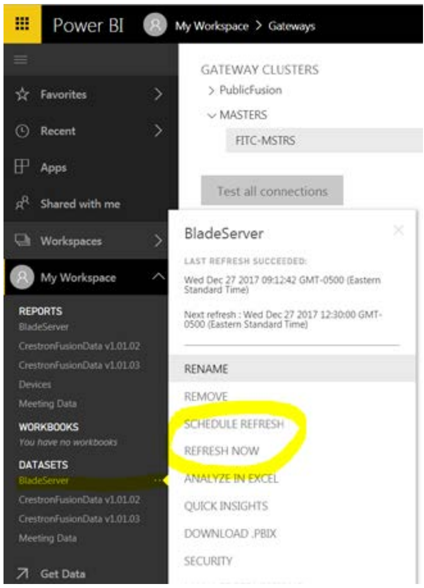


✓Connection Successful

ⓘ Next Step: Go to the Users tab above and add users to this Data Source

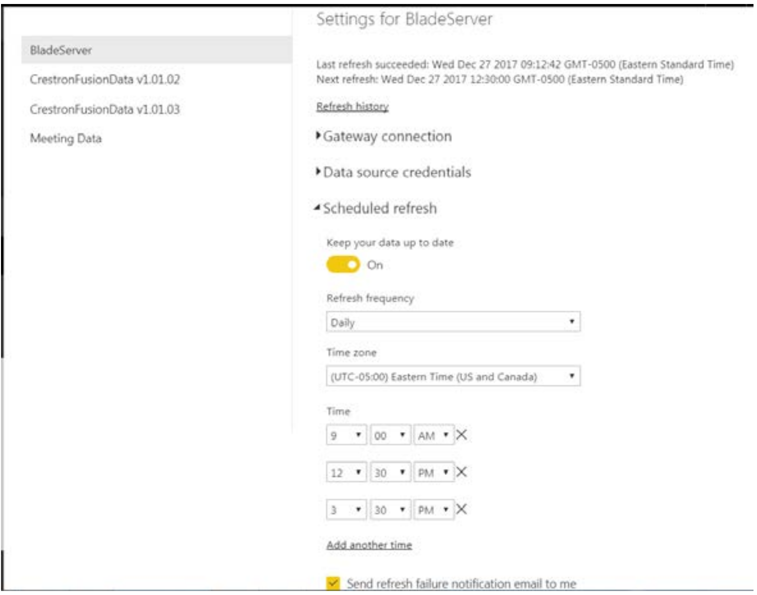
Data Source Name: FITC-MSTRS

With the gateway in place and connected, data is refreshed on demand or on a schedule defined by the user. Add up to eight refresh times.



LAST REFRESH SUCCEEDED:
Wed Dec 27 2017 09:12:42 GMT-0500 (Eastern Standard Time)

Next refresh : Wed Dec 27 2017 12:30:00 GMT-0500 (Eastern Standard Time)



Settings for BladeServer

Last refresh succeeded: Wed Dec 27 2017 09:12:42 GMT-0500 (Eastern Standard Time)
Next refresh: Wed Dec 27 2017 12:30:00 GMT-0500 (Eastern Standard Time)

Keep your data up to date: On

Refresh frequency: Daily

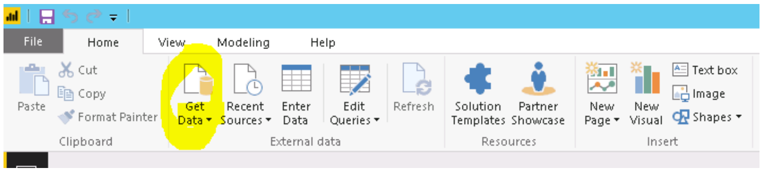
Time zone: (UTC-05:00) Eastern Time (US and Canada)

Time:
9 : 00 AM
12 : 30 PM
3 : 30 PM

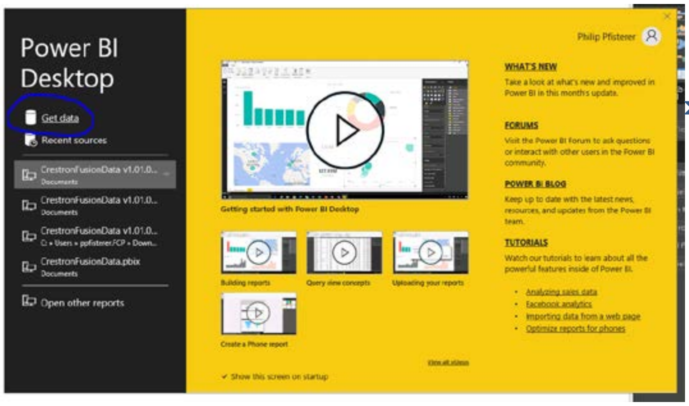
☑ Send refresh failure notification email to me

Datasets: Importing Data

The Crestron Fusion database is always a Microsoft SQL database. The Power BI Desktop application connects to this database to build and publish to the Power BI service.



For a new Power BI Desktop workspace, follow the **Get Data** link on the splash screen to make a new dataset.

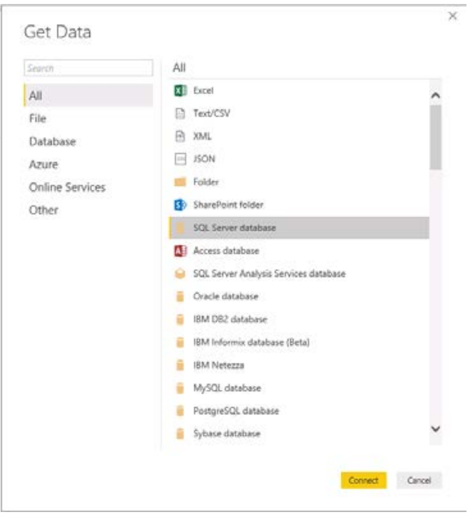


Take a look at what's new and improved in Power BI in this month's update.

Visit the Power BI Forum to ask questions or interact with other users in the Power BI community.

Keep up to date with the latest news, resources, and updates from the Power BI team.

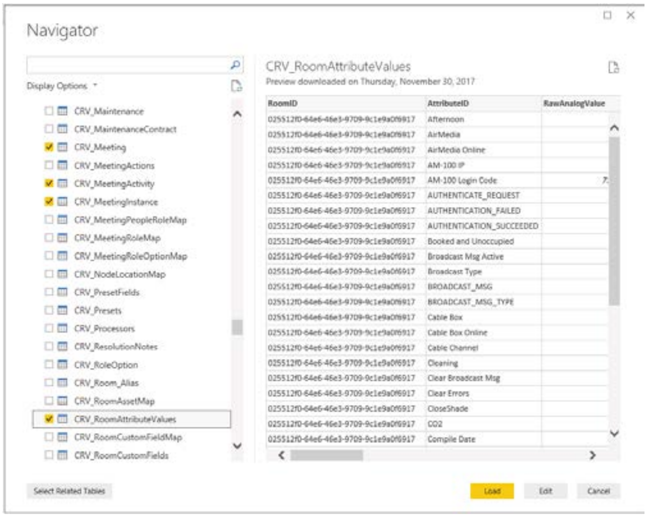
Watch our tutorials to learn about all the powerful features inside of Power BI.



Choose SQL Server Database and click the Connect button. Provide the SQL database Server and Database name. Select Import (DirectQuery is not supported using the Crestron Fusion Dashboard template). Power BI Desktop will return a list of all tables in the database and allow selection of the tables of interest for import into the dataset.

Instead of importing the full tables it is better to streamline the data by only importing the necessary fields. Expand the advanced options where an SQL query is added to produce specific data for the dataset.

Repeat for each SQL query that needs to be included in the complete dataset. The Crestron Fusion Schema section of the document includes suggested queries to add the most useful data to the dataset. This ensures the dataset includes only tables and fields required for reports.

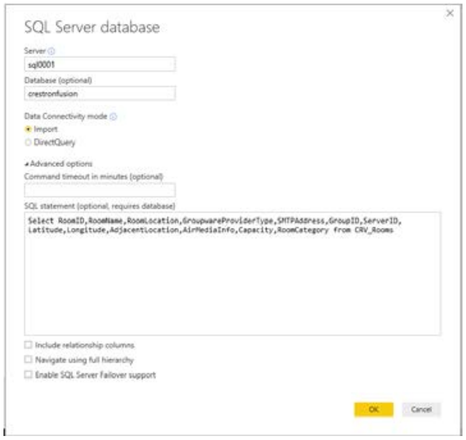


- ☐ CRV_Maintenance
- ☐ CRV_MaintenanceContract
- ☑ CRV_Meeting
- ☐ CRV_MeetingActions
- ☑ CRV_MeetingActivity
- ☑ CRV_MeetingInstance
- ☐ CRV_MeetingPeopleRoleMap
- ☐ CRV_MeetingRoleMap
- ☐ CRV_MeetingRoleOptionMap
- ☐ CRV_NodeLocationMap
- ☐ CRV_PresetFields
- ☐ CRV_Presets
- ☐ CRV_Processors
- ☐ CRV_ResolutionNotes
- ☐ CRV_RoleOption
- ☐ CRV_Room_Alias
- ☐ CRV_RoomAssetMap
- ☑ CRV_RoomAttributeValues
- ☐ CRV_RoomCustomFieldMap
- ☐ CRV_RoomCustomFields

CRV_RoomAttributeValues

Preview downloaded on Thursday, November 30, 2017

RoomID	AttributeID	RawAnalogValue
025512f0-64e6-46e3-9709-9c1e9a0f6917	Afternoon	
025512f0-64e6-46e3-9709-9c1e9a0f6917	AirMedia	
025512f0-64e6-46e3-9709-9c1e9a0f6917	AirMedia Online	
025512f0-64e6-46e3-9709-9c1e9a0f6917	AM-100 IP	
025512f0-64e6-46e3-9709-9c1e9a0f6917	AM-100 Login Code	7.
025512f0-64e6-46e3-9709-9c1e9a0f6917	AUTHENTICATE_REQUEST	
025512f0-64e6-46e3-9709-9c1e9a0f6917	AUTHENTICATION_FAILED	
025512f0-64e6-46e3-9709-9c1e9a0f6917	AUTHENTICATION_SUCCEEDED	
025512f0-64e6-46e3-9709-9c1e9a0f6917	Booked and Unoccupied	
025512f0-64e6-46e3-9709-9c1e9a0f6917	Broadcast Msg Active	
025512f0-64e6-46e3-9709-9c1e9a0f6917	Broadcast Type	
025512f0-64e6-46e3-9709-9c1e9a0f6917	BROADCAST_MSG	
025512f0-64e6-46e3-9709-9c1e9a0f6917	BROADCAST_MSG_TYPE	
025512f0-64e6-46e3-9709-9c1e9a0f6917	Cable Box	
025512f0-64e6-46e3-9709-9c1e9a0f6917	Cable Box Online	
025512f0-64e6-46e3-9709-9c1e9a0f6917	Cable Channel	
025512f0-64e6-46e3-9709-9c1e9a0f6917	Cleaning	
025512f0-64e6-46e3-9709-9c1e9a0f6917	Clear Broadcast Msg	
025512f0-64e6-46e3-9709-9c1e9a0f6917	Clear Errors	
025512f0-64e6-46e3-9709-9c1e9a0f6917	CloseShade	
025512f0-64e6-46e3-9709-9c1e9a0f6917	CO2	
025512f0-64e6-46e3-9709-9c1e9a0f6917	Compile Date	



Server: sql0001

Database (optional): crestronfusion

Data Connectivity mode
● Import
○ DirectQuery

Command timeout in minutes (optional):

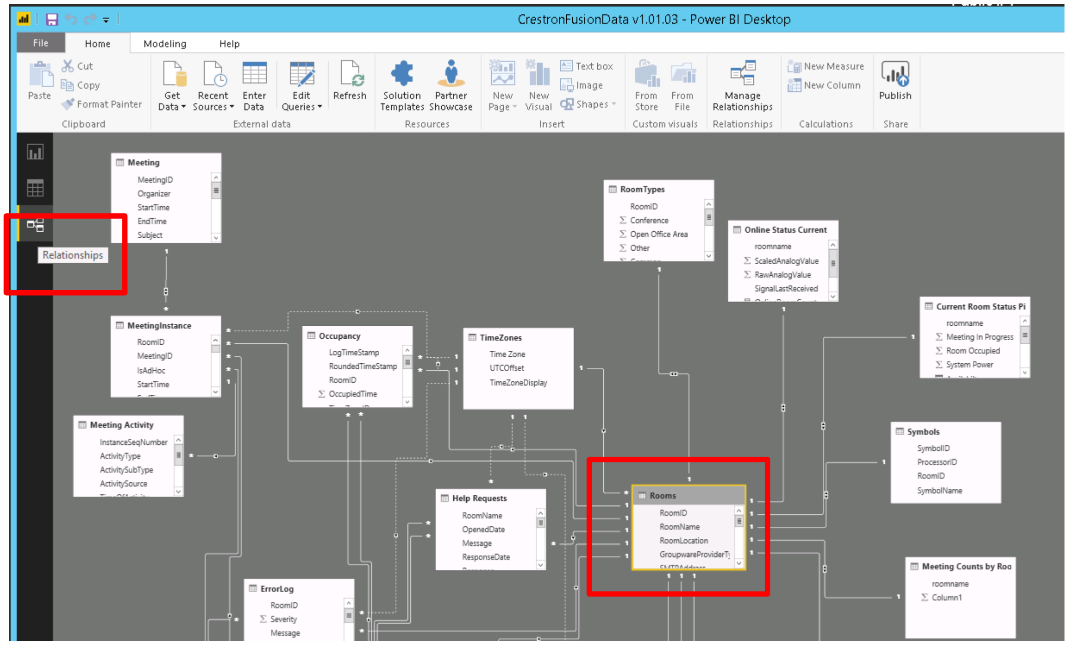
SQL statement (optional, requires database):

```
Select RoomID,RoomName,RoomLocation,GroupwareProviderType,SMTPAddress,GroupID,ServerID,
Latitude,Longitude,AdjacentLocation,AirMediaInfo,Capacity,RoomCategory from CRV_Rooms
```

☐ Include relationship columns
☐ Navigate using full hierarchy
☐ Enable SQL Server Failover support

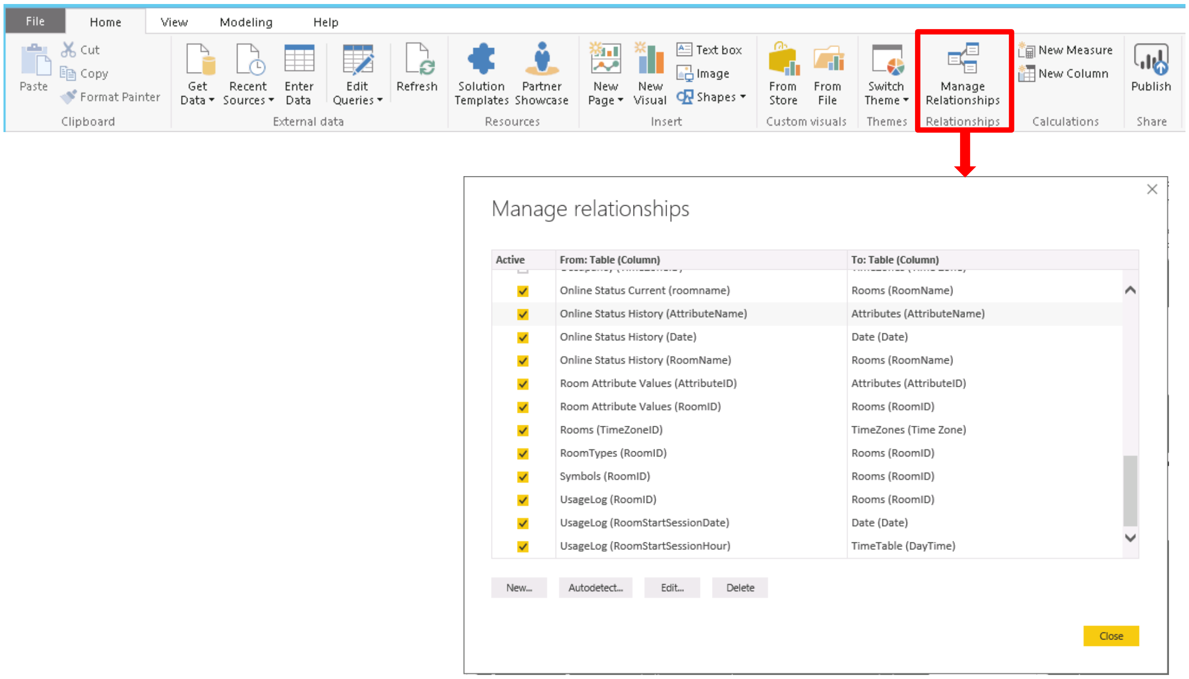
Relationships

Power BI will attempt to find relationships in the data imported into the dataset. However, it will likely be necessary to define relationships directly. The Power BI Desktop application has a tool for this, the Relationships icon along the left margin.



The Relationships tool provides a graphical way to make associations between tables by mapping key fields.

In the Crestron Fusion database, the Rooms table is the starting point of data for the reports. The RoomID field in the Rooms table relates to many of the other tables that reference this field. If Power BI does not automatically recognize these relationships, add them manually using the **Manage Relationships** tool.



Manage relationships

Active	From: Table (Column)	To: Table (Column)
☑	Online Status Current (roomname)	Rooms (RoomName)
☑	Online Status History (AttributeName)	Attributes (AttributeName)
☑	Online Status History (Date)	Date (Date)
☑	Online Status History (RoomName)	Rooms (RoomName)
☑	Room Attribute Values (AttributeID)	Attributes (AttributeID)
☑	Room Attribute Values (RoomID)	Rooms (RoomID)
☑	Rooms (TimeZoneID)	TimeZones (Time Zone)
☑	RoomTypes (RoomID)	Rooms (RoomID)
☑	Symbols (RoomID)	Rooms (RoomID)
☑	UsageLog (RoomID)	Rooms (RoomID)
☑	UsageLog (RoomStartSessionDate)	Date (Date)
☑	UsageLog (RoomStartSessionHour)	TimeTable (DayTime)

See more on how to manage relationships in Power BI at:

https://docs.microsoft.com/en-us/power-bi/desktop-create-and-manage-relationships

Modifying/Customizing Tables

In some cases, the tables in the dataset require manipulation, or data shaping. Operations include renaming tables or fields, removing duplicate data, removing nulls, or removing errors from the tables in the dataset. Power BI allows redefining or transforming data types.

The initial dataset can be manipulated from two places in Power BI Desktop. Access the Query Editor by clicking the Edit Queries button on the tools ribbon or by right-clicking a query from the list and choosing Edit Query from the context menu.

The following mechanisms are available to shape or manipulate data in the dataset after it has been imported.

- Data Analysis Expressions (DAX) - enhance visualizations and reports with these functions and operators to generate values from the existing dataset.

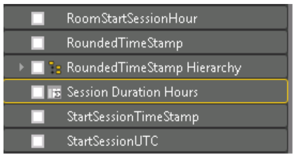
  https://docs.microsoft.com/en-us/power-bi/desktop-quickstart-learn-dax-basics

- Measures - create measures, based on DAX, using Power BI Desktop in either Report View or Data View. A calculator icon in the Fields list indicates a measure. Once it is created, use the measure in a visualization like any other field. In the Crestron Fusion Dashboard Power BI template, measures appear in several tables including Current Room Status, Current Room Status Pivot, Online Status Current, and UsageLog to calculate percentages and other relationships that are not already part of the data.

  https://docs.microsoft.com/en-us/power-bi/desktop-measures

- Calculated Columns - Using DAX, define a new column in a table from Report View or Data View in the Power BI Desktop application. For example, the Crestron Fusion Dashboard UsageLog table includes a calculated column for Session Duration Hours that is based on the DAX formula Session Duration Hours = DIVIDE(UsageLog[Data5],60), which divides the minute values in the "Data5" column by 60. The DAX formula might include values from different tables using other mathematical operations.

  A formula icon indicates a calculated column in the Fields list.

  □ RoomStartSessionHour
  □ RoundedTimeStamp
  □ RoundedTimeStamp Hierarchy
  □ Session Duration Hours
  □ StartSessionTimeStamp
  □ StartSessionUTC

- Calculated Tables - in addition to the tables created from a data source, DAX is sometimes used to create table values. Use the New Table button to create a table using DAX. An example of a calculated table in the Crestron Fusion Dashboard template is the Date Table, described in the following section, "Working with Date/Time/Time Zone."

Working with Date/Time/Time Zone

Note: Power BI does not have the ability to handle daylight savings time.

Each table that requires date/time filtering is modified to include columns that represent the local room date and the local room time.

The LogTimeStamp values used in the CRV_AttributeLog, CRV_ErrorLog, CRV_UsageLog, and other log tables include seconds. This granularity makes associating time events across data tables very difficult, if not impossible. For this reason, the log time stamps are rounded to the minute before importing into the dataset. Further, the log time stamp represents the end of the session, not the start as might be assumed. Therefore, the session start times are calculated so that device and occupancy sessions can matched with the meeting times.

Follow these steps to prepare tables for creating date and time relationships:

1. Import time stamps using a SQL query that rounds to minutes.
2. Select *, dateadd(mi, datediff(mi, 0, CRV_UsageLog.LogTimeStamp), 0) RoundedTimeStamp (refer to “Rounding the Minutes” on page 54).
3. Calculate the StartSessionTimeStamp if required (refer to “Calculating Session Start Times in the Usage Logs” on page 54).
4. Merge table with the Rooms table to add the TimeZoneID column.
5. Merge table with the TimeZone table to add the UTCOffset column.
6. Add a calculated column to add the UTC formatted RoundedTimeStamp (refer to “Date/Time/Time Zone Operations” on page 54).
7. Add a calculated column to add the local time stamp based on the room’s time zone (refer to “Date/Time/Time Zone Operations” on page 54).
8. Copy the room local time column and transform to date only.
9. Copy the room local time column and transform to time only.

These are the columns generated from the above process in the UsageLog:

- TimeZoneID - from the merge in step 4 above
- UTCOffset - from the merge in step 5 above
- LogTimeStamp - from the Database (optional)
- RoundedTimeStamp - Rounded during import based on the database SQL query (Date/Time/Timezone format)
- StartSessionTimeStamp - calculated by subtracting the duration minutes from the RoundedTimeStamp
- StartSessionTimeStampUTC - (Date/Time/Timezone format)
- RoomStartSession - Start of session based on room’s time zone (Date/Time/Timezone format)
- RoomStartSessionDate - Date Table relationship (Date)
- RoomStartSessionHour - Time Table relationship (Time)

Date/Time/Time Zone Operations

Create a custom column and apply Date/Time/Timezone format with 0 for UTC:

```
Formula:  DateTime.AddZone([Time],0)
```

```
Example:
= Table.AddColumn(#"Expanded TimeZones", "RoundedTimeStampUTC", each
DateTime.AddZone([RoundedTimeStamp],0))
```

Then create a new column for the local time zone by using the “SwitchZone” command and applying the local TZ offset in a custom column:

```
Formula:  DateTimeZone.SwitchZone([TimeUTC],[UTCOffset])
```

```
Example:
= Table.AddColumn(#"Added Custom", "LocalTimeStamp", each
DateTimeZone.SwitchZone([RoundedTimeStampUTC],[UTCOffset]))
```

Duplicate the local time column twice; in the first column using transform, extract the Date. In the second extract the Time. The Local Time and Date are now available to reference in reports.

Rounding the Minutes

LogTimeStamp entries include seconds, making it difficult to correlate with time-based data in other tables. With the LogTimeStamp entries rounded to the nearest second, or dropping the seconds by changing all to “00,” the values match to the TimeTable.

Rounding needs to come from the initial SQL query since there is no function in PowerBI to do this:

```
dateadd(mi, datediff(mi, 0, CRV_UsageLog.LogTimeStamp), 0) RoundedTimeStamp
```

Calculating Session Start Times in the Usage Logs

Log time stamps (LogTimeStamp) for usage sessions indicate the time the session data writes to the database. These times correspond to the end of the session. To calculate the start of a session, subtract the “duration” from the LogTimeStamp. Use the rounded value for this operation.

The field formula to calculate session start times:

```
=Table.AddColumn(Source, “StartSessionTimeStamp”, each [RoundedTimeStamp] -
#duration(0,0,[Data5],0))
```

- RoomStartSession - new calculated column - RoundedTimeStamp - “Data5” (minutes)
- RoomStartSessionDate - Start of session in UTC
- RoomStartSessionHour

Use a similar technique for the AttributeLog, Error and Help Request tables.

Date Table

A date table is the date reference to align meeting times and log time stamps across all tables. Render a date table using the following script.

Note: The date table does not include time as time reference uses a separate timetable.

```
Date =
ADDCOLUMNS (
CALENDAR (CALCULATE(MIN(Meeting[StartTime])), (NOW())),
"DateAsInteger", FORMAT ( [Date], "YYYYMMDD" ),
"Year", YEAR ( [Date] ),
"Monthnumber", FORMAT ( [Date], "MM" ),
"YearMonthnumber", FORMAT ( [Date], "YYYY/MM" ),
"YearMonthShort", FORMAT ( [Date], "YYYY/mmm" ),
"MonthNameShort", FORMAT ( [Date], "mmm" ),
"MonthNameLong", FORMAT ( [Date], "mmmm" ),
"DayOfWeekNumber", WEEKDAY ( [Date] ),
"DayOfWeek", FORMAT ( [Date], "dddd" ),
"DayOfWeekShort", FORMAT ( [Date], "ddd" ),
"Quarter", "Q" & FORMAT ( [Date], "Q" ),
"YearQuarter", FORMAT ( [Date], "YYYY" ) & "/Q" & FORMAT ( [Date], "Q" ))
```

The start of the date table is the earliest meeting start-time on record. This may not work if there is no meeting data in the database. Alternately, use a hard-coded start date, such as `CALENDAR ( 1/1/2016, (NOW())`

The earliest data in one of the other log tables is also a useful start time for the date table. `CALENDAR (CALCULATE(MIN(UsageLog[LogTimeStamp])), (NOW())`

Time Table

A time table is the time reference to align meeting times and log time stamps across all tables. The time table includes every hour and minute in a 24-hour day. Seconds are not included in the table, so all time-based data rounds to the nearest minute.

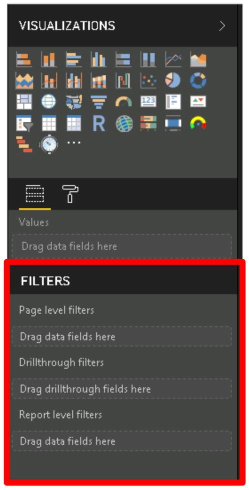
This table makes it possible to filter events for business hours.

Relating the Date and Time across Tables

Create a relationship between the Date field in the Date table and the fields that represent the local room date in the other tables. Create a relationship between the DayTime field in the TimeTable with the fields that represent the local room time in the other tables.

Filtering Techniques

Filtering is a powerful mechanism in Power BI Service and Desktop to help isolate the desired data. In the Report design of the Power BI Desktop application, apply filters to the entire report, a report page, or a specific visualization. Simply drag the desired field to the appropriate filter level to apply the filter, and adjust the parameters.



VISUALIZATIONS

Values

Drag data fields here

FILTERS

Page level filters

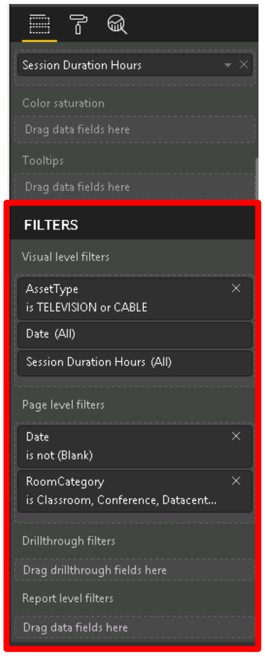
Drag data fields here

Drillthrough filters

Drag drillthrough fields here

Report level filters

Drag data fields here



Session Duration Hours

Color saturation

Drag data fields here

Tooltips

Drag data fields here

FILTERS

Visual level filters

AssetType
is TELEVISION or CABLE

Date (All)

Session Duration Hours (All)

Page level filters

Date
is not (Blank)

RoomCategory
is Classroom, Conference, Datacent...

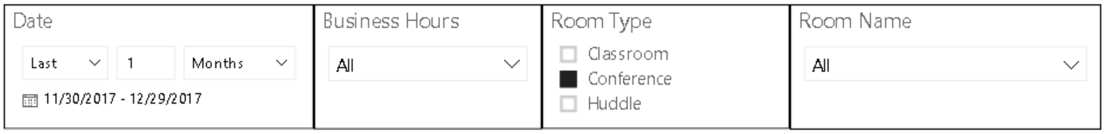
Drillthrough filters

Drag drillthrough fields here

Report level filters

Drag data fields here

The Crestron Fusion Dashboard template includes filters by date, hours, room type (room category), and room as part of the report. These filters utilize the slicer visualization applied to a specific field in a table.



Date

Last | 1 | Months

11/30/2017 - 12/29/2017

Business Hours

All

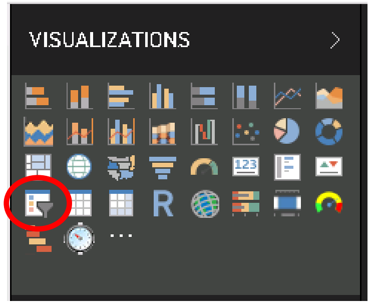
Room Type

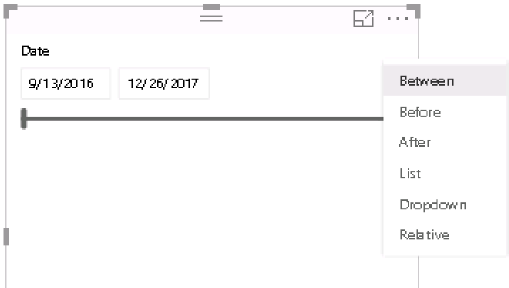
□ Classroom
■ Conference
□ Huddle

Room Name

All

The slicer visualization is an effective tool for filtering. Add the desired field to act as a filter to the report and apply the slicer visualization. The slicer has several options to present. For example, the Date Slicer allows a choice to choose a date between two dates, before a specific date, after a specific date, from list of dates, from a drop-down list, or from a relative date range. The Crestron Fusion Dashboard template uses the Relative date slicer throughout the report, which can easily be change if desired. The Business Hours and Room Name filters use the drop-down list, and Room Type filter uses a List.





Date

9/13/2016 | 12/26/2017

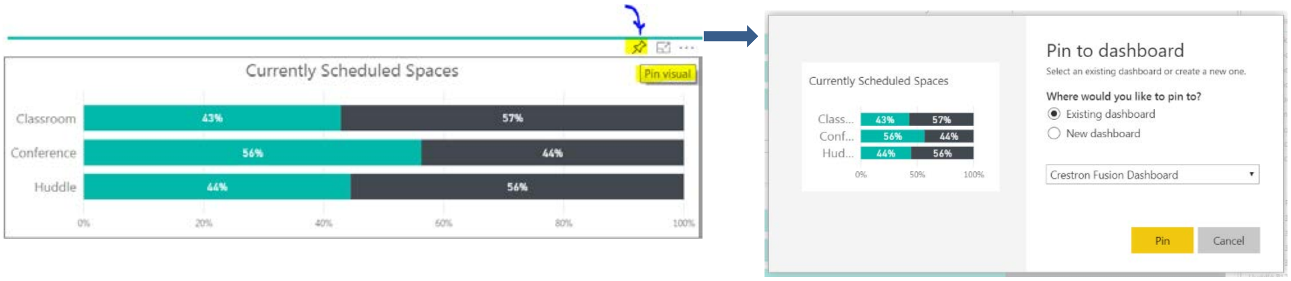
For more info on filtering see:

https://docs.microsoft.com/en-us/power-bi/power-bi-report-add-filter

Building a Dashboard

Dashboards are only available in the Power BI Service, not in the Power BI Desktop application. The dashboard is a one-page collection of visualizations that acts as a storyboard, or a summary for the underlying reports. The key visualizations from the report data are included in the dashboard story.

Each visualization is “pinned” to the dashboard and appears as a tile. Each tile links back to the corresponding report tab. To pin a visualization to the dashboard, locate the visualization in the report and hover over the top right corner, exposing a pushpin icon. Click the icon and follow the prompts to add this to an existing or new dashboard.



Pin to dashboard

Select an existing dashboard or create a new one.

Where would you like to pin to?

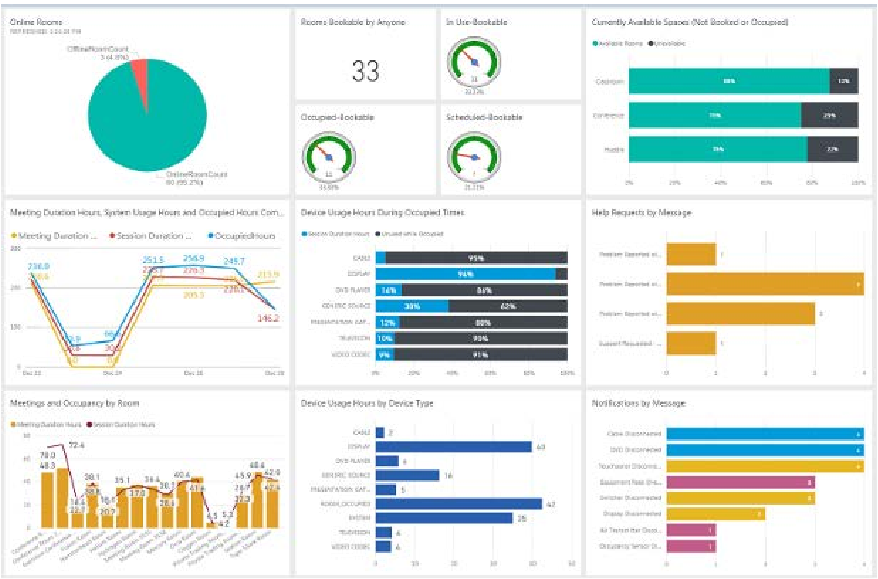
● Existing dashboard

○ New dashboard

Crestron Fusion Dashboard ▾

Pin Cancel

Tiles can be resized and rearranged on the dashboard once they are pinned. Arrange the tiles logically to tell a story. The dashboard also includes some options for tile flow and a Q&A that intuitively finds data and helps create charts. Each tile on the dashboard has options to include a title and subtitle, display the last refresh time, or a customize an external link.


Online Rooms
OfflineRoomCount
OnlineRoomCount
Rooms Bookable by Anyone
33
In Use-Bookable
Occupied-Bookable
Scheduled-Bookable
Currently Available Spaces (Not Booked or Occupied)
Meeting Duration Hours, System Usage Hours and Occupied Hours Com...
Meeting Duration ...
Session Duration ...
OccupiedHours
Device Usage Hours During Occupied Times
Help Requests by Message
Meetings and Occupancy by Room
Device Usage Hours by Device Type
Notifications by Message

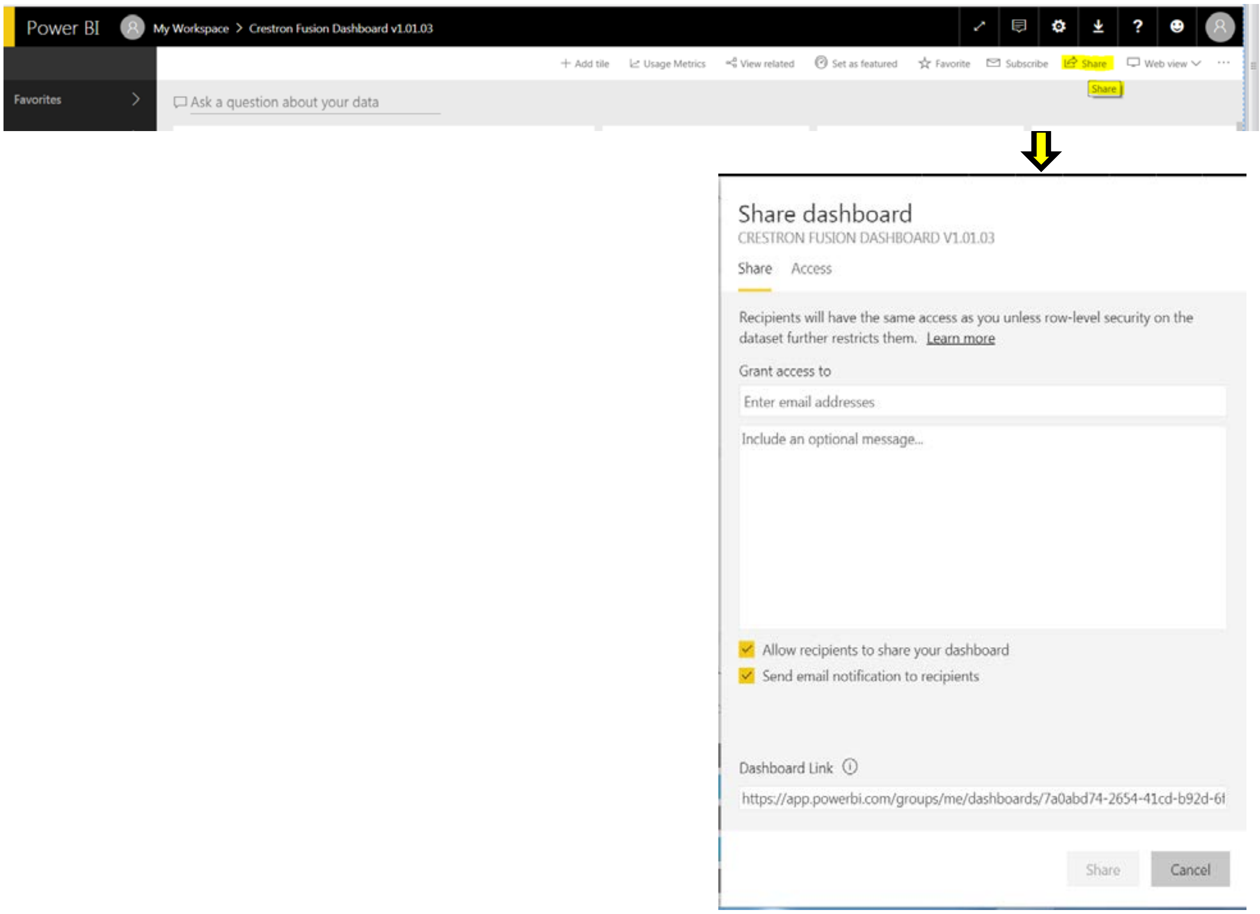
More info can be found at the following links:

https://powerbi.microsoft.com/en-us/guided-learning/powerbi-service-basic-concepts/

https://powerbi.microsoft.com/en-us/guided-learning/powerbi-service-dashboard-tiles/

Sharing Reports and Dashboards

The dashboard can be shared within an organization by using share menu.



Share dashboard
CRESTRON FUSION DASHBOARD V1.01.03

Recipients will have the same access as you unless row-level security on the dataset further restricts them. Learn more

Grant access to

Enter email addresses

Include an optional message...

☑ Allow recipients to share your dashboard

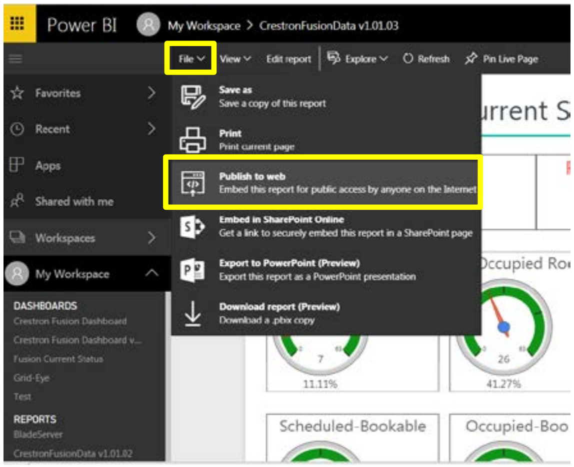
☑ Send email notification to recipients

Dashboard Link ⓘ

https://app.powerbi.com/groups/me/dashboards/7a0abd74-2654-41cd-b92d-6f

Sharing is one of several ways to provide Power BI reports to others. Dashboards can be shared within an organization. It may be possible to share outside an organization, but many domains are inaccessible, such as gmail.com and yahoo.com. In order to view a shared dashboard and report, users require a Power BI Pro account.

It is possible to publish a public link to the dashboard that anyone can see. There is no way to restrict access to this link. From the workspace File menu, choose Publish to web and click the button in the pop-up dialogue to create an embed link. Once the link is published, anyone on the Internet will have access to the dashboard and report.


Power BI
My Workspace > CrestronFusionData v1.01.03
File
View
Edit report
Explore
Refresh
Pin Live Page
Favorites
Recent
Apps
Shared with me
Workspaces
My Workspace
DASHBOARDS
Crestron Fusion Dashboard
Crestron Fusion Dashboard v...
Fusion Current Status
Grid-Eye
Test
REPORTS
BladeServer
CrestronFusionData v1.01.02
Save as
Save a copy of this report
Print
Print current page
Publish to web
Embed this report for public access by anyone on the Internet
Embed in SharePoint Online
Get a link to securely embed this report in a SharePoint page
Export to PowerPoint (Preview)
Export this report as a PowerPoint presentation
Download report (Preview)
Download a .pbix copy
urrent S
Occupied Ro
7
11.11%
26
41.27%
Scheduled-Bookable
Occupied-Boo

Users viewing the shared dashboard can see reports in a read-only view. They do not have access to the dataset and cannot edit the report or make new reports. They can adjust the filters and slicers on the report but cannot save changes.

Revoke share privileges at any time from the Access menu in the Share Dashboard dialogue (see image above).

The ability to print reports is also available.

For more info see:

https://docs.microsoft.com/en-us/power-bi/service-how-to-collaborate-distribute-dashboards-reports

https://docs.microsoft.com/en-us/power-bi/service-share-dashboards

Crestron Fusion Report Readiness Tool

Purpose

The Crestron Fusion Report Readiness Tool determines what data may be available for Power BI. It can also identify problems with data integrity if they exist, such as duplicate data, excessive log data, and long usage sessions spanning time periods greater than a single day, etc.

The Crestron Fusion Report Readiness Tool lists the available static reports and Power BI visualizations, as well as the reports and visualization that will not produce results. It offers insight into the data for troubleshooting purposes and helps determine if an upgrade requires additional pre-upgrade steps.

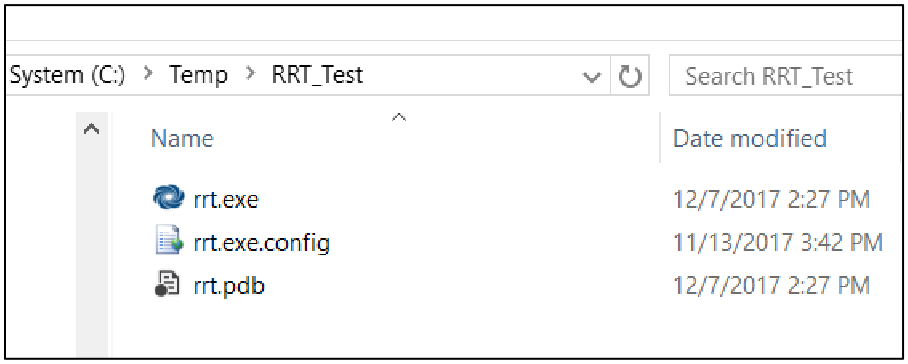
Launching the Report Readiness Tool

The Report Readiness Tool is a Microsoft Windows forms application consisting of a single executable file (.exe) and a configuration (.config) file. The optional rrt.pdb file pictured below, which provides debug information in the event the application fails, is not required for runtime.

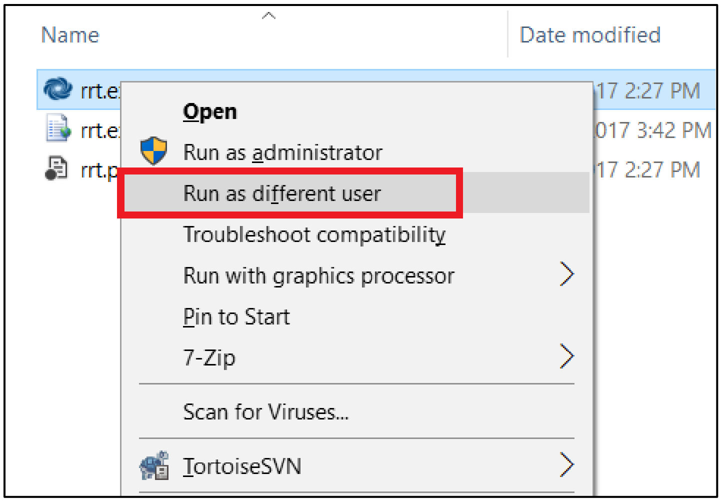
The application operates as a stand-alone executable compatible with Microsoft Windows operating systems for desktop and server, including Windows 7/Windows Server 2008 R2 and later.

The Report Readiness Tool is part of the Crestron Fusion Dashboard download archive. Extract the three files from the archive to a new directory on a computer that has access to the database, like the Crestron Fusion application server.

Double-click rrt.exe to run the application as the currently logged in user. Alternately, hold down the shift key and right-click on rrt.exe and select Run as different user from the context menu if a different account is required for SQL access.



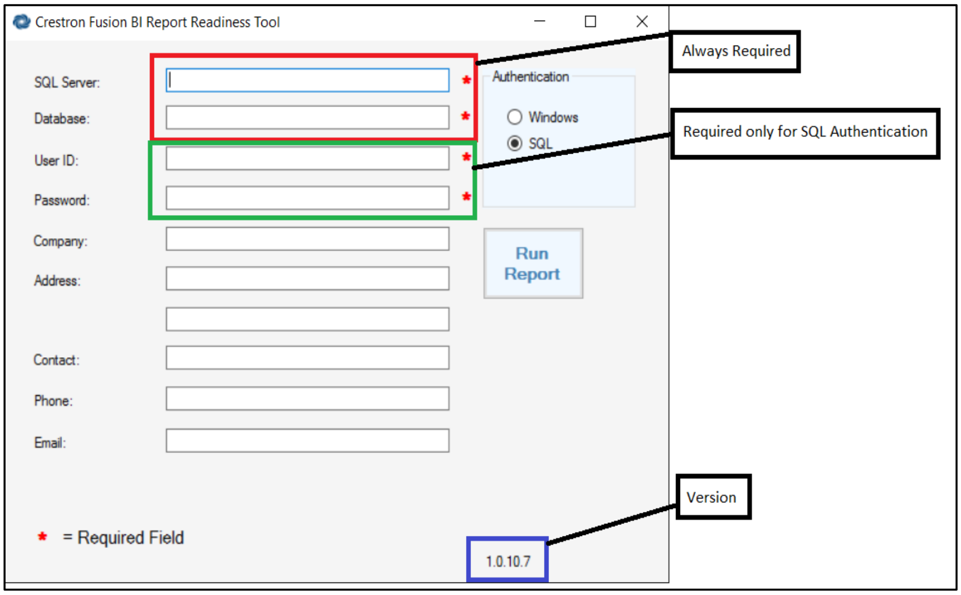
Name	Date modified
rrt.exe	12/7/2017 2:27 PM
rrt.exe.config	11/13/2017 3:42 PM
rrt.pdb	12/7/2017 2:27 PM



Operation

After launching the application, the following screen appears.

Crestron Fusion BI Report Readiness Tool Screen



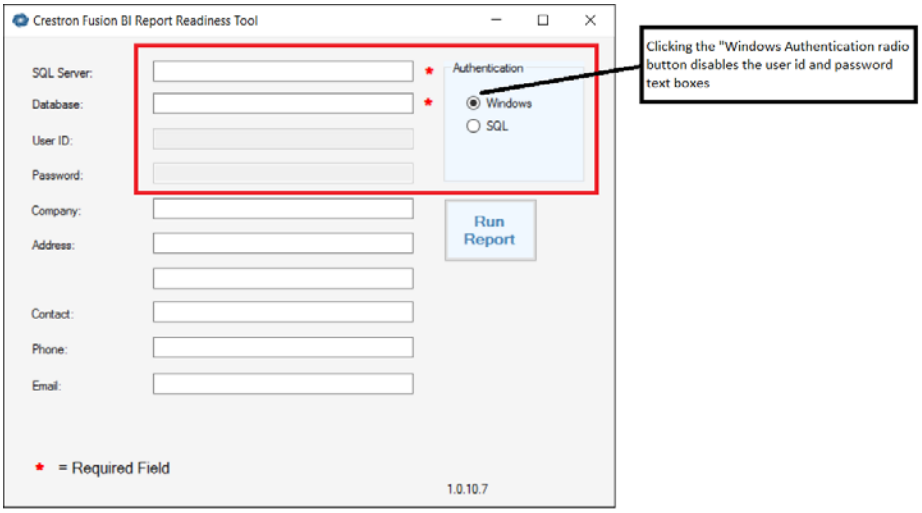
Always Required

Required only for SQL Authentication

Version

Use the **Authentication** radio buttons to select the authentication method to connect to SQL. There are four required data entry fields for SQL authentication, or only two if using Windows Authentication.

Crestron Fusion Report Readiness Tool Screen



Crestron Fusion BI Report Readiness Tool

SQL Server: ★

Database: ★

User ID:

Password:

Company:

Address:

Contact:

Phone:

Email:

Authentication

● Windows

○ SQL

★ = Required Field

1.0.10.7

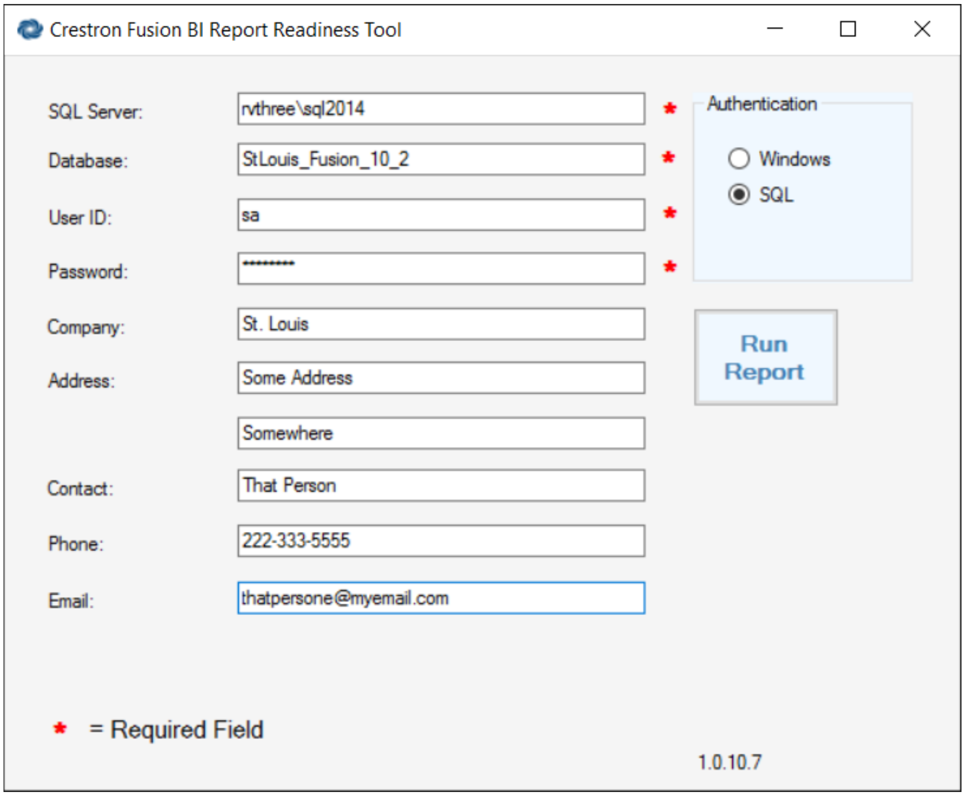
Clicking the "Windows Authentication radio button disables the user id and password text boxes

Running the tool

Additional fields provide information to help identify the customer and deployments that appear on the report after clicking the Run Report button.

Fill out the form and click Run Report.

Crestron Fusion BI Report Readiness Tool Screen



Crestron Fusion BI Report Readiness Tool

SQL Server: rvthree\sql2014 ★

Database: StLouis_Fusion_10_2 ★

User ID: sa ★

Password: ********* ★

Company: St. Louis

Address: Some Address

Somewhere

Contact: That Person

Phone: 222-333-5555

Email: thatpersone@myemail.com

Authentication

○ Windows

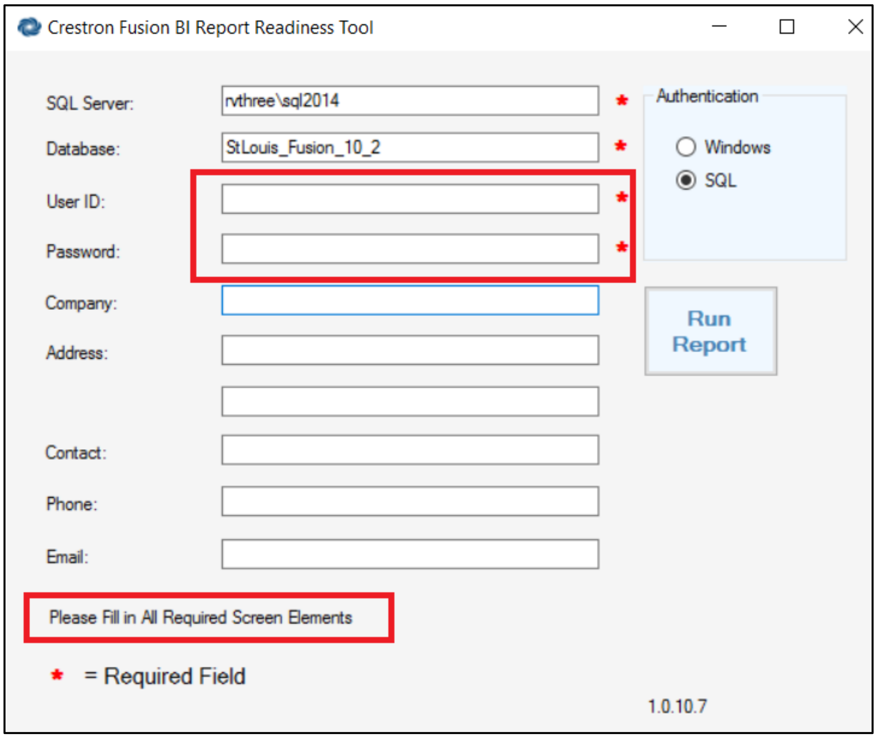
● SQL

★ = Required Field

1.0.10.7

If any required fields are missing, the program prompts as pictured below.

Crestron Fusion BI Report Readiness Tool Screen



Crestron Fusion BI Report Readiness Tool

SQL Server: rvthree\sql2014 *

Database: StLouis_Fusion_10_2 *

User ID: *

Password: *

Company:

Address:

Contact:

Phone:

Email:

Authentication

○ Windows

● SQL

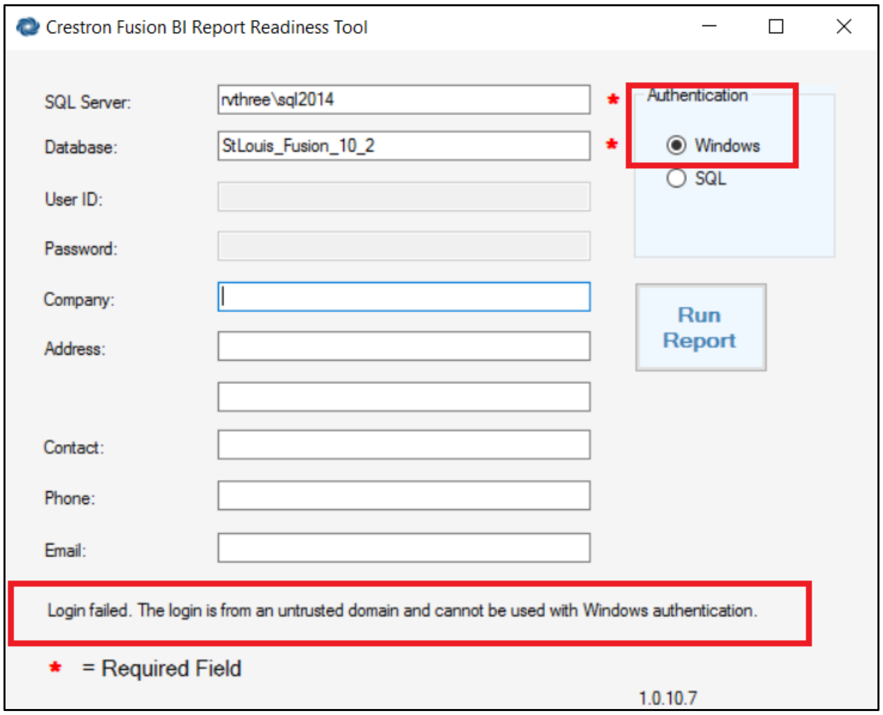
Please Fill in All Required Screen Elements

* = Required Field

1.0.10.7

In the event that the SQL credentials have insufficient privileges, the program prompts as pictured below.

Crestron Fusion BI Report Readiness Tool Screen



Crestron Fusion BI Report Readiness Tool

SQL Server: rvthree\sql2014 *

Database: StLouis_Fusion_10_2 *

User ID:

Password:

Company:

Address:

Contact:

Phone:

Email:

Authentication

● Windows

○ SQL

Login failed. The login is from an untrusted domain and cannot be used with Windows authentication.

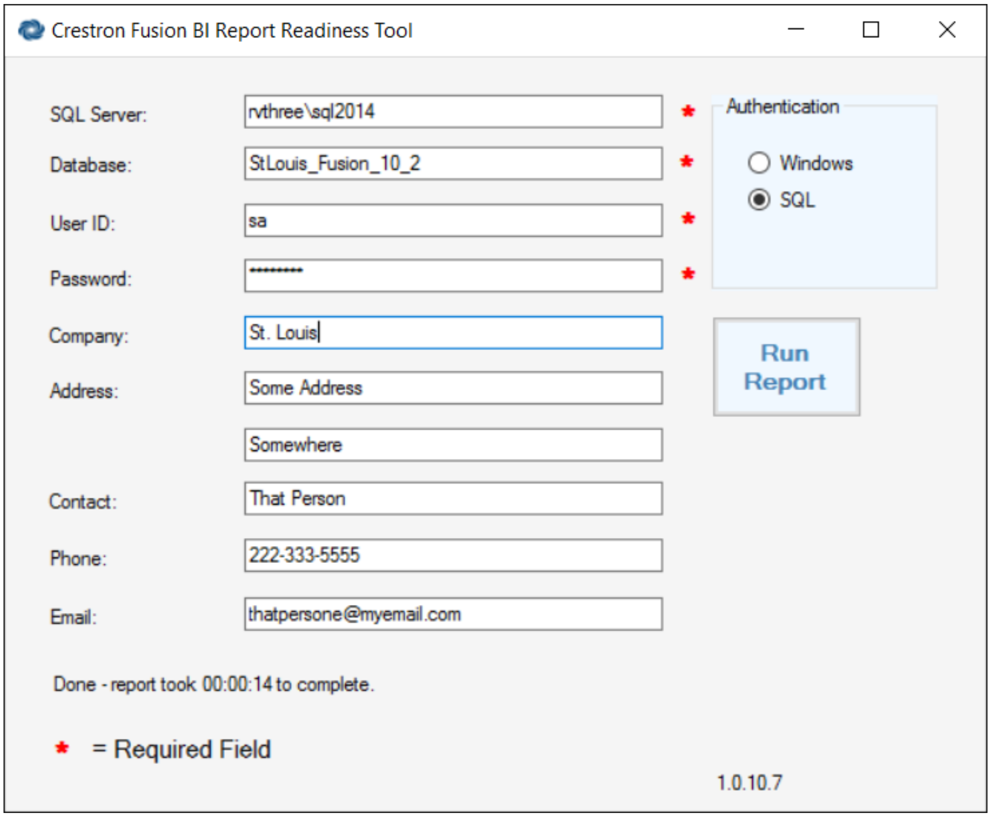
* = Required Field

1.0.10.7

In this example, the program created a report in fourteen seconds.

The data entered is stored in the configuration file and recalled every time the report runs.

Crestron Fusion BI Report Readiness Tool Screen



Crestron Fusion BI Report Readiness Tool

SQL Server:	rvthree\sql2014 *
Database:	StLouis_Fusion_10_2 *
User ID:	sa *
Password:	********* *
Company:	St. Louis
Address:	Some Address
	Somewhere
Contact:	That Person
Phone:	222-333-5555
Email:	thatpersone@myemail.com

Authentication

○ Windows
● SQL

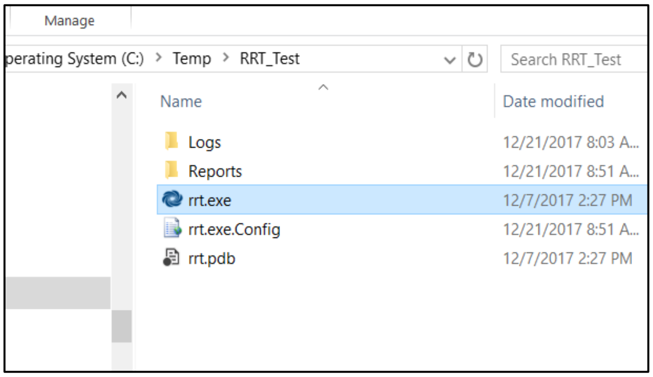
Done - report took 00:00:14 to complete.

* = Required Field

1.0.10.7

The Output

The application creates a Reports folder in the directory from where it runs. It also creates a Logs folder, which contains any errors encountered.

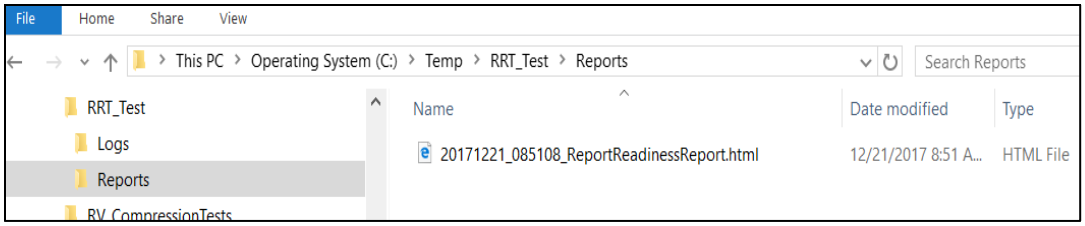


perating System (C:) > Temp > RRT_Test

Name	Date modified
Logs	12/21/2017 8:03 A...
Reports	12/21/2017 8:51 A...
rrt.exe	12/7/2017 2:27 PM
rrt.exe.Config	12/21/2017 8:51 A...
rrt.pdb	12/7/2017 2:27 PM

To create the Reports and Logs folders:

1. Use windows file manager to open the directory where rrt.exe is located
2. Locate the Reports folder in that directory and open it
3. Double click the html report document. It will open in the default browser
4. If prompted for permission, click Allow

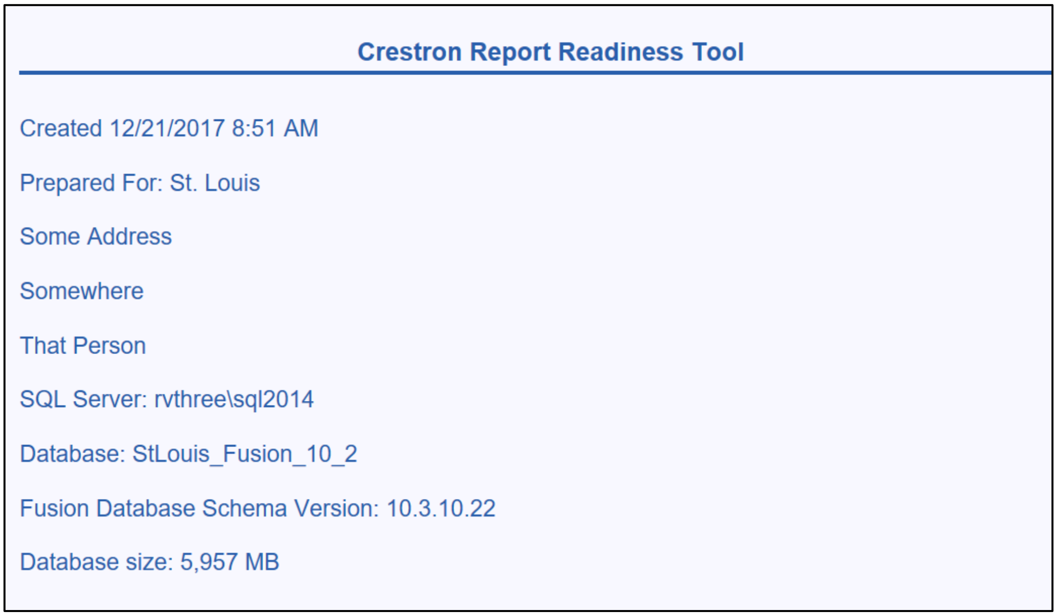


20171221_085108_ReportReadinessReport.html 12/21/2017 8:51 A... HTML File

The Report

Heading

The heading of the report shows the SQL Server, Database, Company, Database size, and any other data entered on the original form.



Crestron Report Readiness Tool

Created 12/21/2017 8:51 AM

Prepared For: St. Louis

Some Address

Somewhere

That Person

SQL Server: rvthree\sql2014

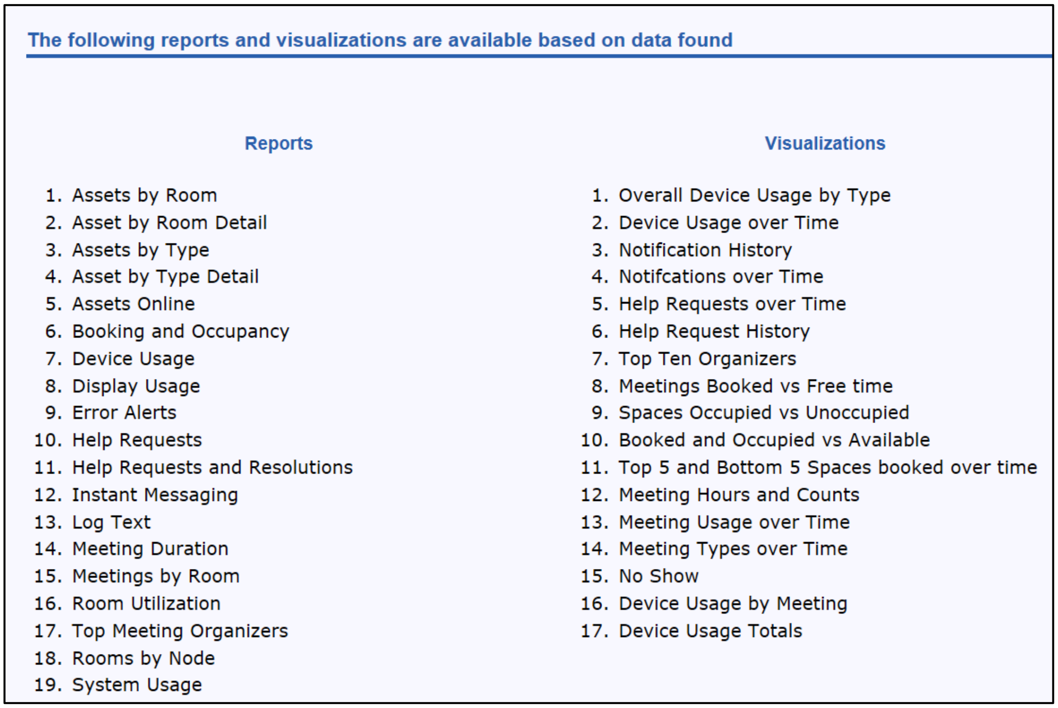
Database: StLouis_Fusion_10_2

Fusion Database Schema Version: 10.3.10.22

Database size: 5,957 MB

Reports and Visualizations

Based on data found, the report presents a list of available Crestron Fusion reports and Power BI visualizations from the included template.



The following reports and visualizations are available based on data found

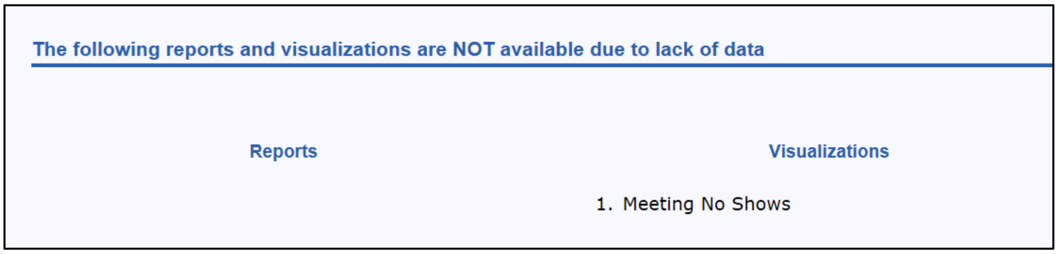
Reports

1. Assets by Room
2. Asset by Room Detail
3. Assets by Type
4. Asset by Type Detail
5. Assets Online
6. Booking and Occupancy
7. Device Usage
8. Display Usage
9. Error Alerts
10. Help Requests
11. Help Requests and Resolutions
12. Instant Messaging
13. Log Text
14. Meeting Duration
15. Meetings by Room
16. Room Utilization
17. Top Meeting Organizers
18. Rooms by Node
19. System Usage

Visualizations

1. Overall Device Usage by Type
2. Device Usage over Time
3. Notification History
4. Notifcations over Time
5. Help Requests over Time
6. Help Request History
7. Top Ten Organizers
8. Meetings Booked vs Free time
9. Spaces Occupied vs Unoccupied
10. Booked and Occupied vs Available
11. Top 5 and Bottom 5 Spaces booked over time
12. Meeting Hours and Counts
13. Meeting Usage over Time
14. Meeting Types over Time
15. No Show
16. Device Usage by Meeting
17. Device Usage Totals

The report also lists Crestron Fusion reports and Power BI visualizations with no supporting data that subsequently will not render.



The following reports and visualizations are NOT available due to lack of data

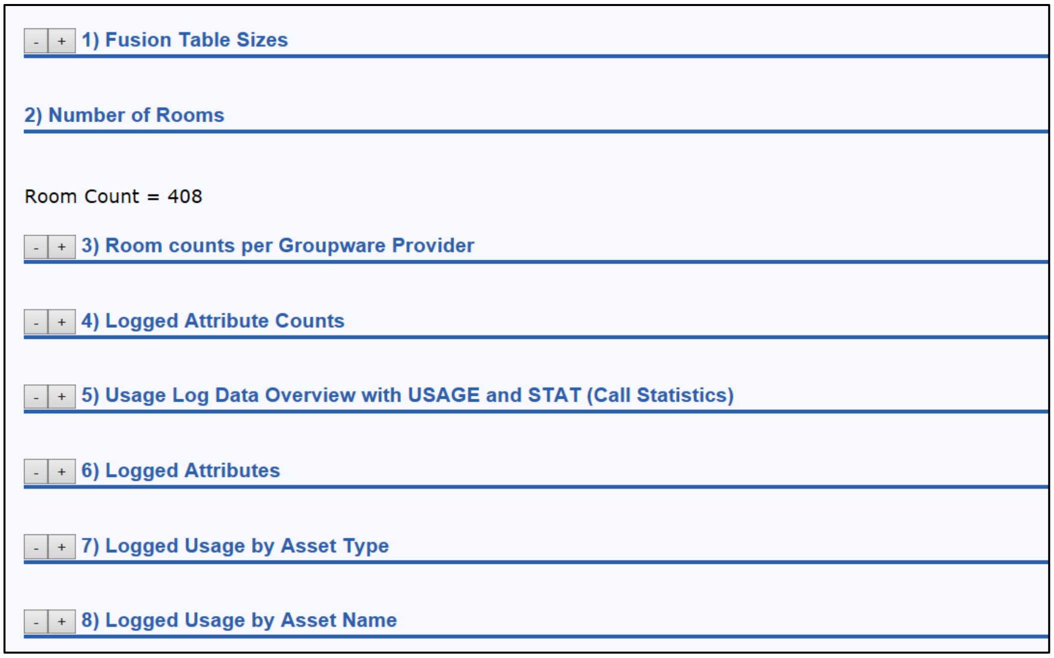
Reports

Visualizations

1. Meeting No Shows

Data Analysis

Additional data analysis is available in the groups as shown below. If the result set of a query is a single row of data, then the result shows directly on the report, as in the Number of Rooms section. Larger, multiple row results are viewed by clicking + alongside the section header to expand the section. Collapse the section by clicking -.



- + 1) Fusion Table Sizes

2) Number of Rooms

Room Count = 408

- + 3) Room counts per Groupware Provider

- + 4) Logged Attribute Counts

- + 5) Usage Log Data Overview with USAGE and STAT (Call Statistics)

- + 6) Logged Attributes

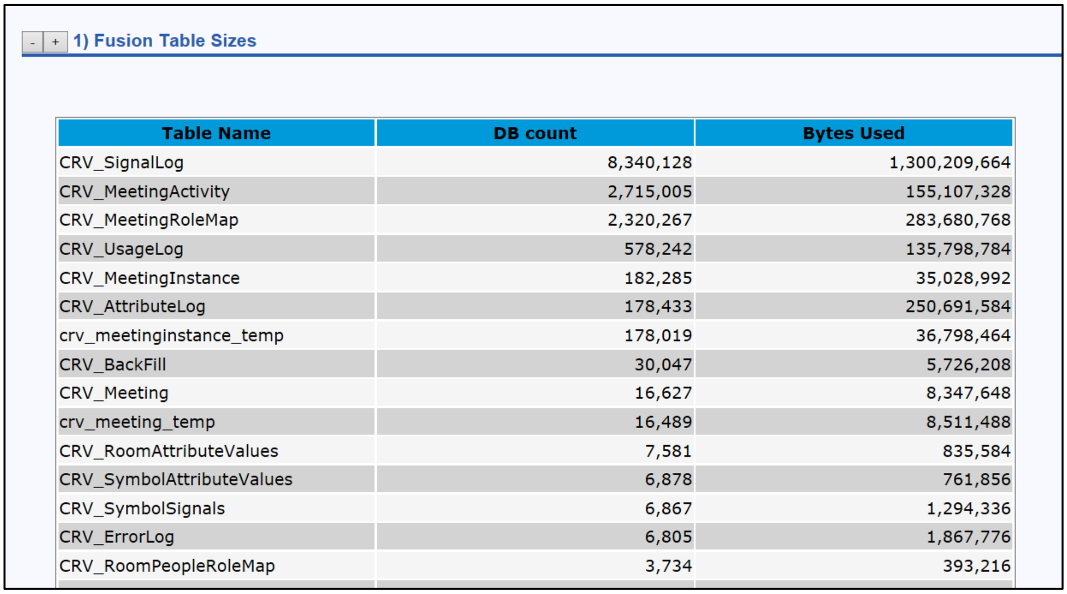
- + 7) Logged Usage by Asset Type

- + 8) Logged Usage by Asset Name

In this example, the sizes of the Crestron Fusion tables are displayed by clicking the + sign on item 1).

Upgrading this database might require truncating several tables. The Crestron Fusion Support Group can assist with understanding the benefits and possible repercussions of data purging.

Crestron Fusion Table Sizes



- + 1) Fusion Table Sizes

Table Name	DB count	Bytes Used
CRV_SignalLog	8,340,128	1,300,209,664
CRV_MeetingActivity	2,715,005	155,107,328
CRV_MeetingRoleMap	2,320,267	283,680,768
CRV_UsageLog	578,242	135,798,784
CRV_MeetingInstance	182,285	35,028,992
CRV_AttributeLog	178,433	250,691,584
crv_meetinginstance_temp	178,019	36,798,464
CRV_BackFill	30,047	5,726,208
CRV_Meeting	16,627	8,347,648
crv_meeting_temp	16,489	8,511,488
CRV_RoomAttributeValues	7,581	835,584
CRV_SymbolAttributeValues	6,878	761,856
CRV_SymbolSignals	6,867	1,294,336
CRV_ErrorLog	6,805	1,867,776
CRV_RoomPeopleRoleMap	3,734	393,216

The SQL

The final section of the report presents the SQL queries used to generate the data for each section. A database administrator may run these queries directly in Microsoft SQL Management Studio.

Crestron Fusion Table Sizes

```
SELECT m.name 'Table Name' , im.rows 'DB count', (convert(bigint, im.dpages) *
8192) 'Bytes Used' FROM sys.tables m INNER JOIN sys.sysindexes im ON (m.object_id
= im.id AND im.indid < 2) WHERE im.rows > 1000 and (m.name like 'crv%' or m.name
like 'cfv%' ) order by im.rows desc, m.name
```

Number of Rooms

```
SELECT Count(*) 'Room Count' FROM CRV_Rooms WHERE Type = 'Room'
```

Room Counts per Groupware Provider

```
SELECT isnull(GroupwareProviderType, 'NO GroupWare Defined') 'GW Provider Type' ,
Count(*) 'Groupware Count' from CRV_Rooms WHERE Type = 'Room' group by
GroupwareProviderType union select 'Total Count', count(*) FROM CRV_Rooms WHERE
Type = 'Room' order by Count (*)
```

Logged Attribute Counts

```
SELECT isnull(data2, 'Missing Attribute') 'Logged Attribute' , count(*) 'Logged
Attribute Count' from CRV_UsageLog group by data2 Union select 'Total Count',
count(*) 'Logged Attribute Count' FROM CRV_UsageLog order by Count(*) desc
```

Usage Log Data Overview with USAGE and STAT (Call Statistics)

```
SELECT isnull(DataType, 'No Data Type') 'Data Type', count(*) 'Logged Attribute
Count' from CRV_UsageLog group by DataType Union SELECT 'Total Count', count(*)
'Logged Attribute Count' FROM CRV_UsageLog order by Count(*) desc
```

Logged Attributes

```
SELECT attributeid 'Attribute ID' , min (logtimestamp ) 'First Logged Date',
max(logtimestamp) 'Last Logged Date', count(*) 'Attribute Count' FROM
CRV_AttributeLog group by attributeid Union select 'Total Count', ' ', ' ',
count(*) 'Attribute Count' FROM CRV_AttributeLog order by Count(*) desc
```

Logged Usage by Asset Type

```
SELECT R.RoomName 'Room Name' , UL.data2 'Attribute ID', count(*) 'Logged
Attribute Count Per Room' FROM CRV_UsageLog UL join CRV_Rooms R on UL.RoomID =
R.RoomID group by R.RoomName, UL.data2 Union SELECT 'Total Count', ' ', count(*)
'Logged Attribute Count ' FROM CRV_UsageLog order by count(*) desc
```

Logged Usage by Asset Name

```
SELECT data3 'Device', count(*) 'Count of Devices' FROM CRV_UsageLog group by
data3 Union select 'Total Count', count(*) 'Count of Devices' FROM CRV_UsageLog
order by count(*) desc
```

Meeting Counts Per Room

```
SELECT R.RoomName 'Room Name' , count(*) 'Meeting Count' FROM CRV_Meeting M join
CRV_MeetingInstance MI on m.meetingid = mi.meetingid Join CVR_Rooms R on
mi.Roomid = R.Roomid group by R.RoomName Union Select 'Total Count', count(*)
'Meeting Count' FROM CRV_Meeting order by Count (*) desc
```

Notifications

```
SELECT isnull(Message, 'Empty Message') Message , count (*) 'Message Count' FROM
CRV_ErrorLog group by Message Union Select 'Total Count', count(*) 'Error Count'
FROM CRV_ErrorLog order by count(*) desc
```

Help Requests

```
SELECT isnull(Message, 'Empty Message') Message, count (*) 'Help Request Count'
FROM CRV_HelpRequests group by Message Union Select 'Total Count', count(*) 'Help
Count' FROM CRV_HelpRequests order by count(*)
```

Asset Types

```
SELECT isnull(Conntype, ' ') 'Connection Type' , AssetTypeid 'Asset Type' ,
count(*) 'Asset / Connection Type Count' FROM CRV_Assets group by Conntype,
AssetTypeid Union Select 'Total Count', ' ', count(*) 'Asset Count' FROM
CRV_Assets order by count(*) desc
```

Usage Data with Excessive Minutes

```
SELECT top(1000) R.RoomName 'Room Name', UL.DataType 'Data Type' , UL.Data1,
UL.Data2, UL.Data5 'Minutes' FROM CRV_UsageLog UL Join CRV_Rooms R on UL.RoomID =
R.RoomID WHERE UL.data5 > 10000000
```

Usage Data with Minutes Greater Than 1 day

```
SELECT top(1000) R.RoomName 'Room Name', UL.DataType 'Data Type' , UL.Data1,
UL.Data2, UL.Data5 'Minutes' from CRV_UsageLog UL Join CRV_Rooms R on UL.RoomID =
R.RoomID WHERE UL.data5 >= 1440 and UL.data5 < 10000000
```

Duplicate Attribute Log Data

```
SELECT Top (1000) Attributeid 'Attribute ID' , R.RoomName 'Room Name',
convert(nvarchar(23), LogTimeStamp, 121) LogTimeStamp, count(*) 'Duplicate Row
Count' FROM CRV_AttributeLog AL Join CRV_Rooms R on AL.roomid = R.roomid group by
Attributeid, R.RoomName , convert(nvarchar(23), LogTimeStamp, 121) having count(*)
> 1 Order By Count(*) desc
```

Duplicate Usage Log Data

```
SELECT top(1000) R.RoomName 'Room Name' , datatype, data1, data2, data3,
convert(varchar(23), logtimestamp, 121) 'Log Time Stamp' , count(*) 'Duplicate
Count' FROM CRV_UsageLog UL Join CRV_Rooms R on UL.RoomID = R.RoomID Group By
r.roomname, datatype, data1, data2, data3, convert(varchar(23), logtimestamp, 121)
having count(*) > 1
```

Useful SQL Queries – Call Statistics

```
SELECT r.roomname, u.* from CRV_UsageLog
u join CRV_Rooms r on u.roomID = r.roomid
WHERE Data1 ='call'
order by LogTimeStamp desc
```

Occupancy

```
SELECT LogTimeStamp,RoomID,Data5 'Occupied Time' FROM CRV_UsageLog
WHERE data2 = 'ROOM_OCCUPIED'
SELECT r.RoomName, a.AttributeName, al.LogTimeStamp, al.AnalogValue
FROM CRV_AttributeLog al
join CRV_Attributes a on al.AttributeID = a.AttributeID
join CRV_Rooms r on al.RoomID= r.RoomID
WHERE a.AttributeID = 'Online_Status'
order by al.LogTimeStamp desc
```

Find “Network Connected” Assets

```
SELECT AssetName, Model FROM CRV_Assets
WHERE ConnType = 'ActiveCNX'
```

Find Duplicates in the Attribute Log

```
SELECT Attributeid, Roomid, convert(nvarchar(19), LogTimeStamp, 121) LTS, count(*)
iCNT
FROM CRV_AttributeLog
group by Attributeid, Roomid, convert(nvarchar(19), LogTimeStamp, 121)
having count(*) > 1
```

Find Duplicates in the Usage Log

```
SELECT roomid, datatype, data1, data2, data3, convert(varchar(19), logtimestamp,
121) lts, count(*) iCNT
FROM CRV_UsageLog
Group By roomid, datatype, data1, data2, data3, convert(varchar(19), logtimestamp,
121)
having count(*) > 1
```

Attribute History

```
SELECT r.RoomName, a.AttributeName, al.LogTimeStamp, al.AnalogValue
FROM CRV_AttributeLog al
join CRV_Attributes a on al.AttributeID = a.AttributeID
join CRV_Rooms r on al.RoomID= r.RoomID
WHERE a.AttributeID = 'DISPLAY_USAGE' and r.Roomid ='7c31f850-9f14-49ec-b79c-
ded7fa77d11f' order by al.LogTimeStamp, r.RoomID desc
```

Glossary

Ad Hoc

Ad Hoc is a meeting typically made anonymously from a scheduling panel. “Reserve Now” meetings are an example of an Ad Hoc meeting.

Attributes

In Crestron Fusion, an attribute represents a digital, analog, or serial signal in the program running on a processor.

Bookable rooms

Bookable rooms are rooms with calendars that are shared resources, available to anyone to reserve for meetings.

Non-bookable rooms

Non-bookable rooms include common areas such as hallways and bathrooms, offices, open office spaces, retail spaces, and datacenters.

GUID

GUID stands for “Globally Unique Identifier,” used to identify many objects in the Crestron Fusion database.

RVI

RVI is a “RoomView Information” file. These files, created when a Crestron program compiles, contain all of the relevant Crestron Fusion information from the corresponding program. Crestron Fusion parses this XML formatted file and builds the corresponding database records.

Decline for No Show (D4NS)

D4NS is a native application on Crestron scheduling panels that will free up a room’s calendar when a meeting is unattended.

Groupware Provider

Groupware Provider refers to the system that provides a calendar for the rooms in Crestron Fusion. Examples are Microsoft Exchange Server® software, Google Calendar™ app, IBM Notes® software, etc.

BI

BI (Business Intelligence) refers to the analysis of data to produce an actionable story that acts as the basis for business decisions.

Data shaping

Data shaping is the process of manipulating existing data to bring together diverse datasets in order to produce an overall report.

SSI – Single Simple Interface

SSI is a set of attributes (signals) and behaviors that define how to send data to Crestron Fusion software.

Visualization

A Visualization is an interactive chart, table or graph that presents data in a report.

Filter

Filter is a control in a Power BI or other report that isolates specific data in the visualization.

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