BRAVIA Meeting

User Guide

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1. Overview

BRAVIA Meeting provides a means of comfortably using a BRAVIA that is installed in a meeting room.

You can select either the free or paid version of BRAVIA Meeting to suit your specific requirements.

Common Functions

You can use the following main functions in both the free and paid versions of BRAVIA Meeting:

- Automatic switching of inputs
  - This software can automatically execute input switching.
  - BRAVIA automatically displays the PC screen simply by connecting the external input terminal to the PC.
- Automatic power OFF function
  - This software automatically turns BRAVIA OFF after a fixed period of inactivity (no input or operations performed) has elapsed.
- Presentation timer
  - This software allows you to display a timer on the screen simply by one-touch operation of the remote control.
- Customizing the home screen
  - You can customize the home screen as you like. For example, playing back still images or videos or embedding your favorite web page.
  - You can customize the names of external inputs or icon images.
- Customizing the Help page
  - You can specify the URL of your favorite web page as the Help page.

Functions in Paid Version

You can use the following functions in only the paid version of BRAVIA Meeting:

- BRAVIA Meeting Server
  - You can manage BRAVIAs on which BRAVIA Meeting Display Software is installed.
  - You can automatically turn a connected BRAVIA ON and OFF with the power schedule setting.
  - Local admin accounts and OAuth2 authentication for the admin page are supported.
- Annotation mode (draw function)
  - You can draw annotation overlaying a connected external input.
  - You can use the screen as a whiteboard when there are no connected external inputs.
- Schedule collaboration with groupware
  - You can display the reservation status of the meeting room on the BRAVIA Meeting home screen in collaboration with groupware.
  - The following groupware is supported:
    - G Suite (Google Calendar)
    - Microsoft Office 365
    - Microsoft Exchange
- Video Conference
  - BRAVIA Meeting supports video conference between two BRAVIAs with a USB camera or a USB microphone. You can select either video and audio mode or audio only mode when you start video conference.
- You can perform the following by using the companion applications of BRAVIA Meeting that are installed on a Windows device or a Mac.
  - Start Mirroring / Stop Mirroring
    - Display the screen of your computer on the meeting room BRAVIA through screen mirroring. You can also capture the screen of your computer as a still image and display it on the meeting room BRAVIA.
  - Capture Display Screenshot
    - Download and save screenshots displayed on the meeting room BRAVIA to your computer.
  - Send My Pointer
    - Use mouse and touch panel controls on your computer to display the pointer on the meeting room BRAVIA and draw pictures using the annotation function. And draw picutres on your conputer and send them to the meeting room BRAVIA.
  - Allow Remote Operation
    - Use the touch controls with the meeting room BRAVIA which is equipped with the touch panel to operate your computer remotely.
  - External Input Change
    - Change the external input or return the screen to HOME on the meeting room BRAVIA.
  - Start Video Conference
    - Launch a video conference on the meeting room BRAVIA.

2. System Requirements

BRAVIA Meeting Display

BRAVIAs which support professional mode.

BRAVIA Meeting Server

- Server
  - Synology NAS
    - See Synology web site(https://www.synology.com/en-global/dsm/packages/Sony_BraviaMeeting).
  - Windows
    - Supported OS
      - Windows 8.1 Pro 64bit
      - Windows 10 Pro 64bit
- Browser
  - IE 11
  - Google Chrome

BRAVIA Meeting Client

- Supported OS
  - Windows 8.1 Pro 64bit
  - Windows 10 Pro 64bit
  - macOS 10.15 Catalina (*1)
  - macOS 11.0 Big Sur (*1)

(*1) Touch operation of the remote operation from display is not supported.

3. System Configuration

System Configuration Elements

- BRAVIA Meeting Display
  - This is the BRAVIA on which BRAVIA Meeting Display Software is installed.
  - In the rest of this document, it will be abbreviated as "BM1 Display".
  - The BM1 Display Software comes in two versions, free and paid, depending on the supported functions.
- BRAVIA Meeting Server
  - This is the server on which BRAVIA Meeting Server Software is installed.
  - In the rest of this document, it will be abbreviated as "BM1 Server".
- BRAVIA Meeting Management Server
  - This is a logical entity of BM1 Server for managing the BM1 Displays.
  - In the rest of this document, it will be abbreviated as "BM1 Management Server".
- BRAVIA Meeting Collaboration Server
  - This is a logical entity of BM1 Server for performing the collaboration functions between BM1 Display and BRAVIA Meeting Client, the companion application described later.
  - In the rest of this document, it will be abbreviated as "BM1 Collaboration Server".
- BRAVIA Meeting Client
  - This is a companion application installed on a Windows or Mac OS.
  - In the rest of this document, it will be abbreviated as "BM1 Client".

System Configuration Patterns

You can configure the BRAVIA Meeting system in the following ways:

- Standalone configuration
- Display management only configuration
- Integrated server configuration
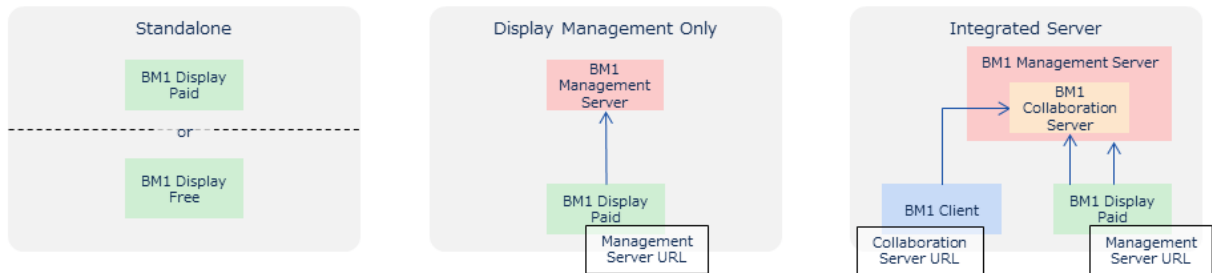
Standalone Configuration

- In this configuration, BM1 Display (free or paid version) is used by itself.
  - The free version of BM1 Display is supported only in this configuration.
- Remote control by BM1 Management Server and collaboration with BM1 Client are not used.
- The BRAVIA needs to be connected to a network.

Display Management Only Configuration

- In this configuration, only BM1 Display (paid version) is supported.
- BM1 Management Server is used and BM1 Collaboration Server is not used.
- The BRAVIA needs to be connected to a network.

Integrated Server Configuration

- In this configuration, only BM1 Display (paid version) is supported.
- Both BM1 Management Server and BM1 Collaboration Server are used.
  - BM1 Management Server equals BM1 Server.
  - BM1 Collaboration Server is included in BM1 Server.
    - The IP address and port number of BM1 Collaboration Server are same as those of BM1 Server.
- The BRAVIA needs to be connected to a network.

TLS Communications

When BRAVIA Meeting is used in a configuration other than standalone, we recommend performing all communications by TLS communications.

BRAVIA Meeting supports configurations that use TLS communications (server and client authentication). However, BM1 Management Server and BM1 Collaboration Server do not directly support TLS communications, and so a reserve proxy must be installed to perform TLS communications.

You must also issue and manage certificates separately for performing authentication.
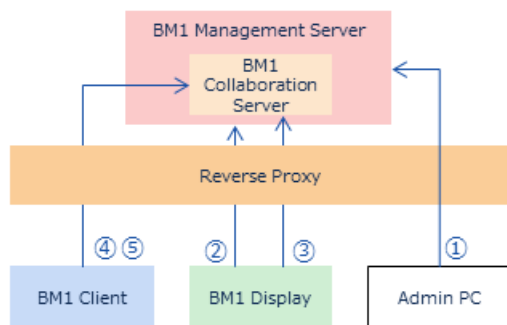
The following is an outline of operations to perform when TLS is supported.

1. BM1 Admin Page
   - TLS communications are supported.
   - Reverse proxy
     - Set server authentication, client authentication, basic authentication, etc., if required.
     - Set the following forwarding setting.
       ```
       /manage/ui/ → http://<BM1 Management Server IP address>:40004/manage/ui/
       ```
   - BM1 Admin Page
     - Specify the URL of the reverse proxy under "Display Management URL" in the settings.
       ```
       https://<Reverse Proxy FQDN>:<Reverse Proxy port number>
       ```
     - PC
       - Set the root certificate, the intermediate certificate for authenticating server certificates, or client certificates, if required.
         ```
         https://<Reverse Proxy FQDN>:<Reverse Proxy port number>/manage/ui/
         ```

2. BM1 Display → BM1 Management Server communications
   - TLS communications (server and client authentication) are supported.
   - Reverse proxy

- - Set server and client authentication.
  - Set the following forwarding setting.
    `/manage/display/ → http://<BM1 Management Server IP address>:40004/manage/display/`

  - BM1 Display
    - Using the import settings from USB storage device function, set the root certificate, the intermediate certificate for authenticating server certificates, or client certificates.
    - Specify the URL of the reverse proxy under "Server URL" in the settings.
      `https://<Reverse Proxy FQDN>:<Reverse Proxy port number>`

3. BM1 Display → BM1 Collaboration Server communications
   - TLS communications (server and client authentication) are supported.
   - Reverse proxy
     - Set server and client authentication.
     - Set the following forwarding setting.
       `/collab/display/ → http://<BM1 Collaboration Server IP address>:40004/collab/display/`

   - BM1 Admin Page
     - Specify the URL of the reverse proxy under "Collaboration Server URL" in the settings.
       `https://<Reverse Proxy FQDN>:<Reverse Proxy port number>`

   - BM1 Display
     - Using the import settings from USB storage device function, set the root certificate or the intermediate certificate for authenticating server certificates, and client certificates.

4. BM1 Client → BM1 Collaboration Server communications
   - TLS communications (server authentication only) are supported.
   - Reverse proxy
     - Set server authentication.
     - Set the following forwarding setting.
       `/collab/client/ → http://<BM1 Collaboration Server IP address>:40004/collab/client/`

   - BM1 Client
     - Set the root certificate or the intermediate certificate for authenticating server certificates on a Windows PC or Mac.
     - Download the client installer from the following URL.
       `https://<Reverse Proxy FQDN>:<Reverse Proxy port number>/collab/client/`

     - Specify the URL of the reverse proxy under "Server URL" in the settings.
       `https://<Reverse Proxy FQDN>:<Reverse Proxy port number>`

5. BM1 Access Code Page
   - TLS communications (server authentication only) are supported.
   - Reverse proxy
     - Set server authentication.
     - Set the following forwarding setting.
       `/accesscode/ → http://<BM1 Collaboration Server IP address>:40004/accesscode/`

   - Client PC
     - Set the root certificate or the intermediate certificate for authenticating server certificates on a Windows PC or Mac.
     - Open the URL of the reverse proxy to access the page to create an access code to join a video conference.
       `https://<Reverse Proxy FQDN>:<Reverse Proxy port number>/accesscode/`

Paths of BRAVIA Meeting communications

BRAVIA Meeting communicates by using the following paths.

communication	path
BM1 Admin Page	/manage/ui/
BM1 Display → BM1 Management Server communications	/manage/display/
BM1 Display → BM1 Collaboration Server communications	/collab/display/
BM1 Client → BM1 Collaboration Server communications	/collab/client/
BM1 Access Code Page	/accesscode/

You can specify any paths for reverse proxy URLs. You need to set forwarding settings by considering paths, because BRAVIA Meeting adds paths internally and communicates. You also need to set a replacement "Location" header value for HTTP redirection.

- Ex)
  - "Server URL" setting of BM1 Display: `http://example.com/bravia-meeting/`
    - BM1 Display adds `manage/display/` internally and communicates to `http://example.com/bravia-meeting/manage/display/`.
  - You need to forward from `/bravia-meeting/manage/display/` to `/manage/display/` on a reverse proxy, because BM1 Management Server accepts `/manage/display/`.
  - You also need to change settings so that the `/manage/display` "Location" header URL is rewritten to `/bravia-meeting/manage/display`.

4. Setup (Free version)

Setting Up BRAVIA

You need to set up the following settings manually when you start up BM1 Display Software from a USB storage device.

- Set "Power" > "Eco" > "Idle TV standby" to "off".
- Set "Settings" > "Network" > "Home network setup" > "IP control" > "Authentication" to "None".
- Set "Settings" > "Network" > "Home network setup" > "IP control" > "Simple IP control" to enabled.
- Set "Pro settings" > "PC input optimisaztion" to "Auto".
- Set "Pro settings" > "Restore picture and sound adjustments" to disable.

Enable to launch a web app from a USB flash memory as follows if you are using Android 10.0 or later model.

- Set "Pro settings" > "USB drive auto run" > "Lanuch web app" to enabled.

Although a network connection is not essential, you must set the BRAVIA network and time or set the time to BM1 Display so that the correct time is displayed on the home screen.

1. Connect the network cable to BRAVIA, or enable the network connection by selecting "Home" > "Network Settings" > "Wi-Fi".
2. If a proxy setting is necessary, set by selecting "Home" > "Network Settings" > "Proxy Settings".
3. If BRAVIA is already connected to the Internet, select "Home" > "Settings" > "Date/Time" > "Automatically Set Date/Time" > "Synchronize With Network Time". Check that the time is displayed correctly by selecting "Home" > "Settings" > "Date/Time". If an NTP server is not used, proceed to the procedure in "Starting Up BM1 Display Software".
4. To use an NTP server, BRAVIA must be set to the "Pro Setting Mode".
5. Set the address of the NTP server by selecting "Home" > "Pro Setting" > "NTP Server".

Starting Up BM1 Display Software

1. Unzip bravia_meeting_free-<version>.zip on your PC.
2. Copy the files under the "sony" folder to a USB flash drive's root directory.
3. Insert the USB flash drive containing the copied files into BRAVIA.
4. BM1 Display Software automatically starts up.

Setting Up BM1 Display

Setting clock to BM1 Display

To accurately display the time when BRAVIA cannot be connected to a network, you must set the time to BM1 Display by the following procedure.

1. Press the "9" button on the remote control on the BM1 Display home screen.
2. The current time setting dialog box is displayed. Set the current time, and press "OK".

The date/time setting of BM1 Display is cleared when BRAVIA reboots or BM1 Display exits. Connect BRAVIA to a network and set the date/time correctly if you want to display the clock in BM1 Display.

BM1 Display Setting Items

Perform settings by directly operating BM1 Display with the remote control. Display the setting dialog box by pressing the "Play" button on the remote control on the BM1 Display home screen.

The following items can be set in the free version of BM1 Display:

Setting Item	Explanation
Home screen > Title	Sets the name of the meeting room and organization that is displayed on the home screen.
Home screen > Subtitle	Sets the name of the meeting room and organization that is displayed on the home screen.
Home screen > Clock	Displays the clock on the home screen.
Home screen > Web frame	Sets the URLs of web pages that are displayed on the home screen. "None": No display "Half": Web page is displayed in the upper half of the screen "Full": Web page is displayed on the full screen Web Pages which are not allowed to be displayed in an iframe by the "X-Frame-Options" HTTP response header can't be displayed.
Power > Auto power off	Turns BRAVIA OFF when operation is disabled due to inactivity on the home screen. This item can be set in 1-minute increments.
Power > Auto reboot	Reboots BRAVIA automatically weekly. Reboot is executed when BRAVIA is inactive for a while.
Inputs	Sets the labels of the inputs.
Help URL	Sets the URL of your own help page. The default help page is replaced when this is set.
Settings lock	Sets the PIN code needed to open the setting screen. When a PIN code is set, the setting screen can only be opened by entering the correct PIN code.

Setting Still Images and Videos as the Home Screen Background

You can play back still images and videos on the BM1 Display home screen by playing this playback media in the "media" folder or below in USB storage device.

Home Screen Background Setting Specifications

The specifications of the background settings for the home screen are as follows:

- Files are played back by name in alphabetical order (regardless of whether media type is still image or video)
- Sub-folders are not supported
- The default playback time for still images is 10 seconds
  - The playback time can be specified by appending the file name before the file extension with the desired playback time (e.g. "30sec")
    - Example) `image(30sec).png`
  - The playback time for video is to the end of the video content
- If the only media file is one still image, that image is displayed at all times
- If the only media file is one video, that video is repeatedly played back.

Don't include a video element in the web page set by "Web URL" when you set a video for the background.

Supported Format and Extension

For details on the supported format codecs, refer to the BRAVIA B2B HTML5 Solution Technical Manual.

- Still images
  - JPEG: jpeg, jpg
  - PNG: png
- Videos
  - MP4: mp4
  - MPEG TS: ts, m2ts

Extensions are not case-sensitive.

5. Setup (Paid version)

Setting Up BM1 Server

Skip this chapter if BRAVIA Meeting is to be used in a standalone configuration.

Installing BM1 Server Software

Windows

1. Run bravia-meeting-display-management.msi on the server PC.
2. Follow the on-screen instructions to proceed with installation.
3. After installation is complete, follow the on-screen instructions to restart the server PC.
4. After the server PC is restarted, the Windows service for BM1 Server Software automatically starts.

You can check if services are running normally by the following procedure.

1. Open the service menu: Control Panel → Administrator Tools → Services
2. Check the "BRAVIA Meeting Display Management Service" status.
3. If the status is "Stopped", right click and select "Start" from the menu.
4. To stop a service, right click and select "Stop" from the menu.

Allow BM1 Server Software to comunicate through the firewall.

Allow BM1 Server Software to communicate through Windows Defender Firewall. If you are using another firewall software, follow the instructions on the software to allow BM1 Server Software to communicate through it.

1. Open "Control Panel > System and Security > Windows Defender Firewall" and select "Allow an app or feature through Windows Defender Firewall".
2. Click "Change settings".
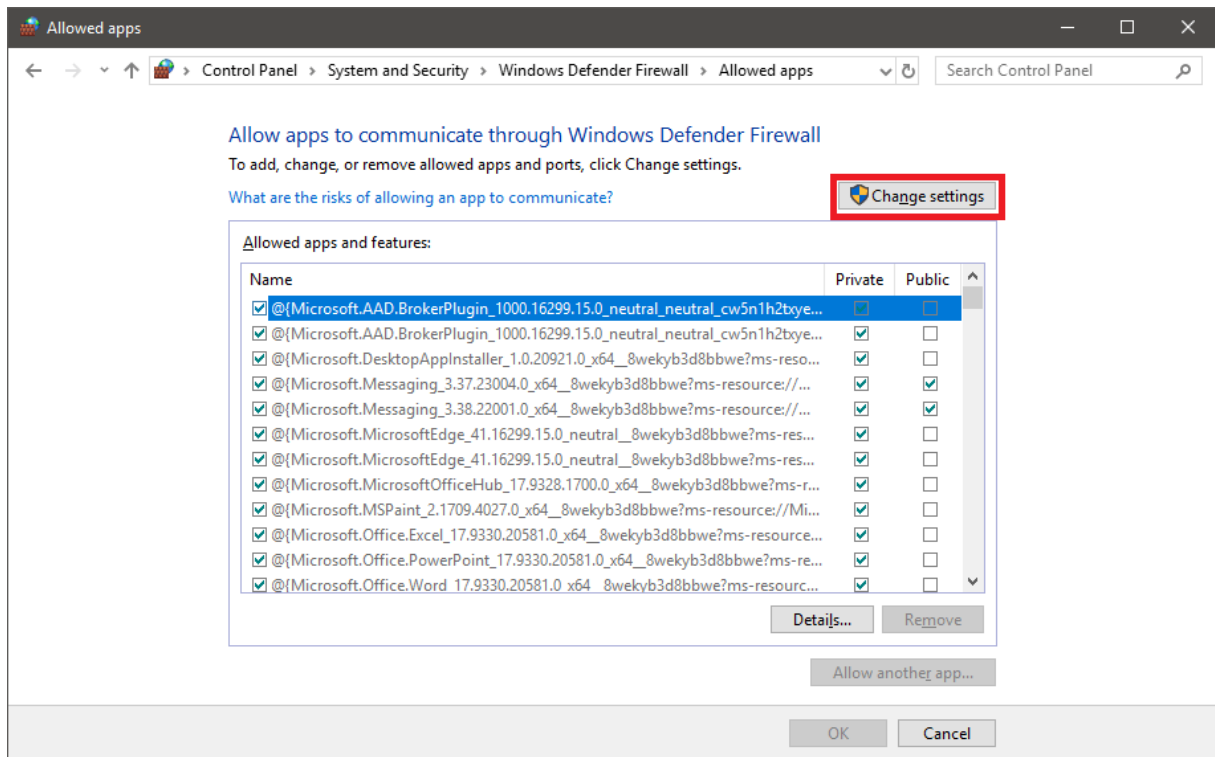
3. Click "Allow another app…".
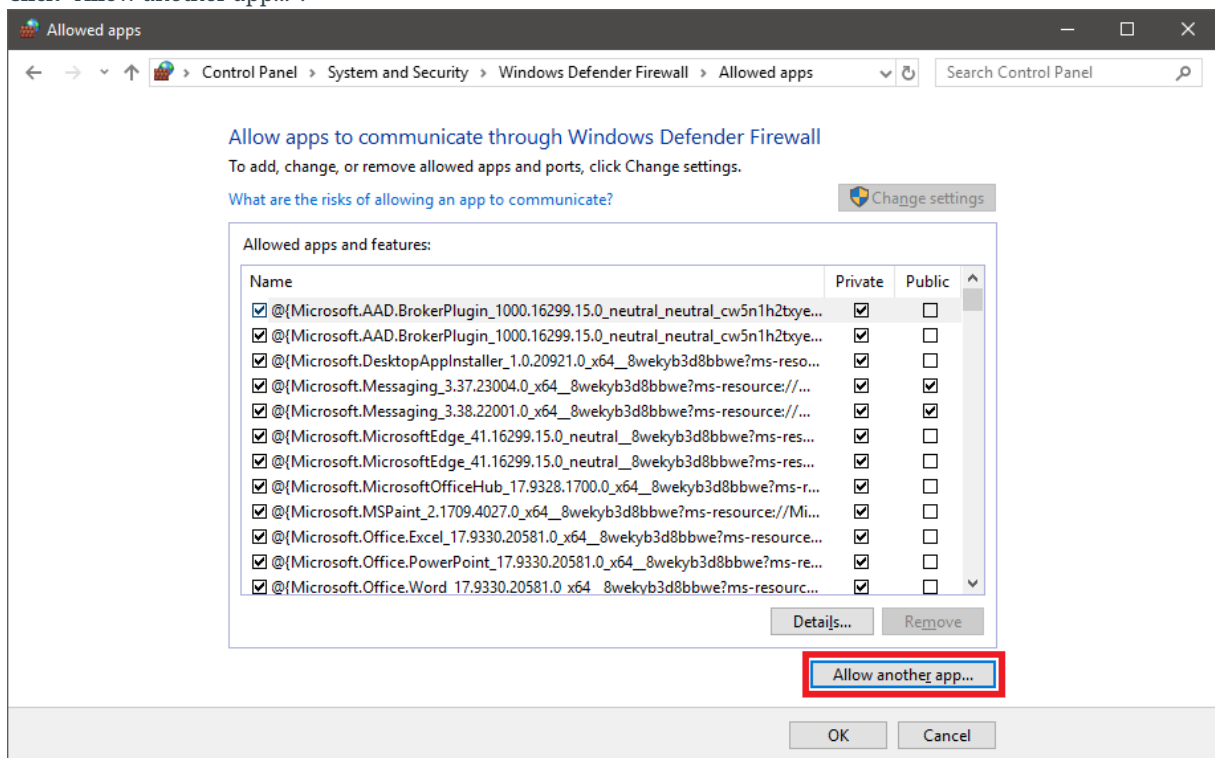
4. Click "Browse…" and select the following path.

```
Windows(C): > Program Files (x86) > Sony > bravia-meeting-display-management-win32-ia32 > bravia-meeting-display
-management.exe
```
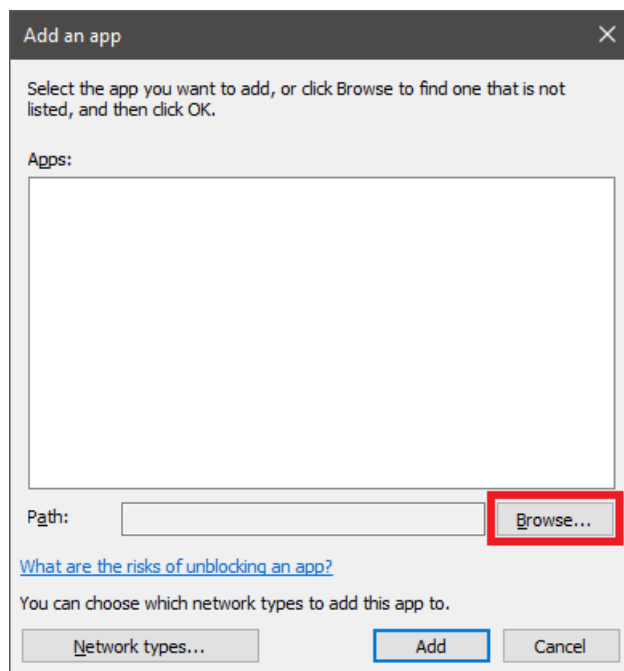
5. Select the network types according to your network environment from "Network types..." and click "Add".
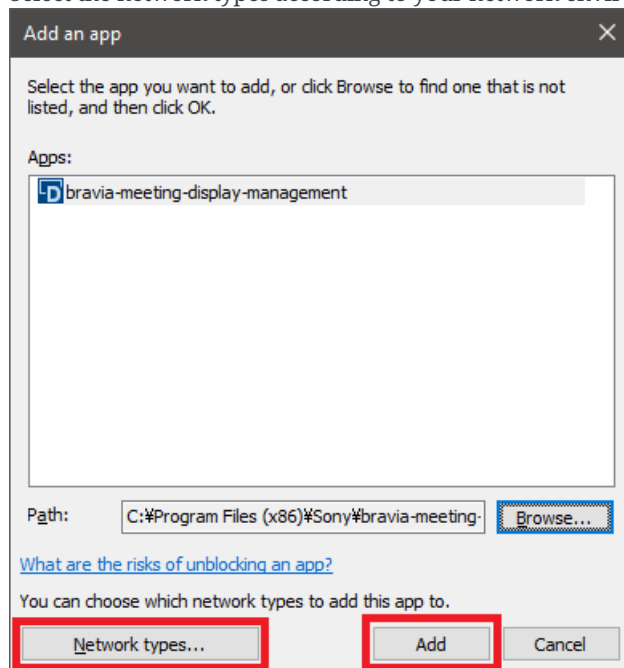
6. Check that "bravia-meeting-display-management" is on the list and click "OK".
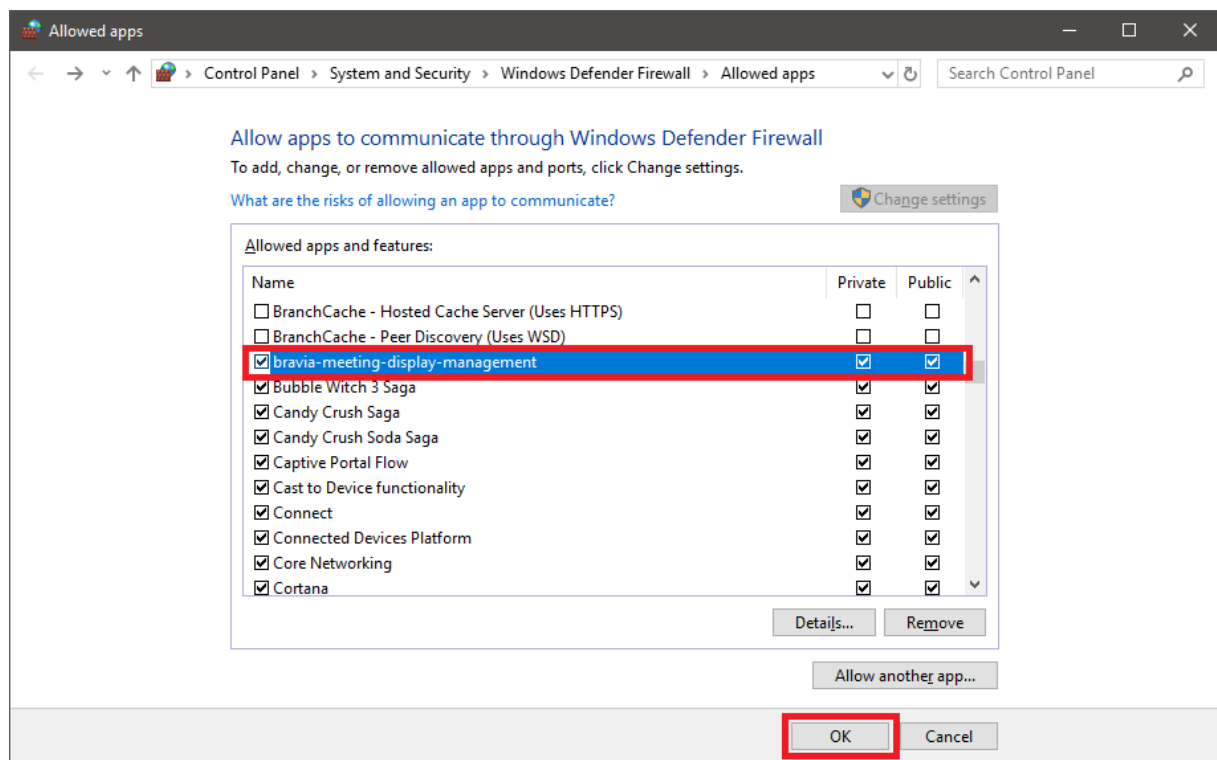
Synology NAS

Install BM1 Server Software from the Package Center.

Setting BM1 Server

- Open the following URL on your PC browser.
  - If a reverse proxy is installed, open the BM1 Admin Page URL set with the reverse proxy.
  - If a reverse proxy is not installed, open the following URL:
    `http://<BM1 Server PC host name or IP address>:40004/manage/ui/`

- Or click the BM1 Server desktop icon on the windows server PC.

Setting Up the Display Management URL

The "Display Management URL" is used to generate URLs such as the callback URL used by OAuth2 authentication. This URL must be set when you have a reverse proxy installed or are using OAuth2 authentication.

1. Open the "Settings" tab on BM1 Admin Page and press the "Edit" icon.
2. Set the "Server" setting "Display management URL".
   - Do not include the path `/manage/ui/` in the URL. Ex)
     `http://example.com:40004`

   - Set reverse proxy URL if you have one. Include a path to specify the reverse proxy URL. Ex)
     `https://example.com/bravia-meeting/`

3. Press the "Save" button to save your settings.

Collaboration Server URL

You need the collaboration server URL to use the BM1 companion application feature.

1. Select the "Settings" tab on BM1 Admin Page.
2. Set the URL of the collaboration server at "Collaboration Server URL".
   - If a reverse proxy is installed, set the URL set with the reverse proxy.
   - If a reverse proxy is not installed, set as follows:
     `http://<BM1 Collaboration Server PC host name or IP address>:40004`

When this setting is blank, the Display Management URL setting is used for the collaboration server URL. When the Display Management URL is also blank, the collaboration server URL is automatically configured. If collaboration with the client is not established or a reverse proxy is being used in your network, specify a collaboration server URL.

Setting Up Authentication for BM1 Admin Page

BM1 Admin Page supports local admin account and OAuth2 authentication.

Authentication is disabled by default. Enable "Auth management" in the "Settings" tab of BM1 Admin Page to enable authentication.

Local admin account

The initial password for the local admin account is `admin`. Change the password from "Change admin password" in the "Settings" tab before starting your operation.

Setting OAuth2 authentication

OAuth2 authentication is disabled by default. Enable "OAuth2 management" and configure the settings to access the service provider in the "Settings" tab.

Setting Display Management URL

You need the "Display Management URL" when use the OAuth2 authentication. Refer to the "Display Management URL" in "Setting Up BM1 Server".

Setting HTTP proxy

You need the HTTP proxy settings when your BM1 Server requires a proxy to connect to OAuth2 service providers.

1. Open "Settings" tab of BM1 Admin Page and press "Edit" icon.
2. Set "HTTP Proxy" of the "Server" setting.

3. Press "Save" button to save the settings.

Setting OAuth2 service provider

This section shows examples of OAuth2 autentication. Configure your own settings values depending on your environment.

Google account

Service provider side

1. Access to the following URL and sign in.
   ```
   https://console.developers.google.com
   ```

2. Create a new project from "NEW PROJECT".
3. Select "Dashbord" from the menu and click "ENABLE APIS AND SERVICES".
4. Select "Google People API" and enable it.
   - Configure "Quotas" depending on your environment if needed.
5. Select "Credentials" from the menu and select "OAuth content screen" tab.
6. Select "Application type" depending on your environment.
7. Confirm that "email", "profile" and "openid" are listed in "Scopes for Google APIs".
8. Set your domain for BM1 Server to "Authorized domains".
   - Domain name is required to authenticate with Google.
9. Select "Credentials" from the menu and select "Credentials" tab.
10. Click "Create credentials" then "OAuth client ID".
11. Select "Web application" and enter an arbitrary name.
12. Enter the value of "Callback URL" of "OAuth2 management" of "Settings" tab of BM1 Admin Page, then click "Create".
13. Copy "Cliend ID" and "Client secret" of "OAuth client" dialog.

BM1 Server side

1. Open "Settings" tab of BM1 Admin Page and press "Edit" icon.
2. Enable "OAuth2 management".
3. Enter the following settings to connect a service provider.
   - Enter an arbitrary value to "Name" and "Login button label".
   - Enter the following value to "Authorization URL".
     ```
     https://accounts.google.com/o/oauth2/auth
     ```
   - Enter the following value to "Token URL".
     ```
     https://oauth2.googleapis.com/token
     ```
   - Enter the following value to "User data URL".
     ```
     https://www.googleapis.com/oauth2/v1/userinfo
     ```
   - Enter "Client ID" and "Client secret" assgined by the service provider.
   - Enter the following value to "Scope".
     ```
     openid email profile
     ```
4. Add emails of users to be permitted to access BM1 Admin Page.
   - Use emails which are registered to the OAuth2 service provider.
5. Press "Save" button to save the settings.

Microsoft Azure Active Directory account

Service provider side

1. Access to the following URL and sign in.
   ```
   https://admin.microsoft.com
   ```

2. Go to Azure Active Directory admin center by clicking "Admin center" - "Azure Active Directory" from the menu.

3. Select "Azure Active Directory" from the "All services" of the menu.

4. Select "App registration" from the menu.

5. Click "New application registration".

6. Enter an arbitrary name, select "Web app / API" on "Application type" and enter BM1 Server URL to "Sign-on URL", then click "Create".

7. Copy the value of "Application ID" in the application settings.

8. Clisk "Settings" of the application settings.

9. Select "Settings" - "Reply URLs" and enter the value of "Callback URL" of "OAuth2 management" of "Settings" tab of BM1 Admin Page, then click "Save".

10. Select "Settings" - "Keys", enter an arbitrary name to "DESCRIPTION" and select an arbitrary duration from "EXPIRATION", then click "Save".

11. After saved, copy the value of "VALUE".
    - Make sure to copy the value. You won't be able to retrieve after you leave the blade.

BM1 Server side

1. Open "Settings" tab of BM1 Admin Page and press "Edit" icon.

2. Enable "OAuth2 management".

3. Enter the following settings to connect a service provider.
   - Enter an arbitrary value to "Name" and "Login button label".
   - Enter the following value to "Authorization URL". Set `<tenant>` or `common` depending on your environment.
     ```
     https://login.microsoftonline.com/<tenant>/oauth2/v2.0/authorize
     ```
     or
     ```
     https://login.microsoftonline.com/common/oauth2/v2.0/authorize
     ```
   - Enter the following value to "Token URL". Set `<tenant>` or `common` depending on your environment.
     ```
     https://login.microsoftonline.com/<tenant>/oauth2/v2.0/token
     ```
     or
     ```
     https://login.microsoftonline.com/common/oauth2/v2.0/token
     ```
   - Enter the following value to "User data URL".
     ```
     https://graph.microsoft.com/oidc/userinfo
     ```
   - Enter "Application ID" and VALUE of the key assgined by the service provider to "Client ID" and "Client secret".
   - Enter the following value to "Scope".
     ```
     openid profile email offline_access
     ```
   - You can see the values for "Authorization URL", "Token URL", "User data URL" and "Scope" by accessing the following URL"
     ```
     https://login.microsoftonline.com/<tenant>/v2.0/.well-known/openid-configuration
     ```

4. Add emails of users to be permitted to access BM1 Admin Page.
   - Use emails which are registered to the OAuth2 service provider.

5. Press "Save" button to save the settings.

Facebook account

Service provider side

1. You need to be Facebook developer.
2. Sign-in to Facebook then move to the developer page by clicking "Manage Apps" from the menu.
3. Create a new app from "Add a New App".
   - Configure your app depending on your environment and enable it.
4. Select "Settings" - "Basic" from the menu and copy "App ID" and "App Secret".
5. Select "PRODUCT+" from the menu and click "Settings" of "Facebook Login".
6. Select "Facebook Login" - "Settings" from the menu and enter the value of "Callback URL" of "OAuth2 management" of "Settings" tab of BM1 Server to "Valid OAuth Redirect URIs", then save the changes.

BM1 Server side

1. Open "Settings" tab of BM1 Admin Page and press "Edit" icon.
2. Enable "OAuth2 management".
3. Enter the following settings to connect a service provider.
   - Enter an arbitrary value to "Name" and "Login button label".
   - Enter the following value to "Authorization URL".
     ```
     https://www.facebook.com/v3.2/dialog/oauth
     ```
   - Enter the following value to "Token URL".
     ```
     https://graph.facebook.com/v2.3/oauth/access_token
     ```
   - Enter the following value to "User data URL".
     ```
     https://graph.facebook.com/me?fields=name,email
     ```
   - Enter "App ID" and "App Secret" assgined by the service provider to "Client ID" and "Client secret".
   - Enter the following value to "Scope".
     ```
     email
     ```
4. Add emails of users to be permitted to access BM1 Admin Page.
   - Use emails which are registered to the OAuth2 service provider.
5. Press "Save" button to save the settings.

GitHub account

Service provider side

1. Sign-in to GitHub.
2. Select "Settings" from the menu.
3. Select "Developer settings" from the menu of the settings page.
4. Create a new app from "Register a new application".
   - Enter the the of "Callback URL" of "OAuth2 management" of "Settings" tab of BM1 Server to "Authorization callback URL".
5. Copy "Client ID" and "Client secret" from the app settings.

BM1 Server side

1. Open "Settings" tab of BM1 Admin Page and press "Edit" icon.
2. Enable "OAuth2 management".
3. Enter the following settings to connect a service provider.
   - Enter an arbitrary value to "Name" and "Login button label".
   - Enter the following value to "Authorization URL".
     ```
     https://github.com/login/oauth/authorize
     ```
   - Enter the following value to "Token URL".
     ```
     https://github.com/login/oauth/access_token
     ```
   - Enter the following value to "User data URL".
     ```
     https://api.github.com/user
     ```
   - Enter "Client ID" and "Client secret" assgined by the service provider.
   - Leave "Scope" to blank.
4. Add emails of users to be permitted to access BM1 Admin Page.
   - Use emails which are registered to the OAuth2 service provider.
5. Press "Save" button to save the settings.

GitHub setting for every user

Email address of every GibHub user must be public to authenticate with GitHub.

1. Sign-in to GitHub.
2. Select "Settings" from the menu.
3. Select "Emails" from the settings menu and uncheck "Keep my email address private".
4. Select "Profile" from the settings menu and select the registered email from "Public email", then save the changes.

Setting Up BRAVIA

When a timetable of the meeting room is displayed in collaboration with groupware or when performing server and client authentication by TLS communications, setting of the time on the BRAVIA unit is required.

Although a network connection is not required when BRAVIA Meeting is to be used in a standalone configuration, you must set the BRAVIA network and time or set the time to BM1 Display so that the correct time is displayed on the home screen.

1. Connect the network cable to BRAVIA, or enable the network connection by selecting "Home" > "Network Settings" > "Wi-Fi".
2. If a proxy setting is necessary, set by selecting "Home" > "Network Settings" > "Proxy Settings".
3. If BRAVIA is already connected to the Internet, select "Home" > "Settings" > "Date/Time" > "Automatically Set Date/Time" > "Synchronize With Network Time". Check that the time is displayed correctly by "Home" > "Settings" > "Date/Time". If an NTP server is not used, proceed to the procedure in "Installing BM1 Display Software".
4. To use an NTP server, BRAVIA must be set to the "Pro Setting Mode".
5. Set the address of the NTP server by selecting "Home" > "Pro Setting Mode" > "NTP Server".

Enable USB camera for Android version 8.0 when using the video conferencing function. It's not necessary for Android version 9.0 or later.

1. Change BRAVIA to the "Pro Settings" mode.
2. Set "Pro settings" > "Developer options" > "Enable USB camera" to "on".

Enable the installation from a USB flash memory as follows if you are using Android 10.0 or later model. If you need to prevent a third party from installing any software during use, switch to Pro settings mode after installation of BM1 Display Software, disable this setting, and then switch to Pro mode again. If this setting is disabled, you need to re-enable it when updating or uninstalling BM1 Display Software.

1. Change BRAVIA to the "Pro Settings" mode.
2. Set "Pro settings" > "USB drive auto run" > "Install BPK" to enabled.

Installing BM1 Display Software

1. Copy "extapp_installer.pkg" to the USB storage device root directory.
2. Insert the USB storage device into BRAVIA.
3. The installation screen is displayed. Follow the on-screen instructions to proceed with the installation.
4. When you have finished the entire procedure, remove the USB storage device and restart the system.
5. BM1 Display Software automatically starts up a short time after the system is restarted.

Setting Up BM1 Display

You can configure settings on the paid version of BM1 Display using the following three methods:

- Operating BM1 Display by remote control
  - You can set the basic setting items in BM1 Display.
- Importing setting information saved on USB storage device to BRAVIA
  - You can configure almost all settings by importing, basic settings, custom settings, background still image settings for the home screen, certificates and other settings.
- Configuring settings from BM1 Admin Page
  - You can configure almost all settings, with the exception of importing certificates.

BM1 Display Basic Setting Items

You can set the following basic setting items in BM1 Display:

Setting Item	Explanation
Server Connection	Sets to connect or not connect BRAVIA to BM1 Server. "Server URL" can only be configured when this setting is "ON". The other setting items can only be configured when this setting is "OFF". When the server connection is enabled, the BM1 Display settings can only be set through BM1 Server.
Server URL	Sets the URL of BM1 Server to be connected. If a reverse proxy is installed, use the reverse proxy URL. If a reverse proxy is not installed, set as follows: `http://<BM1 Server IP address>:40004`
Home screen > Title	Sets the name of the meeting room and organization that is displayed on the home screen.
Home screen > Subtitle	Sets the name of the meeting room and organization that is displayed on the home screen.
Home screen > Clock	Displays the clock on the home screen.
Home screen > Web frame	Sets the URLs of web pages that are displayed on the home screen. "None": No display "Half": Web page is displayed in the upper half of the screen "Full": Web page is displayed on the full screen Web Pages which are not allowed to be displayed in an iframe by the "X-Frame-Options" HTTP response header can't be displayed.
Power > Auto power off	Turns BRAVIA OFF when operation is disabled due to inactivity on the home screen. This item can be set in 1-minute increments.
Power > Auto reboot	Automatically reboots BRAVIA weekly. BRAVIA is rebooted when it has been inactive for a while.
Inputs	Sets the labels of the inputs.
Help URL	Sets the URL of your help page. The default help page is replaced when this is set.
Annotation > Canvas color	Sets the annotation mode canvas color.
Annotation > Save annotation to USB storage device	Sets if the button to save drawing on the annotation to USB storage device is displayed or not displayed.
Settings lock	Sets the PIN code needed to open the setting screen. When a PIN code is set, the setting screen can only be opened by entering the correct PIN code.

Setting by Operating BM1 Display with the Remote Control

Display the setting dialog box by pressing the "Play" button on the remote control on the BM1 Display home screen.

Importing Setting Information from USB storage device

You can import basic settings, custom settings, background still image settings for the home screen, etc. by inserting a USB storage device containing the configuration files and these settings.

Place the following files in the USB storage device root directory. You can set the following content:

Setting Content	File	Operation
Basic settings	settings.json	(optional) For details on format, see the Appendix.
Custom settings	custom.zip	(optional) For details on format, see the Appendix.
Background still images/video on home screen	backgrounds.zip	(optional) For details on format, see the Appendix.
Root certificate/intermediate certificate	ca_certs/*	(optional) Place certificates in PEM format in the "ca_certs" folder. Any file name is acceptable, and you can place multiple files.
Client certificate	client_cert/cert.pfx	(required when there is the "passphrase.txt" file) Place private keys and client certificates in PKCS#12 format in the "client_cert" folder.
Pass phrase for private key of client certificate	client_cert/passphrase.txt	(required when the "cert.pfx " file is present) Place the text file containing the pass phrase.

Import Procedure

1. Copy the configuration files, etc. to the USB storage device root directory.
2. Display the setting dialog box by pressing the "Play" button on the remote control at the BM1 Display home screen.
3. Insert the USB storage device into BRAVIA.
4. The import confirmation dialog box is displayed. Follow the on-screen instructions to complete the import.

Setting from BM1 Admin Page

You can configure the BM1 Display settings on the "Displays" tab of BM1 Admin Page.

To set from BM1 Admin Page, the URL of BM1 Server must be set to BM1 Display, and BM1 Display must be connected to BM1 Server. For this reason, you must set the "Server URL" either by operating the remote control or by importing by USB storage device.

Setting Still Images and Videos as the Home Screen Background

You can play back still images and videos on the BM1 Display home screen.

There are two ways of setting customized settings as follows:

- Importing from USB storage device
  - Import the backgrounds.zip file stored on the USB storage device.
    - Use a backgrounds.zip file which includes no image or video file to reset the home screen background to default.
    - For details on the format of the backgrounds.zip file, see the Appendix.
- Setting from BM1 Admin Page
  - Upload a still image file, a video file, or the backgrounds.zip file in "Background image" under the display settings or the tab settings.
    - You can set either a single still image file, a video file, or multiple files in the zip file.
    - For details on the format of the backgrounds.zip file, see the Appendix.

Don't include a video element in the web page set by "Web URL" when you set a video for the background.

Home Screen Background Setting Specifications

The specifications of the background settings for the home screen are as follows:

- Files are played back by name in alphabetical order (regardless of whether media type is still image or video)
- Sub-folders are not supported
- The default playback time for still images is 10 seconds
  - The playback time can be specified by appending the file name before the file extension with the desired playback time (e.g. "30sec")
    - Example) `image(30sec).png`
  - The playback time for video is to the end of the video content
- If the only media file is one still image, that image is displayed at all times
- If the only media file is one video, that video is repeatedly played back.

Supported Format and Extension

For details on the supported format codecs, refer to the BRAVIA B2B HTML5 Solution Technical Manual.

- Still images
  - JPEG: jpeg, jpg
  - PNG: png
- Videos
  - MP4: mp4
  - MPEG TS: ts, m2ts

Extensions are not case-sensitive.

Setting up Schedule Collaboration with Groupware

HTTP proxy setting

You need to set the HTTP proxy setting when it's required to connect to a groupware server from your BM1 Server.

1. Select the "Settings" tab on BM1 Admin Page.
2. Set "HTTP Proxy" in the "Server" setting.

GSuite (Google Calendar)

GSuite side

- Project settings
    1. Access the following URL and sign in.
       `https://console.developers.google.com`

    2. Add the project from the project selection dialog.
    3. Fill in the project name. (Ex. BraviaMeeting)
    4. Enable the API by selecting "ENABLE APIS AND SERVICES" in the "Dashboard" tab.
    5. Open the "Library" tab and select "Google Calendar API", and then select "ENABLE" to enable the API.
    6. "Queries per day" and "Queries per 100 seconds" are editable from "Quotas".
       - This software uses the API once or twice every 100 seconds, or 1440 times per day for each display.
       - If the maximum number of queries is not high enough, request Google to change the maximum limitation from "Queries quota limit" on the same page.
    7. Create credentials: "Credentials" tab - "Create credentials" - "Service account key".
    8. Select "Service account" - "New service account", then fill in "Service account name" and "Service account ID".
    9. Select "Role" - "Project" - "Viewer"
    10. Select "Key type" - "JSON", and execute "Create".
    11. Save created JSON file (*1).
    12. Record the "Service account ID" (*2).
        - Ex)
          `account@project-777777.iam.gserviceaccount.com`

        - You can also go to "Credentials" tab - "Credentials"-"Manage service accounts" to confirm the "Service account ID".
- Room resource settings
    1. Follow the instructions in the link below to register your meeting rooms as resources.
       `https://support.google.com/a/answer/1033925`

- Calendar settings

1. Access the following URL and sign in.
   `https://calendar.google.com/calendar/render`

2. Change the following settings for each resource calendar so that they can be displayed.

3. Open calendar settings.

4. Record the "Calendar ID" (*3).

5. Add the service account ID of (*2) to "Share with specific people" and set "See all event details" permissions.

BM1 Server Side

1. Open the "Settings" tab of BM1 Admin Page and press the "Edit" button.
2. Open "Edit credentials" of the "Google Calendar" item, select the service account key downloaded by (*1) and press "OK".
3. Press "OK" to save the settings.
4. Change the following "Schedule integration" settings for each display.
5. Set "Schedule enabled" to "ON".
6. Select "Google Calendar" in "System".
7. Set "Room ID" to the calendar ID of (*3) on each display.

Microsoft Exchange Server

BM1 Server Side

1. Open the "Settings" tab of BM1 Admin Page and press the "Edit" button.
2. Set "URL" in the "Microsoft Exchange Server" item to the URL of the EWS service.
   - Ex)
     `https://computer.domain.contoso.com/EWS/Exchange.asmx`
3. Select the method from "Authentication/Authorization method" of the "Microsoft Exchange Server" item.
4. Fill in "User" and "Password" based on the method from "Edit credentials" of the "Microsoft Exchange Server" item.
   - Use the "domain\user" format if the NTLM method and domain are used in your environment.
5. Press "OK" to save the settings.
6. Change the following "Schedule integration" settings for each display.
7. Set "Schedule enabled" to "ON".
8. Select "Microsoft Exchange Server" in "System".
9. Set the e-mail address of the facility resource to "Room ID" of each display.

Microsoft Office 365

Microsoft Office 365 side

You need the following settings when you use OAuth for the Authentication/Authorization method.

- Application registration portal
    1. Access the following URL and sign in as an administrator.
       `https://apps.dev.microsoft.com`

    2. Click "Add an app".
    3. Input "Application Name" and click "create".
    4. Record the displayed "Application ID" (*1).
    5. Click "Generate New Key Pair" in "Application Secrets", and download the generated PFX file (*2).
    6. Click "Add Platform" in "Platforms", and select "Web".
    7. Input the follwing URL to "Redirect URLs".
       `http://localhost:40002`

    8. Click "Add" in "Microsoft Graph Permissions" - "Application Permissions".
    9. Activate "Calendars.Read", and click "OK".
    10. Save settings.
- Permission
    1. Access the following URL and sign in as an administrator.
       `https://login.microsoftonline.com/{tenant}/adminconsent?client_id={application ID}&state={arbitrary value}&redirect_uri=http:%2f%2flocalhost:40002`

    2. Click "Accept".

BM1 Server Side

1. Open the "Settings" tab of BM1 Admin Page and press the "Edit" button.
2. "URL" will be automatically set based on the Authentication/Authorization method.
3. Select the method from "Authentication/Authorization method" of the "Microsoft Office 365" item.
4. Fill in the credentials based on the method from "Edit credentials" of the "Microsoft Office 365" item.
    - Fill in "User" and "Password" when you use BASIC authentication.
    - When you use OAuth.
    1. Enter the domain part of the e-mail address in "Tenant".
    2. Enter the ID of (*1) to "Application ID".
    3. Select the downloaded PFX file (*2) for "Application secret".
    4. Enter the password which you set to download the PFX file.
5. Press "OK" to save the settings.
6. Change the following "Schedule integration" settings for each display.
7. Set "Schedule enabled" to "ON".
8. Select "Microsoft Office 365" in "System".
9. Set the e-mail address of the facility resource to "Room ID" of each display.

Remarks

- The schedule function is available only if the display's timezone is set correctly.
- The schedule function is available only if access rights are correctly given to the user.

Setting up Video Conference

BRAVIA Meeting supports video conferences between two BRAVIAs with USB cameras or USB microphones. You can select either video and audio mode or audio only mode when you start a video conference.

Below is a summary of how to set up a video conference.

1. Connect a USB camera or USB microphone to the BRAVIA.
2. Set up the video conference on BM1 Admin Page if needed.

Setting up BRAVIA

Enable USB camera for Android version 8.0. It's not necessary for Android version 9.0 or later. Refer to the "Setting Up BRAVIA" in "Setup (Paid version)".

Connect a USB camera or USB microphone to the BRAVIA. BRAVIA Meeting supports the following cameras and microphones.

- Camera: SONY FWA-CE100
- Microphone: Generic USB HID microphone (Not all devices are guaranteed to work.)

BRAVIA Meeting supports using a USB camera and USB microphone at the same time. When a USB camera and USB microphone are connected to BRAVIA at the same time, the camera is used for video and the microphone is used for audio. Connecting two or more cameras or microphones is not supported.

When you start a video conference for the first time, allow permissions for "Video" and "Mic" access.

Setting up Video Conference on BM1 Admin Page

The following settings for the video conference can be configured on BM1 Admin Page.

Setting Item	Default	Explanation
Enabled	ON	Sets the video conference to enabled or disabled. When disabled, the video conference item on the menu is disabled and cannot be used to launch the video confernece function.
Outbound Resolution	1280 x 720	Sets the resolution of the video captured on the target display. This setting affects the resolution of the video displayed on the other side of the video conference.
Outbound Frame Rate	15fps	Sets the frame rate of the video captured on the target display. This setting affects the frame rate of the video displayed on the other side of the video conference.
Inbound Bit Rate	2Mbps	Sets the bit rate of the video received by the target display. This setting affects the bit rate of the video displayed on the target display of the video conference.
Auto Gain Control	OFF	Sets the auto gain control of audio capture on the target display to enabled or disabled. When enabled, the audio gain will be automatically adjusted based on the input level, and the output volume level will be equalled, but the audio quality may be worse in some situations. You may enable this setting when the BRAVIA is located in a larger meeting room.

You can customize the resolution, frame rate, and bit rate settings depending on your network environment and the model of BRAVIA. The default values of these settings are optimized for BZ35F series. When you set them to a higher value than the default, performance such as the screen sharing connecting speed or the annotation mode drawing performance during the video conference will be affected.

Customizing UI Design

You can customize the UI design of BM1 Display. You can customize the following UI elements:

- Text (messages, font, text color, text size)
- Icon images
- Background color
- Time format

There are two ways of setting customized settings as follows:

- Importing from USB storage device
  - Import the custom.zip file stored on the USB storage device.
    - For details on the format of the custom.zip file, see the Appendix.
- Setting from BM1 Admin Page
  - Upload the custom.zip file in "Custom design" under the display settings or the tab settings.
    - For details on the format of the custom.zip file, see the Appendix.

Setting Up BM1 Client App

Skip this chapter if BRAVIA Meeting is to be used in a standalone configuration.

Downloading the installer

1. Open the following URL on each user's PC browser.
   - If a reverse proxy is installed, set the URL set with the reverse proxy.
   - If a reverse proxy is not installed, set as follows:
     ```
     http://<BM1 Server host name or IP address>:40004
     ```

2. Download the installer.

On a Windows PC

1. Run bravia_meeting_client-<version>-setup.exe for each user on the Windows PC.
2. Follow the on-screen instructions to proceed with the installation.
3. After installation is completed, BM1 Client App automatically starts.

On a Mac

1. Run bravia_meeting_client-<version>-mac.dmg for each user on the Mac.
2. Follow the on-screen instructions to proceed with the installation.
3. After installation is completed, launch BM1 Client App from Launchpad.

BM1 Client App Settings

Set "Server URL" as follows in the BM1 Client App settings.

- If a reverse proxy is installed, set the URL set with the reverse proxy.
- If a reverse proxy is not installed, set as follows:
  ```
  http://<BM1 Server host name or IP address>:40004
  ```

Automatic Update of BM1 Client App

BM1 Client App supports automatic update. Software is automatically updated if there is new software in the connected BM1 Server.

6. Basic Usage

Admin Page

"Display" tab

You can turn the power of the display on or off, change the display input, and view/edit/delete displays.

Display management operation can be easy and efficient by attaching tags made up of common display settings to the display. You can configure setting items the same as those of the display in to a tag, then enable the settings of the attached tags as display settings.

- You can attach 0 or more tags to one display.
  - If multiple tags are attached, a previously attached tag is enabled.
    - You can change the order of the tags by dragging and dropping them in the display settings.
- You can attach tags to 0 or more displays.
- You can select to overwrite a display's settings or use a tag's settings when a tag is attached.

Bulk display control

You can control multiple displays at a time by clicking the checkboxes of the displays and clicking "Display control".

Editing bulk tags

You can edit the tags of multiple displays at a time by clicking the checkboxes of the displays and clicking "Bulk tag edit".

"Tag" tab

You can view/edit/add/delete tags.

"Settings" tab

You can configure the server settings, schedule integration settings and authentication settings.

"Settings" tab

Home Screen

While the home screen or an external input is displayed, you can perform the following by remote control or by touching the touch panel.

Remote Control Operations

Operation	Action
"↑", "↓", "←", "→", or "Enter" button	Displays the menu.
"0" button	Switches visibility of the status bar displayed in the top right corner of the screen. The status bar is always displayed on the HOME screen.
"1" button	Switches external input to HDMI 1.
"2" button	Switches external input to HDMI 2.
"3" button	Switches external input to HDMI 3.
"4" button	Switches external input to HDMI 4.
"9" button	Displays the time setting dialog box.
"Play" button	Displays the setting dialog box.
"Red" button	Displays the presentation timer of the menu.
"Green" button	Starts the annotation mode.
"Yellow" button	Launches the video conference.
"Blue" button	Displays Help.

Touch Operations

When you touch anywhere on the screen, the menu guide will be shown on the bottom of the screen. When you touch the menu guide, the menu will be shown.

Automatic Switching of Inputs

Connected inputs are automatically switched to if external equipment (e.g., PC) is connected to the HDMI terminal on BRAVIA.

- If an external equipment is connected when BRAVIA is OFF, BRAVIA is automatically turned ON and the newly connected input is automatically switched to.

- If additional equipment is connected when external equipment is already connected and an input already selected, the newly connected equipment is automatically switched to.
  - If the additionally connected external equipment is disconnected, the previously connected external input is automatically switched to.

Presentation Timer

You can set the presentation timer from the home menu.

You can increase or decrease the timer in 1-minute increments by pressing the up/down buttons on the remote control or by touching the up/down arrow of the menu. To start countdown, press the "Enter" button on the remote control or touch the timer display part of the menu.

The countdown is displayed at all times at the top center of the screen. When the timer has counted down to 0, a notification is displayed on the screen.

Annotation (draw function) Mode

The Annotation mode can be started using the following operations:

- Press the "→" button on the remote control, select "Annotation" in the displayed menu and press the "Apply" button
- Press the green button on the remote control
- Touch the "Annotation" icon on the touch menu.

When BM1 Client is in use, the mode automatically transitions to the Annotation mode when Remote Pointer is connected.

If the mode is started up in the absence of external input, the screen background is white and can be used as a whiteboard. If the mode is started up with an external input present, drawing directly over the display screen of the external input is possible.

You can perform the following operations in the Annotation mode:

- Drawing tools
  - Switch to the mode for mouse operation of the PC connected by Remote Operation (Can be selected only while Remote Operation is connected)
  - Switch to the mode for touch operation of the PC connected by Remote Operation (Can be selected only while Remote Operation is connected and the PC supports touch operation)
  - Switch to draw operation
  - Select draw operation colors
  - Switch to rubber eraser operation
  - Undo
  - Redo
  - Clear entire screen
  - Save drawings to USB storage device. USB storage device must be inserted into BRAVIA. When capturing screenshots is not allowed, images cannot be saved.
  - Exit Annotation mode
- Move Annotation toolbar
  - Move Annotation toolbar up/down/left/right by dragging and dropping button-free area of toolbar
- Minimize Annotation toolbar
  - Minimize Annotation toolbar by touching button-free area of toolbar
    - Resize minimized toolbar by touching a spot nearby the toolbar

You can exit the Annotation mode using the following operations:

- Touch "x" button on Annotation toolbar
- Press "Apply" or "Back" button on remote control
- Turn BRAVIA power OFF

Known Issue

- When a USB camera and USB microphone are connected to BRAVIA at the same time, the microphone will not be available after reboot of the BRAVIA.
  - Workaround: Connect a USB microphone to USB 3 of BRAVIA as below.
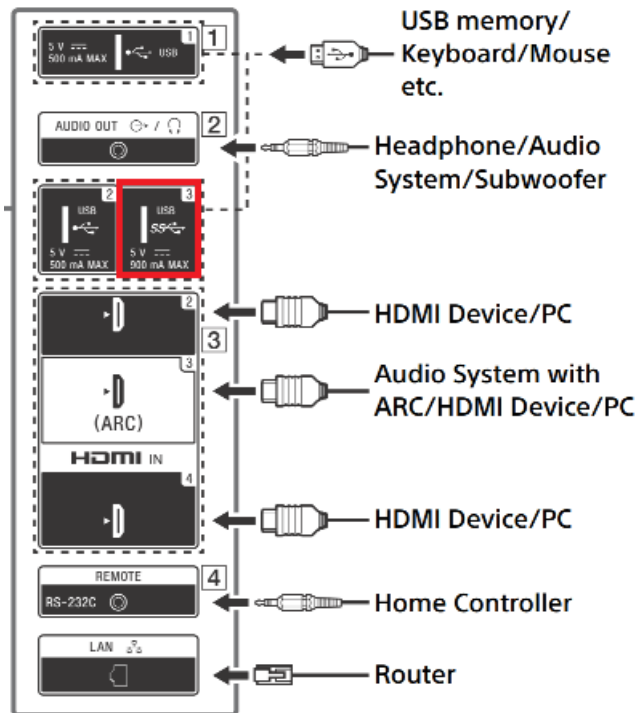
  - Recovery Method: Disconnect the USB microphone once and connect it again.
- When a USB camera and USB microphone are connected to BRAVIA at the same time, each time one of them is disconnected, connecting to a video conference will be fail.
  - Reovery Method: Disconnect both USB camera and USB microphone once and connect the one you want to use.
- When you connected to a video conference, your video and audio feed may not be available to the other participants of the video conference.
  - Recovery Method: Exit the video conference once and connect again.
- When you try to connect to a video conference, the BRAVIA screen may become a black and you cannot operate it.
  - Recovery Method: Reboot the BRAVIA by pressing the [Power] button by remote control for more than 5 seconds.
- When you try to connect to a video conference, the video conference may not start. After that you try to connect again but the "Camera or microphone is not available." or "The video conference is full." dialog may be shown.
  - Recovery Method: Reboot the BRAVIA by pressing the [Power] button by remote control for more than 5 seconds.

Appendix I. settings.json

settings.json is written in JSON format. The formats are as follows:

- title ... <string> (optional) Title
- subtitle ... <string> (optional) Sub-title
- autoEndAlarm ... <boolean> (optional) Automatic end alarm based on the schedule. Enabled when "true".
- autoPowerOff ... <number> (optional) Automatic power OFF function. Unit is (minutes). Function is disabled by "-1".
- clock ... <boolean> (optional) Home screen clock display flag. The clock is displayed when this flag is "true".
- inputs
  - hdmi1
    - label ... <string> (optional) Text that is displayed at the No.1 port of the external input menu
  - hdmi2
    - label ... <string> (optional) Text that is displayed at the No.2 port of the external input menu
  - hdmi3
    - label ... <string> (optional) Text that is displayed at the No.3 port of the external input menu
  - hdmi4
    - label ... <string> (optional) Text that is displayed at the No.4 port of the external input menu
- webFrame
  - enabled ... <boolean> (optional) Display of WebFrame. "true": display, "false: hide
  - size ... <string> (optional) WebFrame display position. This is mandatory when "enabled" is "true". "half" or "full".
  - url ... <string> (optional) URL that is displayed in WebFrame. This is mandatory when "enabled" is "true".
- helpUrl ... <string> (optional) External collaboration URL of Help screen. If this is not specified or is left blank, the standard Help screen is displayed.
- serverConnection ... <boolean> (optional) The server connection is enabled when this flag is "true". The default is "false".
- serverUrl ... <string> (optional) BM1 Server URL
- canvasColor ... <string> (optional) The annotation mode canvas color. The value is "white" or "black". The default is "white".
- savingAnnotationToUsbMemory ... <boolean> (optional) Sets if the button to save drawing on the annotation to USB storage device is displayed or not displayed. The default is "false".
- pincode
  - enabled ... <boolean> (optional) Enable flag for setting protection function using a PIN code. This function is enabled when this flag is "true". The default is "false".
  - code ... <string> (optional) PIN code. This is mandatory when "enabled" is "true". Specify a 4-digit number. The default is '0000'.
- version ... <number> (mandatory) Version of setting data. Specify "1" at all times.

Ex)

```
{
  "title": "101",
  "subtitle": "Meeting Room",
  "autoPowerOff": 30,
  "clock": true,
  "inputs": {
    "hdmi1": {
      "label": "HDMI 1"
    },
    "hdmi2": {
      "label": "HDMI 2"
    },
    "hdmi3": {
      "label": "VC"
    },
    "hdmi4": {
      "label": "VC"
    }
  },
  "helpUrl": "http://help.example.com",
  "webFrame": {
    "enabled": false,
  },
  "pincode": {
    "enabled": true,
    "code": "5577"
  },
  "version": 1
}

{
  "serverConnection": true,
  "serverUrl": "https://example.com"
  "version": 1
}
```

Appendix II. custom.zip

This zip archive contains settings, icon images and other content for customizing the UI design of BM1 Display.

Zip the "custom" folder in the following configuration as "custom.zip". (When zipping, include the "custom" folder. The "custom" folder must be generated when unzipping the zipped folder.)

```
custom/
  i18n/
    locale*.json
  images/
    *.{png,jpg}
  style/
    style.css
  fonts/
    *.{woff2,woff,eot,ttf,svg}
  custom.json
```

locale.json (optional)

You can customize all UI messages. Program messages are written in the following JSON formats:

- Files named locale-<language name>.json, are used when the language in the filen ame matches the language setting on BRAVIA.
  - Specify the "language name" section in ISO 639-1 format. Example) `locale-en.json, locale-ja.json`
- Files named locale.json, are used when the corresponding message is not included in the locale-<language name>.json file.
  - locale-<language name>.json messages have higher priority than locale.json messages.
- When messages are not set in locale-<language name>.json or locale.json format, default messages are used.

```
{
  "COMMON":{
    "MESSAGE_AUTH_ERROR":"Please confirm authentication of IP control",
    "BUTTON_OK":"OK",
    "BUTTON_CANCEL":"Cancel",
    "BUTTON_BACK":"Back",
    "BUTTON_CLOSE": "Close",
    "LABEL_PASSCODE":"Passcode",
    "LABEL_PASSCODE_DELIMITER":":",
    "MENU_GUIDE": "Touch the bar to open Menu",
    "LOADING" : "Loading..."
  },
  "HOME":{
    "BUTTON_HOME":"HOME",
    "BUTTON_INPUTS":"Input",
    "BUTTON_PRESENTATION_TIMER":"Presentation Timer",
    "BUTTON_VC":"Video Conference",
    "BUTTON_ANNOTATION":"Annotation",
    "BUTTON_HELP":"Help"
  },
  "END_ALARM": {
    "MESSAGE_FINISH_BEFORE_15_MIN":" 15 min left",
    "MESSAGE_FINISH_BEFORE_5_MIN":" 5 min left",
    "MESSAGE_FINISH":" End time"
  },
  "PRESENTATION_TIMER":{
```

```
    "MESSAGE_TIMEOUT":" Presentation time is up.",
    "LABEL_PRESENTATION_TIME":"Presentation Time",
    "LABEL_MINUTES":"min."
  },
  "ANNOTATION":{
    "MESSAGE_CONFIRM_CLOSE":"Are you sure to quit annotation mode?",
    "MESSAGE_CONFIRM_SAVE":"Are you sure to save screen data on USB storage?",
    "MESSAGE_SAVE":"Successfully saved.",
    "MESSAGE_SAVE_ERROR":"Failed to save.",
    "MESSAGE_SAVE_ERROR_FORBIDDEN": "Saving is not allowed."
  },
  "VC":{
    "BUTTON_VIDEO_AUDIO": "Join with Video &amp; Audio",
    "BUTTON_AUDIO_ONLY": "Join with Audio Only",
    "BUTTON_MIC": "Mic",
    "BUTTON_ANNOTATION": "Annotation",
    "BUTTON_LAYOUT": "Layout",
    "BUTTON_EXIT": "Exit",
    "LABEL_ACCESS_CODE": "Access Code:",
    "LABEL_DISPLAY": "Display",
    "MESSAGE_ENTER_ACCESS_CODE":"Enter the access code.",
    "MESSAGE_WAITING":"Waiting...",
    "MESSAGE_CONNECTING":"Connecting...",
    "MESSAGE_CONFIRM_EXIT": "Are you sure you want to exit the video conference?",
    "MESSAGE_SHARING_SCREEN": "You are sharing the screen.",
    "MESSAGE_CHECKING_USB_DEVICE": "Checking USB camera or microphone...",
    "MESSAGE_CLOSED": "The video conference has closed.",
    "MESSAGE_DISPLAY_CONSTRAINTS": "No video due to display performance restriction.",
    "ERROR_MESSAGE_SETTING_DISABLED": "The video conference setting is disabled.",
    "ERROR_MESSAGE_NO_DEVICE": "USB camera or microphone is not connected.",
    "ERROR_MESSAGE_INVALID_DEVICE" : "USB camera or microphone is not available.",
    "ERROR_MESSAGE_SERVER_CONNECT": "Failed to connect to the server. Please check the network connection of the displ
ay.",
    "ERROR_MESSAGE_INVALID_ACCESS_CODE": "Invalid access code. Please try again.",
    "ERROR_MESSAGE_ROOM_IS_FULL": "The video conference is full",
    "ERROR_MESSAGE_P2P_CONNECT": "Failed to connect to the video conference.",
    "ERROR_MESSAGE_P2P_TIMEOUT": "Failed to connect to the video conference.",
    "ERROR_MESSAGE_P2P_CLOSED": "Connection closed.",
    "ERROR_MESSAGE_GENERIC": "Error occurred."
  },
  "HELP": {
    "DIALOG_HEADER":"Help",
    "ITEM_LABEL_HDMI":"External input switching",
    "ITEM_LABEL_PRESENTATION_TIMER":"Presentation timer [Red Button]",
    "ITEM_LABEL_ANNOTATION":"Annotation [Green Button]",
    "ITEM_LABEL_VC":"Video conference [Yellow Button]",
    "ITEM_LABEL_STATUSBAR":"Status bar",
    "ITEM_LABEL_HELP_INFO": "About this application",
    "LABEL_IP":"IP address",
    "LABEL_VERSION":"Version",
    "LABEL_LICENSES":"Open source licenses",
    "MESSAGE_HDMI":"Switching the external input automatically by connecting HDMI. You can also manually switch to HDM
I 1 - 4 by the input menu or pushing [1] - [4] button.",
    "MESSAGE_PRESENTATION_TIMER":"Sets the timer to count down. This is useful when the discussion time for topics is
predetermined.",
    "MESSAGE_ANNOTATION":"Draws annotation overlaying a connected external input, or uses the screen as a whiteboard w
ithout external inputs. You can also download the content you drew to your PC or save it to a USB storage.",
    "MESSAGE_VC":"Joins the video conference by entering the access code.",
    "MESSAGE_STATUSBAR":"You can switch visibility of the status bar displayed in the top right corner of the screen b
y the [0] button of remote control. The status bar is always displayed on the HOME screen."
  },
  "SETTINGS":{
    "DIALOG_HEADER": "Settings",
    "ITEM_LABLE_SERVER_CONNECTION": "Server connection",
    "ITEM_LABEL_SERVER_URL": "Server URL",
    "ITEM_LABEL_HOME_SCREEN": "Home screen",
    "ITEM_LABLE_TITLE": "Title",
    "ITEM_LABEL_SUBTITLE": "Subtitle",
    "ITEM_LABEL_CLOCK": "Clock",
    "ITEM_LABEL_WEB_FRAME": "Web frame",
    "ITEM_LABEL_FRAME_SIZE": "Frame size",
    "ITEM_LABEL_URL": "URL",
    "ITEM_LABEL_POWER": "Power",
    "ITEM_LABEL_AUTO_POWER_OFF": "Auto power off",
    "ITEM_LABEL_AUTO_REBOOT": "Auto reboot",
    "ITEM_LABEL_INPUTS": "Inputs",
    "ITEM_LABEL_INPUTS_DISPLAY_NAME": "Display name",
    "ITEM_LABEL_INPUTS_HDMI1": "HDMI 1",
    "ITEM_LABEL_INPUTS_HDMI2": "HDMI 2",
    "ITEM_LABEL_INPUTS_HDMI3": "HDMI 3",
    "ITEM_LABEL_INPUTS_HDMI4": "HDMI 4",
    "ITEM_LABEL_HELP_URL": "Help URL",
    "ITEM_LABEL_ANNOTATION": "Annotation",
    "ITEM_LABEL_CANVAS_COLOR": "Canvas color",
    "ITEM_LABEL_SAVING_ANNOTATION_TO_USB_MEMORY": "Save annotation to USB storage device",
    "ITEM_LABEL_SETTINGS_LOCK": "Settings lock"
```

```
    "ITEM_LABEL_SETTINGS_LOCK": "Settings lock",
    "ITEM_LABEL_LOCK": "Lock",
    "ITEM_LABEL_PINCODE": "PIN code",
    "ITEM_VALUE_ON": "On",
    "ITEM_VALUE_OFF": "Off",
    "ITEM_VALUE_FRAME_SIZE_NONE": "None",
    "ITEM_VALUE_FRAME_SIZE_HALF": "Half",
    "ITEM_VALUE_FRAME_SIZE_FULL": "Full",
    "ITEM_VALUE_AUTO_POWER_OFF_MIN": " min",
    "ITEM_VALUE_CANVAS_COLOR_WHITE": "White",
    "ITEM_VALUE_CANVAS_COLOR_BLACK": "Black",
    "MESSAGE_CONFIRM_IMPORTING": "A USB storage device with valid data to import has been detected. Do you want to imp
ort this data?",
    "MESSAGE_IMPORTING": "Importing... \nDo not remove USB storage device.",
    "MESSAGE_IMPORTING_COMPLETED": "Import completed successfully. You can remove the USB storage device.",
    "MESSAGE_IMPORTING_ERROR_FORMAT": "Failed to import. Failed to parse .",
    "MESSAGE_IMPORTING_ERROR_UNZIP": "Failed to import. Failed to extract .",
    "MESSAGE_IMPORTING_ERROR_NOT_FOUND": "Failed to import.  is required.",
    "MESSAGE_IMPORTING_ERROR_COPY": "Failed to import. Failed to copy .",
    "MESSAGE_IMPORTING_ERROR_IN_PROGRESS": "Import is in progress. Please retry later.",
    "MESSAGE_IMPORTING_ERROR": "Failed to import.",
    "MESSAGE_PINCODE_ENTER": "Enter PIN code.",
    "MESSAGE_PINCODE_INCORRECT": "PIN code is incorrect. Enter PIN code.",
    "BUTTON_IMPORT_OK": "Import"
  },
  "TIME_SETTINGS":{
    "DIALOG_HEADER":"Set current date &amp; time"
  },
  "NOTIFICATION": {
    "MESSAGE_REBOOT_1MIN": "Display will reboot in 1 minute.",
    "MESSAGE_REBOOT_NOW": "Display rebooting.",
    "MESSAGE_AUTO_POWER_OFF": "Powering off due to inactivity.",
    "MESSAGE_POWEROFF_NOW": "Powering off.",
    "MESSAGE_VC_JOINED": " has joined.",
    "MESSAGE_VC_LEFT": " has left.",
    "MESSAGE_VC_MIRRORING_SHARED": " has started screen sharing.",
    "MESSAGE_VC_ANNOTATION_SHARED": "Started screen sharing."
  }
}
```

images (opional)

You can customize all UI icon images.

Image files with the specified file names are placed in the "images" folder. The file names and resolution of each icon are as follows.

Place	Icon	File name	Default resolution
HOME	Screenshot not allowed	icon-home-meshot_ban.png	48x48
Menu	Input	icon-menu-inputr.png	72x72
Menu	Presentation Timer	icon-menu-timer.png	72x72
Menu	Annotation	icon-menu-annotation.png	72x72
Menu	Video Conference	icon-menu-vc.png	72x72
Menu	Help	icon-menu-help.png	72x72
Menu	Current Input	icon-menu-current_input.png	24x24
Menu	Current Input (Focused)	icon-menu-current_input_focused.png	24x24
Menu	Guide Arrow	icon-menu-guide_arrow.png	48x48
Menu	Arrow Up	icon-menu-arrow_up.png	48x48
Menu	Arrow Down	icon-menu-arrow_down.png	48x48
Annotation	Close	icon-annotation-close.png	72x72
Annotation	Mouse Mode	icon-annotation-mouse_mode.png	72x72
Annotation	Touch Mode	icon-annotation-touch_mode.png	72x72
Annotation	Clear	icon-annotation-clear.png	72x72
Annotation	Undo	icon-annotation-undo.png	72x72
Annotation	Redo	icon-annotation-redo.png	72x72
Annotation	Eraser	icon-annotation-eraser.png	72x72
Annotation	Pen - Red	icon-annotation-pen_red.png	72x72
Annotation	Pen - Blue	icon-annotation-pen_blue.png	72x72
Annotation	Pen - Green	icon-annotation-pen_green.png	72x72
Annotation	Pen - Yellow	icon-annotation-pen_yellow.png	72x72
Annotation	Pen - Purple	icon-annotation-pen_purple.png	72x72
Annotation	Pen - Orange	icon-annotation-pen_orange.png	72x72
Annotation	Pen - White	icon-annotation-pen_white.png	72x72
Annotation	Pen - Black	icon-annotation-pen_black.png	72x72
Annotation	Palette - Red	icon-annotation-palette_red.png	50x50
Annotation	Palette - Blue	icon-annotation-palette_blue.png	50x50
Annotation	Palette - Green	icon-annotation-palette_green.png	50x50
Annotation	Palette - Yellow	icon-annotation-palette_yellow.png	50x50
Annotation	Palette - Purple	icon-annotation-palette_purple.png	50x50
Annotation	Palette - Orange	icon-annotation-palette_orange.png	50x50
Annotation	Palette - White	icon-annotation-palette_white.png	50x50

Place	Icon	File name	Default resolution
Annotation	Palette - Black	icon-annotation-palette_black.png	50x50
Annotation	Save	icon-annotation-save.png	72x72
Annotation	Remote Pointer	icon-mytouch-pointer.png	64x64
Video Conference Menu	Mic ON	icon-vc_menu-mic_on.png	64x64
Video Conference Menu	Mic OFF	icon-vc_menu-mic_off.png	64x64
Video Conference Menu	Layout	icon-vc_menu-layout.png	64x64
Video Conference Menu	Exit	icon-vc_menu-exit.png	64x64
Video Conference	Mic ON	icon-vc-mic_on.png	48x48
Video Conference	Mic OFF	icon-vc-mic_off.png	48x48
Video Conference	Person Large	icon-vc-person_l.png	720x720
Video Conference	Person Small	icon-vc-person_s.png	180x180
Notification	Presentation Timer	icon-notification-presentation_timer.png	60x60
Notification	Information (i mark)	icon-notification-information.png	60x60
Dialog	Arrow Up	icon-dialog-arrow_up.png	48x48
Dialog	Arrow Down	icon-dialog-arrow_down.png	48x48
Num Pad	Close	icon-vc-numpad_close.png	72x72
Common	Loading	icon-common-loading.png	48x48

style.css (optional)

You can customize the style (font, text color, text size, background color) of the main parts of the UI.

Write customization files in CSS file format. The classes of each customizable section are defined as follows.

style.css (optional)

Class name	Target	Recommended property	Note
.custom-font	All	font-family	Use @font-face to add font definition.
.custom-menu-button	Menu button	background, font-size, collor	Use :focus class for focused. "!importand" is required.
.custom-menu-guide	Menu guide	background, font-size, collor	
.custom-dialog-body	Dialog body	background, font-size, color	
.custom-dialog-button	Dialog button	background, font-size, color	Use :focus class for focused. "!important" is required.
.custom-dialog-select	Dialog select box	background, font-size, color	Use :focus class for focused. "!important" is required.
.custom-title-main	Title	background, font-size, color	
.custom-title-sub	Subtitle	background, font-size, color	
.custom-notification	Notification	background, font-size, color	
.custom-statusbar	Statusbar	background, font-size, color, height	
.custom-passcode	Passcode	background, font-size, color	
.custom-clock	Clock	font-size, color	
.custom-presentation-timer	Presentation timer	font-size, color	
.custom-annotation-toolbar	Annotation toolbar	background	
.custom-annotation-toolbar-item	Annotation toolbar item	border	Use :active class for selected.
.custom-vc-background	Video conference background	background-color	"!important" is required.
.custom-vc-sharing-message	Screen sharing message	background, font-size, color	"!important" is required.
.custom-help	Help	background-color, color	"!important" is required.
.custom-schedule	Shedule	background-color: #202124, top: 0, left: 1302px, width: 618px	
.custom-schedule-item	Shedule item	background-color: #40688F, left: 128px, color: #F1F1F1, font-size: 28px	
.custom-schedule-time-scale-label	Schedule time scale label	top: -12px, left: 45px, color: #EDEDED, font-size: 24px	
.custom-schedule-time-scale-line	Schedule time scale line	left: 118px, border-top: solid 1px #999999	
.custom-schedule-current-time-line	Current timeline of schedule	left: 0px, border-top: solid 2px #51AAFF	
.custom-schedule-past-rect-dimmer	Dimmer of past rectangle on schedule	background-color: rgba(33,33,33,0.7)	

Ex)

```
@font-face {
    font-family: orangejuice;
    src: url("../fonts/orangejuice2.0.ttf") format('truetype');
}

.custom-font {
    font-family: orangejuice, serf;
}

.custom-menu {
    background: #3e8f3e;
    color: #204d74;
}
```

fonts (optional)

You can set any font file to the text to be used in the UI.

The default file is placed in the "fonts" file. Specify the font family in "style.css".

custom.json (optional)

Write custom.json in JSON format. The formats are as follows:

- webFrame ... <object> (optional)
  - top ... <number> (optional) WebFrame display X coordinate Default: 0
  - left ... <number> (optional) WebFrame display Y coordinate Default: 0
  - width ... <number> (optional) WebFrame display width Default: 1920
  - height ... <number> (optional) WebFrame display height Default: 1080
  - zoom ... <number> (optional) WebFrame enlargement ratio Default: 1.0
- clock ... <object> (optional)
  - format ... <string> (mandatory) Format of home screen clock moment.js(https://momentjs.com/docs/) Compliant character string
- canvasColor ... <object> (optional)
  - white ... <string> (optional) "White" canvas color, Default: "0xFFFFFFFF"
  - black ... <string> (optional) "Black" canvas color, Default: "0x000000FF"
- version ... <number> (mandatory) Version of setting data. Specify "1" at all times.

Ex)

```
{
  "webFrame": {
    "top": 0,
    "left": 0,
    "width": 1920,
    "height": 1080,
    "zoom": 1.0
  },
  "clock": {
    "format": "YYYY/MM/DD HH:mm:ss"
  },
  "canvasColor": {
    "white": "0xFFFFFFFF",
    "black": "0x000000FF"
  },
  "version": 1
}
```

```
  "webFrame": {
    "top": 0,
    "left": 0,
```

Appendix III. backgrounds.zip

This zip archive contains the background still images and videos to be set to the home screen.

Include the "backgrounds" folder in the zip file. (The "backgrounds" folder must be generated when unzipping the zipped folder.)

Example of hierarchy structure after unzipping)

```
backgrounds/
  image1.png
  image2.png
  video1.mp4
```