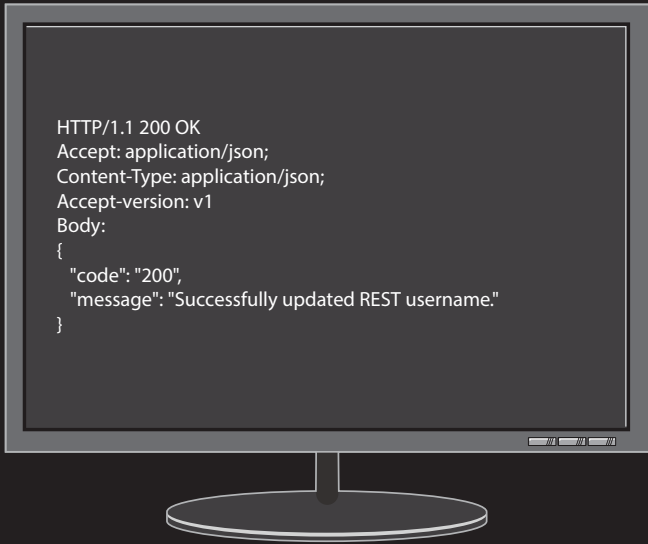


APPLICATION PROGRAM INTERFACE MANUAL

BXAMGR

BOXILLA REST API V1.2 MANUAL

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```
HTTP/1.1 200 OK
Accept: application/json;
Content-Type: application/json;
Accept-version: v1
Body:
{
  "code": "200",
  "message": "Successfully updated REST username."
}
```

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Boxilla Northbound REST API V1.2 Release for External Manager

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GLOSSARY OF REST-RELATED TERMS

GLOSSARY OF REST-RELATED TERMS

REST: Representational State Transfer. An architectural style that uses HTTP as the transport protocol for the message requests and responses.

API: Application Programming Interface. Enables different systems to interact with each other programmatically.

URI: Uniform Resource Identifier. A string containing an identifier (usually a name or an address) which refers to a resource in the web.

GET A REST: operation to retrieve a resource.

POST A REST: operation to create a resource.

PUT A REST: operation to update or create within an existing resource.

DELETE A REST: operation to remove a resource.

JSON: JavaScript Object Notation. A lightweight syntax containing objects and arrays, usually used (instead of XML) to return information from a REST API.



CHAPTER 1: INTRODUCTION

1. INTRODUCTION

Black Box hardware devices are managed on Boxilla via web services that provide functionalities of creating, removing, updating, and validating KVM devices, connections and user profiles. The corresponding functionalities are required as independent components that can be integrated into and accessed potentially by third-party management platforms used by customers for Black Box device management, other than accessing devices directly from Boxilla.

This document provides the definition of Boxilla northbound REST API that acts as the management interface integrated with any third-party management tools. Requirements on the REST API functionalities are listed but not limited as follows:

- ◆ Add support to create/edit/delete profiles of KVM users and get information of individual/multiple users
- ◆ Add support to log KVM users in to or out from KVM receivers
- ◆ Add support to update API authentication credentials (username/password)
- ◆ Add support to get list of transmitters/receivers, properties, and status
- ◆ Add support to reboot individual/multiple devices
- ◆ Add support to create/delete KVM connections, get connection information, and edit connection properties

NOTE: The northbound REST API is designed as one of the new features for Boxilla 3.5. It is NOT supported by Boxilla with versions older than 3.5.

CHAPTER 2: BOXILLA REST API FOR EXT. MGMT. PLAT. INT.

2. BOXILLA REST API FOR EXTERNAL MANAGEMENT PLATFORM INTEGRATION

2.1 GENERAL PROCEDURES

Version 1 of the northbound REST APIs listed in this document provides administrator level of operations to the Boxilla® system and the associated resources. For this reason, they are disabled and cannot be accessed by external management platforms by default. Configuration of enabling northbound REST APIs is managed by Boxilla via its web interface. Potential REST API users should enable the northbound REST APIs (and only enable them when required) before using them; otherwise, all requests via the APIs would fail and with no response.

2.2 NORTHBOUND REST API URI FORMAT

The URI of each northbound REST API designed in this document is formatted as follows:

scheme "://" authority "/" path ["?" query] ["#" fragment]

The path field within the format is defined using the following hierarchy rules:

- ◆ users
 - kvm
 - system
- ◆ devices
 - kvm
 - switches
 - dkm
- ◆ peripherals
 - usb-extenders
- ◆ connections
 - kvm
 - dkm
 - groups

As the northbound REST API is designed for the majority of REST functionalities for Boxilla in general, the authority field within the URI is defined as bxa-api.

The following sections list the URLs of all the northbound REST APIs accessed using the GET, POST, PUT and DELETE verbs, respectively.



CHAPTER 2: BOXILLA REST API FOR EXT. MGMT. PLAT. INT.**2.2.1 GET APIS**

SCOPE	URL	API VERSION
Users	bxapi/users/kvm	v1
Devices	bxapi/devices/kvm	v1
	bxapi/devices/kvm/properties	v1
	bxapi/devices/kvm/status	v1
Connections	bxapi/connections/kvm	v1
	bxapi/connections/kvm/active	v1
Versioning	bxapi/version	v1

2.2.2 POST APIS

SCOPE	URL	API VERSION
Users	bxapi/users/kvm	v1
	bxapi/users/kvm/login	v1
	bxapi/users/kvm/logout	v1
Devices	bxapi/devices/kvm/reboot	v1
	bxapi/devices/kvm/reboot-all	v1
Connections	bxapi/connections/kvm	v1
	bxapi/connections/kvm/active	v1

2.2.3 PUT APIS

SCOPE	URL	API VERSION
Users	bxapi/users/kvm	v1
	bxapi/users/kvm/connections	v1
Devices	bxapi/devices/kvm/properties/rx	v1
	bxapi/devices/kvm/properties/tx	v1
Connections	bxapi/connections/kvm	v1
REST Authentication	bxapi/users/rest/username	v1
	bxapi/users/rest/password	v1

CHAPTER 2: BOXILLA REST API FOR EXT. MGMT. PLAT. INT.

2.2.4 DELETE APIS

SCOPE	URL	API VERSION
Users	bxa-api/users/kvm	v1
	bxa-api/users/kvm/all	v1
Connections	bxa-api/connections/kvm	v1
	bxa-api/connections/kvm/all	v1
	bxa-api/connections/kvm/active	v1

2.3 REST API HEADER

The header of each REST API defined in this document contains universal information that applies to all APIs, validated by Boxilla. A standard example of the header of a Boxilla northbound REST API in this document is defined as follows:

Accept: application/json

Content-Type: application/json

Authorization: Basic bG9sOnNlY3VyZQ==

Accept-version: v1

Each field of the header is discussed in the following sections.

2.3.1 REQUEST/RESPONSE FORMATTING

The "Accept: application/json" and "Content-Type: application/json" fields in each REST API request header indicate that the body of API request and response is in JSON format.

If these fields are not provided in the API request header, a standard HTTP-302 response would be returned by Boxilla.

2.3.2 AUTHENTICATION/AUTHORIZATION AND SECURITY

The Northbound REST APIs listed in this document use HTTPs by default, configurable on port 443.

The "Authorization: Basic" field in the header of each API request indicates that all requests/responses of the REST APIs in this document use basic authentication method for authentication/authorization. A universal REST API user with a username-password credential pair is designed for operations over REST APIs for all KVM devices and connections, independent from the associated KVM user accounts. This credential pair is deployed in Boxilla with uniqueness, encoded with Base64 algorithm and included after the "Basic" context in any API request header.

The default REST API authentication/authorization credential pair used in Boxilla is as follows:

- ◆ Username: **REST_BbAdminUser**
- ◆ Password: **Boxill@2020**

As mentioned in Section 2.1, the northbound REST APIs are with administrator level access of Boxilla system and resources, which is guaranteed by using this default REST credential pair. New credential pairs potentially added in future design can be used to change the access level.

CHAPTER 2: BOXILLA REST API FOR EXT. MGMT. PLAT. INT.

2.3.3 API VERSIONING

Versioning is handled in the customized REST API request/response header to preserve URIs between versions using the "Accept-version" field. The default version number to be used is v1.

2.4 ERROR RESPONSE CASES FOR ALL APIS

The success/error response of each northbound REST API in this document follows the HTTP-statuscode style of response, using status code to represent various cases together with details of the response. The API response header includes the version of API being used via the request and the response body contains the detailed description of the response status in a "message" field in JSON.

The following error response cases apply to all the REST APIs defined in this document.

2.4.1 RESPONSE - ERROR: BAD REQUEST

This error response indicates any non-specific error that might be caused by internal errors within the API, with the following format:

```
HTTP/1.1 400 Bad Request
Accept: application/json;
Content-Type: application/json;
Accept-version: v1
Body:
{
  "code": "400",
  "message": "[Error details]."
}
```

The detailed error message varies depending on the actual error case related. The individual error case would be discussed in the definition of each REST API, respectively.

2.4.2 RESPONSE - ERROR: UNAUTHORIZED

This error response indicates that the operation related to the API request is not authorized on Boxilla, usually caused by an invalid authentication credential.

```
HTTP/1.1 401 Unauthorized
Accept: application/json;
Content-Type: application/json;
Accept-version: v1
Body:
{
  "code": "401",
  "message": "Operation is not authorized."
}
```

CHAPTER 2: BOXILLA REST API FOR EXT. MGMT. PLAT. INT.

2.4.3 RESPONSE - ERROR: NOT FOUND

This error response indicates that the API request URL does not exist. The error case is handled with a HTML-format error response. Version 1 of northbound REST API does not customize this error response in JSON.

```
HTTP/1.1 404 Not Found
Accept: application/json;
Content-Type: application/json;
Accept-version: v1
Body:
<html lang="en">
<head>
<meta charset="utf-8" />
<title>Action Controller: Exception caught</title>

</head>
<body>
<center><br><br><br><br>
<h2>404: Resource not found.</h2><br><br>
<h3>Please return and try again</h3>
<a href="/"><button class="btn btn-default" type="button">Dashboard</button></a><br><br>
<small><i>Routing Error</i></small>
</body>
</html>
```

2.5 APIS FOR REST USER RELATED OPERATIONS

The APIs for REST user management include the following functionalities:

- ♦ Change username/password of the REST user account credential

The associated definition of each API is listed as follows.

2.5.1 API FOR EDITING REST USERNAME

2.5.1.1 REQUEST - URI

Uri	bxa-api/users/rest/username
Method	PUT



CHAPTER 2: BOXILLA REST API FOR EXT. MGMT. PLAT. INT.

2.5.1.2 REQUEST – PARAMS

REQUIREMENT	NAME	TYPE	DESCRIPTION
Mandatory	username	String	Current username credential of the REST API user. Maximum length 64.
	new_username	String	New username credential of the REST API user to change to. Maximum length 64.

2.5.1.3 REQUEST BODY JSON FORMAT

```
{  
  "username": "[username]",  
  "new_username": "[new_username]"  
}
```

2.5.1.4 RESPONSE - SUCCESS

```
HTTP/1.1 200 OK  
Accept: application/json;  
Content-Type: application/json;  
Accept-version: v1  
Body:  
{  
  "code": "200",  
  "message": "Successfully updated REST username."  
}
```

2.5.1.5 RESPONSE – ERROR: BAD REQUEST

This error response indicates any non-specific error (may be caused by internal errors within the API) returned, which might include:

- ◆ Parameters are passed in as empty or invalid (contain invalid characters; length exceeding limit; etc.). The associated error message in the response body is as follows:
"message": "Invalid parameter(s): [List of parameters detected as empty or invalid]"
- ◆ The username credential provided in the parameters does not match the existing valid credential. The associated error message in the response body is as follows:
"message": "REST username [username] does not exist."

CHAPTER 2: BOXILLA REST API FOR EXT. MGMT. PLAT. INT.

2.5.1.6 RESPONSE – ERROR: REST USERNAME CREDENTIAL ALREADY EXISTS

This error indicates that the new REST username credential to be updated to (specified by the "new_username" parameter) already exists.

HTTP/1.1 403 Forbidden

Accept: application/json;

Content-Type: application/json;

Accept-version: v1

Body:

```
{
  "code": "403",
  "message": "Cannot update REST username to [new_username], [new_username] already exists."
}
```

2.5.1.7 RESPONSE – ERROR: NORTHBOUND REST API IS NOT ENABLED FOR THE REST USER

This error indicates that northbound REST API is disabled for the specified REST user specified by the "username" parameter.

HTTP/1.1 403 Forbidden

Accept: application/json;

Content-Type: application/json;

Accept-version: v1

Body:

```
{
  "code": "403",
  "message": "Editing REST authentication credentials is forbidden for user [username]. REST API is not accessible for this user."
}
```

2.5.2 API FOR EDITING REST PASSWORD

2.5.2.1 REQUEST – URI

Uri	bxapi/users/rest/password
Method	PUT

CHAPTER 2: BOXILLA REST API FOR EXT. MGMT. PLAT. INT.

2.5.2.2 REQUEST – PARAMS

REQUIREMENT	NAME	TYPE	DESCRIPTION
Mandatory	username	String	Current username credential of the REST API user. Maximum length 64.
	new_password	String	New password credential of the REST API user to change to. Maximum length 32.

2.5.2.3 REQUEST BODY JSON FORMAT

```
{  
  "username": "[username]",  
  "new_password": "[new_password]"  
}
```

2.5.2.4 RESPONSE – SUCCESS

```
HTTP/1.1 200 OK  
Accept: application/json;  
Content-Type: application/json;  
Accept-version: v1  
Body:  
{  
  "code": "200",  
  "message": "Successfully updated REST user password."  
}
```

2.5.2.5 RESPONSE – ERROR: BAD REQUEST

This error response indicates any non-specific error (may be caused by internal errors within the API) returned, which might include:

- ◆ Parameters are passed in as empty or invalid (contain invalid characters; length exceeding limit; etc.). The associated error message in the response body is as follows:
"message": "Invalid parameter(s): [List of parameters detected as empty or invalid]"
- ◆ The username credential provided in the parameters does not match the existing valid credential. The associated error message in the response body is as follows:
"message": "REST username [username] does not exist."

CHAPTER 2: BOXILLA REST API FOR EXT. MGMT. PLAT. INT.

2.5.2.6 RESPONSE – ERROR: NORTHBOUND REST API IS NOT ENABLED FOR THE REST USER

This error indicates that northbound REST API is disabled for the specified REST user specified by the "username" parameter.

```
HTTP/1.1 403 Forbidden
```

```
Accept: application/json;
```

```
Content-Type: application/json;
```

```
Accept-version: v1
```

```
Body:
```

```
{  
  "code": "403",  
  "message": "Editing REST authentication credentials is forbidden for user [username]. REST API is  
not accessible for this user."  
}
```

2.6 APIS FOR VERSIONING

This API is to get versioning information related to Boxilla components, including information of the following items each with fixed format:

- ◆ Boxilla software version
Format is [major_version].[minor_version].[patch].[build_number], e.g. 3.4.1.5120
- ◆ Northbound REST API version: fixed as "v1" for API version 1
- ◆ Boxilla model number: fixed as "BXAMGR"
- ◆ Boxilla serial number: e.g. AEBB19B00022

2.6.1 REQUEST - URI

Uri	bxa-api/version
Method	GET

2.6.2 REQUEST – PARAMS

This API does not require any parameters within the request body.



CHAPTER 2: BOXILLA REST API FOR EXT. MGMT. PLAT. INT.

2.6.3 RESPONSE – SUCCESS

```
HTTP/1.1 200 OK
Accept: application/json;
Content-Type: application/json;
Accept-version: v1
Body:
{
  "code": "200",
  "message": {
    "software-version": "[boxilla software version]",
    "api_version": "v1",
    "model_number": "BXAMGR",
    "serial_number": "[boxilla serial number]"
  }
}
```

2.7 APIS FOR USER-ORIENTED OPERATIONS

The APIs for Boxilla user operations include functionalities as follows:

- ♦ Creating new KVM users
- ♦ Editing existing KVM user profiles
- ♦ Deleting existing KVM users
- ♦ Getting KVM users (individual/all)
- ♦ Editing associations between KVM users and connections
- ♦ Logging users in to KVM receivers
- ♦ Logging users out from KVM receivers

The associated definition of each API is listed as follows.

2.7.1 API FOR CREATING KVM USERS

This API is to create a new KVM user in Boxilla using a valid credential set (username + password) from the API input parameters, together with the property set associated to the user. For each API request, one of the following categories of user property sets is defined with the relevant parameters passed in apart from the user credential (username/password):

- ♦ Unique property: user is created with a unique set of properties defined with the API request parameters. In this case the request of the API should contain the following parameters for the user property:
 - privilege: identifying the privilege of the user, valid values including "Administrator", "PowerUser" or "GeneralUser".
 - auto_connect: identifying whether the auto-connection option of the user property is enabled, valid values including "Yes" or "No".
 - auto_connect_name: identifying the name of the auto-connection if the property is enabled.
 - remote_access: identifying whether access of the user profile via the remote windows application is enabled, valid values include "Yes" or "No".

CHAPTER 2: BOXILLA REST API FOR EXT. MGMT. PLAT. INT.

Version 1 of northbound REST API does not support user-related operations with non-unique properties, including template-based and system properties.

The "Requirement" column in the parameter table represents whether each parameter is mandatory, conditional-mandatory or optional, depending on specific values of some parameters as follows:

- ♦ Mandatory: the parameter is required.
- ♦ Conditionally Optional: the parameter is optional depending on values of one or more other parameters.

2.7.1.1 REQUEST - URI

Uri	bxa-api/users/kvm
Method	POST

2.7.1.2 REQUEST - PARAMS

REQUIREMENT	NAME	TYPE	DESCRIPTION
Mandatory	username	String	Username credential of the KVM user. Maximum length 64.
	password	String	Password credential of the KVM user. Maximum length 32.
	privilege	String	User privilege. Valid values are: "Administrator" "PowerUser" "User". (Case sensitive)
	remote_access	String	Enabled/disabled option for remote app access. Valid values are "Yes" or "No". (Case sensitive)
	auto_connect	String	Enabled/disabled option for auto-connection. Valid values are "Yes" or "No". (Case sensitive)
Conditionally Optional	auto_connect_name	String	Name of the auto-connection if enabled. Maximum length 64. Applicable when "auto_connect" is "Yes".

CHAPTER 2: BOXILLA REST API FOR EXT. MGMT. PLAT. INT.

2.7.1.3 REQUEST BODY JSON FORMAT

```
{
  "username": "[username]",
  "password": "[password]",
  "privilege": "Administrator" | "PowerUser" | "User",
  "remote_access": "Yes" | "No",
  "auto_connect": "Yes" | "No",
  "auto_connect_name": "[auto_connect_name]", // only add it when "auto_connect" is "Yes"
}
```

2.7.1.4 RESPONSE – SUCCESS

```
HTTP/1.1 201 Created
Accept: application/json;
Content-Type: application/json;
Accept-version: v1
Body:
{
  "code": "201",
  "message": "Created user [username]."
}
```

2.7.1.5 RESPONSE – ERROR: BAD REQUEST

This error response indicates any non-specific error (may be caused by internal errors within the API) returned, which might include:

- ◆ Username/password or other required property parameters are passed in as empty or invalid. The associated error message in the response body is as follows:
"message": "Invalid parameter(s): [List of parameters detected as empty or invalid]"
- ◆ When "auto_connect" is enabled, the provided "auto_connect_name" parameter value is not the name of any existing KVM connections. The associated error message in the response body is as follows:
"message": "Invalid parameter: auto_connect_name [auto_connect_name] does not point to any existing KVM connections."
- ◆ "auto_connect_name" parameter is provided when "auto_connect" is disabled. The associated error message in the response body is as follows:
"message": "Invalid parameter: auto_connect_name [auto_connect_name] cannot be set when auto_connect is disabled."

CHAPTER 2: BOXILLA REST API FOR EXT. MGMT. PLAT. INT.

2.7.1.6 RESPONSE – ERROR: LICENSE-RELATED FAILURE

This error response indicates that the Boxilla license installed on the server is invalid, expired or limitation of the maximum number of users is reached.

HTTP/1.1 403 Forbidden

Accept: application/json;

Content-Type: application/json;

Accept-version: v1

Body:

```
{
  "code": "403",
  "message": "License limit reached."
}
```

2.7.1.7 RESPONSE – ERROR: USER ALREADY EXISTS

This error response indicates that a KVM user record with the specified username already exists and the API request is attempting to create a duplicate record.

HTTP/1.1 403 Forbidden

Accept: application/json;

Content-Type: application/json;

Accept-version: v1

Body:

```
{
  "code": "403",
  "message": "Duplicate name received."
}
```

2.7.2 API FOR EDITING KVM USERS

This API is to edit the profile/properties of an existing KVM user. The request of the API should contain the user profile/property parameters to be updated.

2.7.2.1 REQUEST – URI

Uri	bxa-api/users/kvm
Method	PUT

CHAPTER 2: BOXILLA REST API FOR EXT. MGMT. PLAT. INT.

2.7.2.2 REQUEST – PARAMS

REQUIREMENT	NAME	TYPE	DESCRIPTION
Mandatory	username	String	Username credential of the KVM user. Maximum length 64.
	password	String	Password credential of the KVM user. Maximum length 32.
	privilege	String	User privilege. Valid values are: "Administrator" "PowerUser" "User". (Case sensitive)
	remote_access	String	Enabled/disabled option for remote app access. Valid values are "Yes" or "No". (Case sensitive)
	auto_connect	String	Enabled/disabled option for auto-connection. Valid values are "Yes" or "No". (Case sensitive)
Optional	new_username	String	New username to be edited. Maximum length 64. Username is updated if provided.
Conditionally Optional	auto_connect_name	String	Name of the auto-connection if enabled. Maximum length 64.

2.7.2.3 REQUEST BODY JSON FORMAT

```
{  
  "username": "[username]",  
  "password": "[password]",  
  "privilege": "Administrator" | "PowerUser" | "User",  
  "remote_access": "Yes" | "No",  
  "auto_connect": "Yes" | "No",  
  "auto_connect_name": "[auto_connect_name]" // only add it when "auto_connect" is "Yes"  
  "new_username": "[new_username]" // Optional, username is updated if provided  
}
```

CHAPTER 2: BOXILLA REST API FOR EXT. MGMT. PLAT. INT.

2.7.2.4 RESPONSE – SUCCESS

```
HTTP/1.1 200 OK
Accept: application/json;
Content-Type: application/json;
Accept-version: v1
Body:
{
  "code": "200",
  "message": "Updated profile/properties for user [username]."
}
```

2.7.2.5 RESPONSE – ERROR: BAD REQUEST

This error response indicates any non-specific error (may be caused by internal errors within the API) returned, which might include:

- ◆ Required parameters are passed in as empty or invalid. The associated error message in the response body is as follows:
"message": "Invalid parameter(s): [List of parameters detected as empty or invalid]"
- ◆ One or more KVM users within the username list parameter do not exist. The associated error message in the response body is as follows:
"message": "User [username] does not exist."
- ◆ When "auto_connect" is enabled, the provided "auto_connect_name" parameter value is not the name of any existing KVM connections. The associated error message in the response body is as follows:
"message": "Invalid parameter: auto_connect_name [auto_connect_name] does not point to any existing KVM connections."
- ◆ "auto_connect_name" parameter is provided when "auto_connect" is disabled. The associated error message in the response body is as follows:
"message": "Invalid parameter: auto_connect_name [auto_connect_name] cannot be set when auto_connect is disabled."

2.7.2.6 RESPONSE – ERROR: CHANGING USERNAME TO NAME OF EXISTING USER

This error response indicates that the new username to be changed to belongs to an existing user.

The associated error message in the response body is as follows:

```
HTTP/1.1 403 Forbidden
Accept: application/json;
Content-Type: application/json;
Accept-version: v1
Body:
{
  "code": "403",
  "message": "Cannot update username to [new_username]. User [new_username] already exists."
}
```



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2.7.2.7 RESPONSE – ERROR: ATTEMPTING TO EDIT PROPERTIES OF NON-UNIQUE USERS

This error response indicates that the specified user is with non-unique properties. Editing properties of the user would be prohibited by the northbound REST API and a HTTP 403 error response is returned. The associated error message in the response body is as follows:

HTTP/1.1 403 Forbidden

Accept: application/json;

Content-Type: application/json;

Accept-version: v1

Body:

```
{
  "code": "403",
  "message": " Editing properties for non-unique user [username] is not supported."
}
```

2.7.3 API FOR DELETING ALL KVM USERS

This API is to delete all the existing KVM users with unique properties in Boxilla.

2.7.3.1 REQUEST - URI

Uri	bxa-api/users/kvm/all
Method	DELETE

2.7.3.2 REQUEST – PARAMS

This API does not require any parameters within the request body. The version of API is included in the request header, as described in Section 2.3.3.

2.7.3.3 RESPONSE – SUCCESS

HTTP/1.1 200 OK

Accept: application/json;

Content-Type: application/json;

Accept-version: v1

Body:

```
{
  "code": "200",
  "message": "Successfully deleted all users."
}
```

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2.7.3.4 RESPONSE – ERROR: USER IN ACTIVE CONNECTION

This error response indicates that one or more users are actively logged in receivers that are in active connections. The associated error message in the response body is as follows:

HTTP/1.1 409 Conflict

Accept: application/json;

Content-Type: application/json;

Accept-version: v1

Body:

```
{
  "code": "409",
  "message": "Fail to delete user(s) [list of active users] because one or more users are in active connections."
}
```

2.7.4 API FOR DELETING SPECIFIC KVM USERS

This API is to delete one or more KVM users with unique properties in Boxilla, specified by the request parameter that contains a list of existing usernames to be deleted.

2.7.4.1 REQUEST – URI

Uri	bxa-api/users/kvm
Method	DELETE

2.7.4.2 REQUEST – PARAMS

REQUIREMENT	NAME	TYPE	DESCRIPTION
Mandatory	usernames	String array	List of names of the KVM users to be deleted. If array is empty with no usernames inside, the API request is successful but no user would be deleted.

2.7.4.3 REQUEST BODY JSON FORMAT

```
{
  "usernames": ["[username _ 1]", "[username _ 2]", ...]
}
```



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2.7.4.4 RESPONSE – SUCCESS

```
HTTP/1.1 200 OK
Accept: application/json;
Content-Type: application/json;
Accept-version: v1
Body:
{
  "code": "200",
  "message": "Successfully deleted user(s) [usernames]."
```

2.7.4.5 RESPONSE – SUCCESS WITH EMPTY USERNAMES PARAMETER

```
HTTP/1.1 204 No Content
Accept: application/json;
Content-Type: application/json;
Accept-version: v1
```

2.7.4.6 RESPONSE – ERROR: BAD REQUEST

This error response indicates any non-specific error (may be caused by internal errors within the API) returned, which might include:

- ◆ Required parameters are passed in as empty (null parameter, not parameter as an empty array) or invalid. The associated error message in the response body is as follows:
"message": "Invalid parameter(s): [List of parameters detected as empty or invalid]"
- ◆ "usernames" parameter is not an array (for example, an integer is given instead) or any elements within are not String type. The associated error message in the response body is as follows:
"message": "Invalid parameter usernames: [usernames], expecting a String array."
- ◆ One or more KVM users within the username list parameter do not exist. The associated error message in the response body is as follows:
"message": "The following user(s) do(es) not exist: [List of usernames do not exist]"

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2.7.4.7 RESPONSE – ERROR: ATTEMPTING TO DELETE USERS WITH NON-UNIQUE PROPERTIES

This error response indicates that one or more KVM users specified in the parameters are with non-unique properties. Deleting these users would be prohibited by the northbound REST API and a HTTP 403 error response is returned. Meanwhile all the other valid users specified in the parameters would still be successfully deleted.

The associated error message in the response body is as follows:

```
HTTP/1.1 403 Forbidden
Accept: application/json;
Content-Type: application/json;
Accept-version: v1
Body:
{
  "code": "403",
  "message": "The following users are with non-unique properties: [List of usernames]."
```

2.7.4.8 RESPONSE – ERROR: USER IN ACTIVE CONNECTION

This error response indicates that one or more users are actively logged in receivers that are in active connections. The associated error message in the response body is as follows:

```
HTTP/1.1 409 Conflict
Accept: application/json;
Content-Type: application/json;
Accept-version: v1
Body:
{
  "code": "409",
  "message": "Fail to delete user(s) [list of active users] because one or more users are in active connections."
```

2.7.5 API FOR GETTING KVM USERS

This API is to obtain one or more KVM users on Boxilla, specified by the request parameter.

2.7.5.1 REQUEST – URI

Uri	bxa-api/users/kvm
Method	GET



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2.7.5.2 REQUEST – PARAMS

REQUIREMENT	NAME	TYPE	DESCRIPTION
Optional	usernames	String array	List of names of the KVM users to get. If array is empty with no usernames inside, the API request is successful but no user would be returned in response body.

NOTE: If no parameter is provided by the API request (parameter is null, not an empty array), the operation would be considered as getting all KVM users and the response is returned accordingly.

If the "usernames" parameter is an empty array, the API request is successful but no user is returned in the response (the "users" JSON array in response body is empty).

2.7.5.3 REQUEST BODY JSON FORMAT

```
{
  "usernames": ["[username _1]", "[username _2]", ...] // Optional, can be null or empty array
}
```

2.7.5.4 RESPONSE – SUCCESS

HTTP/1.1 200 OK

Accept: application/json;

Content-Type: application/json;

Accept-version: v1

Body:

```
{
  "code": "200",
  "message": {
    "users": [
      {
        "username": "[username]",
        "privilege": "Administrator" | "PowerUser" | "User",
        "auto_connect": "Yes" | "No",
        "auto_connect_name": "[auto_connect_name]", // available if "auto_connect" is "Yes"
        "remote_access": "Yes" | "No",
        "connections": [
          {
            "connection_name": "[connection_name]"
          },
          {...},
          ... // if there are more connections
        ]
      },
      {...}, // if there are more users
      ...]
    }
  }
}
```

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In the "message"->"users" JSON array field in the response body, the following keys are mandatory (always be present) in each JSON element of the array:

- ◆ username
- ◆ privilege
- ◆ remote_access
- ◆ auto_connect

The "auto_connection_name" key is conditionally optional based on the value of the "auto_connect" parameter. Meanwhile the value "connections" key depends on the associated connection list of the specified user.

2.7.5.5 RESPONSE - ERROR: BAD REQUEST

This error response indicates any non-specific error (may be caused by internal errors within the API) returned, which might include:

- ◆ Required property parameters are passed in as invalid. The associated error message in the response body is as follows:
"message": "Invalid parameter(s): [List of parameters detected as invalid]."
- ◆ "usernames" parameter is not an array (for example, an integer is given instead) or any elements within are not String type. The associated error message in the response body is as follows:
"message": "Invalid parameter usernames: [usernames], expecting a String array."
- ◆ One or more KVM users within the username list parameter do not exist. The associated error message in the response body is as follows:
"message": "The following user(s) do(es) not exist: [List of usernames do not exist]"

2.7.6 API FOR EDITING ASSOCIATIONS BETWEEN KVM USERS AND CONNECTIONS

This API is to edit the association between a KVM user and a list of KVM connections, each of which is either attached to or detached from the KVM user.

2.7.6.1 REQUEST - URI

Uri	bxa-api/users/kvm/connections
Method	PUT

2.7.6.2 REQUEST - PARAMS

REQUIREMENT	NAME	TYPE	DESCRIPTION
Mandatory	username	String	Name of the KVM user that owns the list of KVM connections.
	connection_names	String array	List of names of the KVM connections to be associated to the KVM user. Can be an empty array.

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The operation of this API depends on the value of the `connection_names` parameter as follows:

- ◆ If the parameter includes one or more valid connection names, all existing associations of KVM connections to the specified KVM user are removed and a new user-connection association is created for each KVM connection included in the parameter to the KVM user.
- ◆ If the parameter is an empty array, all existing associations of KVM connections to the specified KVM user are removed.

2.7.6.3 REQUEST BODY JSON FORMAT

```
{
  "username": "[username]",
  "connection_names": ["[connection_1]", "[connection_2]", ...] //Mandatory, can be empty array
}
```

2.7.6.4 RESPONSE - SUCCESS

HTTP/1.1 200 OK

Accept: application/json;

Content-Type: application/json;

Accept-version: v1

Body:

```
{
  "code": "200",
  "message": "Successfully updated connection associations for user [username]."
}
```

2.7.6.5 RESPONSE - ERROR: BAD REQUEST

This error response indicates any non-specific error (may be caused by internal errors within the API) returned, which might include:

- ◆ Parameters are passed in as invalid (contain invalid characters; length exceeding limit; etc.).
The associated error message in the response body is as follows:
"message": "Invalid parameter(s): [List of parameters detected as empty or invalid]."
- ◆ "connection_names" parameter value is not an array or any elements within are not String type. The associated error message in the response body is as follows:
"message": "Invalid parameter connection_names: [connection_names], expecting a String array."
- ◆ No KVM user exists with the specified username parameter in the request body. The associated error message in the response body is as follows:
"message": "User [username] does not exist."
- ◆ No KVM connections exist with the specified connection name parameters in the request body. The associated error message in the response body is as follows:
"message": "The following connection(s) do(es) not exist: [connection_names]."

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- The maximum limit of connections (22500) can be associated to a user has been reached. The associated error message in the response body is as follows:
"message": "User connection limit reached."

2.7.7 API FOR KVM USER LOGIN TO RECEIVERS

This API is to login a KVM user to a specific receiver or group of receivers, with a force-login option enabled or disabled. Enabling force-login would log out the alternative KVM user logged in currently, while disabling force-login results in a failure of the API request when another KVM user is logged in.

The force-login option is set as a parameter within the request body. Valid parameters are listed in the parameter table below.

2.7.7.1 REQUEST - URI

Uri	bxa-api/users/kvm/login
Method	POST

2.7.7.2 REQUEST - PARAMS

REQUIREMENT	NAME	TYPE	DESCRIPTION
Mandatory	username	String	Username credential of the KVM user for logging in.
	password	String	Password credential of the KVM user for logging in.
	rx_list	String array	The list of receiver names that the user logs in.
	forced	String	String parameter indicates login operation is a force-login or not. Valid values are "Yes" or "No". NOTE: force-login would break existing active connections

2.7.7.3 REQUEST BODY JSON FORMAT

```
{
  "username": "[username]",
  "password": "[password]",
  "rx_list": ["[receiver_1]", "[receiver_2]", ....], // Mandatory, API does nothing if empty array is
  given
  "forced": "Yes" | "No"
}
```



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2.7.7.4 RESPONSE - SUCCESS

```
HTTP/1.1 200 OK
Accept: application/json;
Content-Type: application/json;
Accept-version: v1
Body:
{
  "code": "200",
  "message": "User [username] has successfully logged in to the target receivers."
}
```

2.7.7.5 RESPONSE - ERROR: BAD REQUEST

This error response may be caused by:

- ◆ Parameters are passed in as empty or invalid (contain invalid characters; length exceeding limit; etc.). The associated error message in the response body is as follows:
"message": "Invalid parameter(s): [List of parameters detected as empty or invalid]"
- ◆ One or more receivers included in the rx-list parameter are offline. The associated error message in the response body is as follows:
"message": "The following receiver(s) to log in is(are) offline: [List of offline receiver names]"
- ◆ The KVM user specified by the username parameter does not exist. The associated error message in the response body is as follows:
"message": "User [username] does not exist."

2.7.7.6 RESPONSE - ERROR: UNAUTHORIZED

This error response may be caused by:

- ◆ The REST user credentials included in the request header are invalid, as described in Section 2.4.2.
- ◆ The username/password parameters do not match. The associated error message in the response body is as follows:
"message": "Operation is not authorized due to invalid login credentials."

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2.7.7.7 RESPONSE - ERROR: LOGGING IN WITH FORCE-LOGIN DISABLED WHILE ALTERNATIVE USER IS LOGGED IN

This error response indicates that another user is logged in to one or more receivers listed in the rxlist parameter, with the force-login option disabled. In this case the non-force-login operation from the API request would be rejected.

HTTP/1.1 403 Forbidden

Accept: application/json;

Content-Type: application/json;

Accept-version: v1

Body:

```
{
  "code": "403",
  "message": "Another user is logged in target receiver(s) [rx_list with user logged in]."
```

2.7.8 API FOR KVM USER LOGOUT FROM SPECIFIC RECEIVERS

This API is to log out a KVM user from a specific receiver or group of receivers. Valid parameters are listed in the parameter table below.

2.7.8.1 REQUEST - URI

Uri	bxa-api/users/kvm/logout
Method	POST

2.7.8.2 REQUEST - PARAMS

REQUIREMENT	NAME	TYPE	DESCRIPTION
Mandatory	username	String	Username credential of the KVM user for logging out.
	rx_list	String array	The list of receiver names that the user logs out.
	forced	String	String parameter indicates login operation is a force-logout or not. Valid values are "Yes" or "No". NOTE: force-logout would break existing active connections



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2.7.8.3 REQUEST BODY JSON FORMAT

```
{
  "username": "[username]",
  "rx_list": ["[receiver_1]", "[receiver-2]", ...], // Mandatory, API does nothing if empty array is
  given
  "forced": "Yes" | "No"
}
```

2.7.8.4 RESPONSE – SUCCESS

```
HTTP/1.1 200 OK
Accept: application/json;
Content-Type: application/json;
Accept-version: v1
Body:
{
  "code": "200",
  "message": "User [username] has successfully logged out to the target receivers."
}
```

2.7.8.5 RESPONSE - ERROR: BAD REQUEST

This error response indicates any non-specific error (may be caused by internal errors within the API) returned, which might include:

- ◆ Parameters are passed in as empty or invalid (contain invalid characters; length exceeding limit; etc.). The associated error message in the response body is as follows:
"message": "Invalid parameter(s): [List of parameters detected as empty or invalid]"
- ◆ One or more receivers included in the rx-list parameter do not exist. The associated error message in the response body is as follows:
"message": "The following receiver(s) do(es) not exist: [List of non-exist receiver names]."
- ◆ One or more receivers included in the rx-list parameter are offline. The associated error message in the response body is as follows:
"message": "The following receiver(s) to log out from is(are) offline: [List of offline receiver names]"
- ◆ The KVM user specified by the username parameter does not exist. The associated error message in the response body is as follows:
"message": "User [username] does not exist. "
- ◆ User logout operation fails on one or more receivers due to internal issues. The associated error message in the response body is as follows:
"message": "User logout failed on the following receiver(s): [List of receiver names where logout failed]. Other users are successfully logged out."

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2.7.8.6 RESPONSE - ERROR: LOGGING OUT NOT SUPPORTED BY RECEIVER FIRMWARE

This error response indicates that the firmwares on one or more receivers do not support the associated user-logout functionality required by this API.

HTTP/1.1 403 Forbidden

Accept: application/json;

Content-Type: application/json;

Accept-version: v1

Body:

```
{
  "code": "403",
  "message": "Logout via northbound REST API is not supported by the following receiver(s): [List of receivers not supporting user logout]."
```

2.7.8.7 RESPONSE - ERROR: LOGGING OUT WITH FORCE-LOGOUT DISABLED WHILE CONNECTIONS ASSOCIATED TO USER ARE ACTIVE

This error response indicates that there are active connections associated to the user exist on one or more receivers the user attempts to log out from, when force-logout is disabled.

HTTP/1.1 403 Forbidden

Accept: application/json;

Content-Type: application/json;

Accept-version: v1

Body:

```
{
  "code": "403",
  "message": "Active connections associated to user [username] exist in one or more target ..... receivers."
```



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2.7.8.8 RESPONSE - ERROR: USER NOT LOGGED IN RECEIVERS

This error response indicates that the KVM user specified by the username parameter is not logged in to one or more target receivers.

```
HTTP/1.1 403 Forbidden
```

```
Accept: application/json;
```

```
Content-Type: application/json;
```

```
Accept-version: v1
```

```
Body:
```

```
{  
  "code": "403",  
  "message": "User [username] is not logged in to one or more of the following receivers: [List of  
  receiver names the user is not logged in]."  
}
```

2.8 APIS FOR DEVICE-ORIENTED OPERATIONS

The APIs for device operations include functionalities as follows:

- ◆ Get KVM receivers/transmitters
- ◆ Get all properties set on each KVM appliance
- ◆ Get KVM appliance status and information
- ◆ Set properties of KVM appliances
- ◆ Reboot specific/all KVM appliances

The associated design of each API is listed as follows:

2.8.1 API FOR GETTING KVM APPLIANCES

This API is to obtain the list of all the receivers/transmitters managed on the host Boxilla. Valid property parameters are listed in the parameter table below.

2.8.1.1 REQUEST - URI

Uri	bxa-api/devices/kvm
Method	GET

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2.8.1.2 REQUEST – PARAMS

REQUIREMENT	NAME	TYPE	DESCRIPTION
Optional	device_type	String	Type of device. Valid values are "transmitter" or "receiver".
	device_names	String array	List of names of KVM appliances to be obtained.

NOTES:

- If device_names parameter is null, the operation would be considered as getting all KVM appliances and the response is returned accordingly.
- If device_names parameter is an empty array, the API request is successful but the "devices" JSON array in the response body would be empty.
- If device_names is not null and contains valid device names, the value of device_type parameter would be ignored.
- If device_names is null and device_type is "transmitter" or "receiver", the response would only contain the list of all the transmitters/receivers, respectively.

2.8.1.3 REQUEST BODY JSON FORMAT

```
{  
  "device_type": "receiver" | "transmitter", // Optional, can be null  
  "device_names": ["[device_1]", "[device_2]", ...] // Optional, can be null or empty array  
}
```

2.8.1.4 RESPONSE - SUCCESS

HTTP/1.1 200 OK

Accept: application/json;

Content-Type: application/json;

Accept-version: v1

Body:

```
{  
  "code": "200",  
  "message": {  
    "devices": [  
      {  
        "name": "[device_name]",  
        "ip": "[ip]",  
        "mac": "[MAC address]",  
        "model": "[sales part number]",  
        "swversion": "[firmware version]",  
        "serialno": "[serial number]"  
      }  
    ]  
  }  
}
```



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```

},
... // Multiple appliances
]
}
}

```

2.8.1.5 RESPONSE - ERROR: BAD REQUEST

This error response indicates any non-specific error (may be caused by internal errors within the API) returned, which might include:

- ◆ Required property parameters are passed in as invalid. The associated error message in the response body is as follows:
"message": "Invalid parameter(s): [List of parameters detected as invalid]."
- ◆ "device_names" parameter value is not an array or any elements within are not String type. The associated error message in the response body is as follows:
"message": "Invalid parameter device_names: [device_names], expecting a String array."
- ◆ One or more KVM appliances specified in the device_names parameter do not exist. The associated error message in the response body is as follows:
"message": "The following device(s) do(es) not exist: [List of device_names do not exist]."

2.8.2 API FOR GETTING KVM APPLIANCE PROPERTIES

This API is to obtain the property settings of each KVM appliance managed by the host Boxilla. Valid property parameters are listed in the parameter table below.

2.8.2.1 REQUEST - URI

Uri	bxa-api/devices/kvm/properties
Method	GET

2.8.2.2 REQUEST – PARAMS

REQUIREMENT	NAME	TYPE	DESCRIPTION
Optional	device_names	String array	List of names of the KVM devices managed in Boxilla.

NOTES:

- ◆ If device_names parameter is null, the operation would be considered as getting all KVM appliance properties and the response is returned accordingly.
- ◆ If device_names parameter is an empty array, the API request is successful but the "properties" JSON array in the response body would be empty.

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2.8.2.3 REQUEST BODY JSON FORMAT

```
{  
  "device_names": ["[device-1]", "[device-2]", ...] // Optional, can be null or empty array  
}
```

2.8.2.4 RESPONSE – SUCCESS

HTTP/1.1 200 OK

Accept: application/json;

Content-Type: application/json;

Accept-version: v1

Body:

```
{  
  "code": "200",  
  "message": {  
    "properties": [  
      {  
        "device_name": "[device_name]",  
        "property_state": "Configured" | "Waiting" | "Configuring",  
        "model": "[sales part number]",  
        "swversion": "[firmware version]",  
        [List of supported properties]  
      },  
      {...}, // If multiple properties  
      ....  
    ]  
  }  
}
```

NOTE: In the response body, the "list of supported properties" tag composes of the properties supported by the requested KVM device, which may be different based on the manufacturer brand/class and the firmware version of the KVM device.

The following three examples show cases of the JSON element in "properties" JSON array in the response body, with various values of keys determining the type of device.



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Example 1:

```
{
  "device_name": "transmitter-A",
  "property_state": "Configured",
  "model": "EMD2002SE-T",
  "swversion": "V5.3.1_r5666",
  "video_quality": "Default",
  "video_source_optimization": "Off",
  "hid_configurations": "3",
  "mouse_keyboard_timeout": "0",
  "edid_settings_dvi1": "1920x1080",
  "edid_settings_dvi2": "1920x1200"
}
```

Example 2:

```
{
  "device_name": "transmitter-B",
  "property_state": "Configured",
  "model": "EMD4000T",
  "swversion": "V1.3.1_r5639",
  "hid_configurations": "3",
  "mouse_keyboard_timeout": "0"
}
```

Example 3:

```
{
  "device_name": "receiver-A",
  "property_state": "Configured",
  "model": "EMD2000SE-R",
  "swversion": "V5.4.0_r6438",
  "config": "Unique",
  "http_enabled": "Enabled"
}
```

The full supported list of properties for various types of KVM devices is listed in table 2 in the appendix section 4.1.

2.8.2.5 RESPONSE – ERROR: BAD REQUEST

This error response indicates any non-specific error (may be caused by internal errors within the API) returned, which might include:

- ◆ Required property parameters are passed in as invalid. The associated error message in the response body is as follows:

```
"message": "Invalid parameter(s): [List of parameters detected as invalid]."
```

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- ◆ "device_names" parameter value is not an array or any elements within are not String type. The associated error message in the response body is as follows:
"message": "Invalid parameter device_names: [device_names], expecting a String array."
- ◆ One or more KVM appliances specified in the device_names parameter has corrupted type related properties. The associated error message in the response body is as follows:
"message": "Invalid property configuration for device [name of the device]: property conflict or missing."
- ◆ One or more KVM appliances specified in the device_names parameter do not exist. The associated error message in the response body is as follows:
"message": "The following device(s) do(es) not exist: [List of device_names do not exist]."

2.8.3 API FOR SETTING KVM RECEIVER PROPERTIES

This API is to update the unique property settings of individual KVM receiver managed by the host Boxilla. Valid property parameters are listed in the parameter table below.

2.8.3.1 REQUEST – URI

Uri	bxa-api/devices/kvm/properties/rx
Method	PUT

2.8.3.2 REQUEST – PARAMS

REQUIREMENT	NAME	TYPE	DESCRIPTION
Mandatory	device_type	String	Name of the KVM receiver managed in Boxilla. Maximum length 255.
	http_enabled	String	HTTP-enabled property to set. Valid values are "Enabled" or "Disabled".

2.8.3.3 REQUEST BODY JSON FORMAT

```
{
  "device _ name": "[device _ name]",
  "http _ enabled": "Enabled" | "Disabled"
}
```

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2.8.3.4 RESPONSE – SUCCESS

```
HTTP/1.1 200 OK
Accept: application/json;
Content-Type: application/json;
Accept-version: v1
Body:
{
  "code": "200",
  "message": "Receiver settings have been updated successfully."
}
```

2.8.3.5 RESPONSE – ERROR: BAD REQUEST

This error response may be caused by:

- ◆ Required property parameters are passed in as invalid. The associated error message in the response body is as follows:
"message": "Invalid parameter(s): [List of parameters detected as invalid]."
- ◆ The specified device has corrupted type-related properties. The associated error message in the response body is as follows:
"message": "Unknown type of device [device_name]. Device properties might be missing or corrupted."
- ◆ Receiver is not found on Boxilla. The associated error message in the response body is as follows:
"message": "Device [device_name] does not exist."
- ◆ The property parameter values in the API request body are invalid or incompatible. The associated error message in the response body is as follows:
"message": "Parameters [list of params] are invalid or incompatible with firmware of receiver [device_name]."

2.8.3.6 RESPONSE – ERROR: ATTEMPTING TO SET UNIQUE PROPERTIES FOR RECEIVER CONFIGURED WITH NON-UNIQUE PROPERTIES

This error response indicates that the specified receiver in request parameters is configured with template or system properties at the moment. As northbound REST API version 1 supports unique device property configuration only, in this case the operation would be forbidden.

```
HTTP/1.1 403 Forbidden
Accept: application/json;
Content-Type: application/json;
Accept-version: v1
Body:
{
  "code": "403",
  "message": "Receiver [device_name] is with template/system properties. Editing is enabled for unique properties only."
}
```

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2.8.3.7 RESPONSE – ERROR: RECEIVER FIRMWARE NOT SUPPORTING EDITING PROPERTIES

This error response indicates that the version of firmware deployed on the specified receiver in request parameters does not support editing properties. Usually this is caused by older versions of firmware without the associated appliance API.

HTTP/1.1 403 Forbidden

Accept: application/json;

Content-Type: application/json;

Accept-version: v1

Body:

```
{
  "code": "403",
  "message": "Firmware [firmware version] of [receiver model] receiver [device_name] does not
  support editing settings."
}
```

2.8.4 API FOR SETTING KVM TRANSMITTER PROPERTIES

This API is to set the property settings of individual KVM transmitter managed by the host Boxilla.

Valid property parameters are listed in the parameter table below.

2.8.4.1 REQUEST - URI

Uri	bxa-api/devices/kvm/properties/tx
Method	PUT

REQUIREMENT	NAME	TYPE	DESCRIPTION
Mandatory	device_name	String	Name of the KVM transmitter managed in Boxilla. Maximum length 255.
Conditional	video_quality	String	Video quality property to set. Valid values are "Best Quality", "2", "Default", "4" or "Best Compression". (Case sensitive) Supported by single/dual-head Emerald-SE/Emerald-PE transmitters and ZeroU transmitters.
	video_source_optimization	String	Video source optimization property to set. Valid values are "Off", "DVI Optimised", "VGA - High Performance", "VGA - Optimised" or "VGA - Low Bandwidth". (Case sensitive) Supported by single-head Emerald-SE/Emerald-PE and ZeroU transmitters.

2.8.4.2 REQUEST – PARAMS

REQUIREMENT	NAME	TYPE	DESCRIPTION
Conditional	hid_configurations	String	<p>HID property to set.</p> <p>Valid values are integer formatted strings from 0-5, which represents: 0 – Default; 1 – Basic; 2 – MAC; 3 – Absolute; 4 – Absolute MAC; 5 – Dual Mouse</p> <p>0-3 are supported by all types of transmitters.</p> <p>4 is supported by single/dual-head Emerald-SE/Emerald-PE and ZeroU with firmware version no older than 5.3.0, and Emerald-4K with firmware version no older than 1.3.1.</p> <p>5 is supported by single/dual-head Emerald-SE/Emerald-PE and ZeroU with firmware version no older than 5.4.1, and Emerald-4K with firmware version no older than 1.3.1.</p>
	mouse_keyboard_timeout	String	<p>Mouse-keyboard timeout property to set.</p> <p>Valid values are integer formatted strings from 0-5, representing timeout in seconds.</p> <p>Supported by all single/dual-head Emerald-SE/Emerald-PE and ZeroU transmitters, and Emerald-4K transmitters with firmware version no older than 1.4.0.</p>
	edid_settings_dvi1	String	<p>EDID DVI property to set for head 1 on transmitter.</p> <p>Valid values are "1920x1080", "1920x1200", "1680x1050", "1280x1024" and "1024x768" for Emerald-SE/PE/ZeroU transmitters, and "Default", "3840x2160p-60Hz", "3840x2160p-30Hz", "2560x1440p-60Hz", "1920x1080p-60Hz" for Emerald- 4K transmitters. (Case sensitive)</p> <p>Supported by all single/dual-head Emerald- SE/Emerald-PE and ZeroU transmitters, and Emerald-4K transmitters with firmware version no older than 1.4.0.</p>
	edid_settings_dvi2	String	<p>EDID DVI property to set for head 2 on transmitter (Dual-head only).</p> <p>Valid values are the same with edid_settings_dvi1.</p> <p>Supported by dual-head Emerald-SE and Emerald-PE transmitters.</p>

NOTE: for EDID DVI properties, this API does not support "Clone" as a valid value, which is different from the API to get transmitter properties.

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2.8.4.3 REQUEST BODY JSON FORMAT

// Only "device_name" is mandatory, the rest parameters are conditionally applicable as described above.

```
{
  "device_name": "[device_name]",
  "video_quality": "Best Quality" | "2" | "Default" | "4" | "Best Compression",
  "video_source_optimization": "Off" | "DVI Optimised" | "VGA - High Performance"
  | "VGA - Optimised" | "VGA - Low Bandwidth",
  "hid_configurations": "0" | "1" | "2" | "3" | "4" | "5",
  "mouse_keyboard_timeout": "0" | "1" | "2" | "3" | "4" | "5",
  "edid_settings_dvi1": "1920x1080" | "1920x1200" | "1680x1050" | "1280x1024" | "1024x768"
  (5 possible values for Emerald-SE/PE/ZeroU) | "Default" | "3840x2160p-60Hz" | "3840x2160p-30Hz"
  | "2560x1440p-60Hz" | "1920x1080p-60Hz" (5 possible values for Emerald-4K),
  "edid_settings_dvi2": "1920x1080" | "1920x1200" | "1680x1050" | "1280x1024" | "1024x768"
}
```

2.8.4.4 RESPONSE – SUCCESS

HTTP/1.1 200 OK

Accept: application/json;

Content-Type: application/json;

Accept-version: v1

Body:

```
{
  "code": "200",
  "message": "Transmitter settings have been updated successfully."
}
```

2.8.4.5 RESPONSE – ERROR: BAD REQUEST

This error response may be caused by:

- ◆ Required property parameters are passed in as invalid. The associated error message in the response body is as follows:
"message": "Invalid parameter(s): [List of parameters detected as invalid]."
- ◆ The specified device has corrupted type-related properties. The associated error message in the response body is as follows:
"message": "Unknown type of device [device_name]. Device properties might be missing or corrupted."
- ◆ Transmitter is not found on Boxilla. The associated error message in the response body is as follows:
"message": "Device [device_name] does not exist."
- ◆ The property parameter values in the API request body are invalid or incompatible. The associated error message in the response body is as follows:
"message": "Parameters [list of params] are invalid or incompatible with firmware of transmitter [device_name]."



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The following response shows an example of incompatible parameters:

```
HTTP/1.1 400 Bad Request
Accept: application/json;
Content-Type: application/json;
Accept-version: v1
Body:
{
  "code": "400",
  "message": "Parameters 'video_quality' and 'video_source' are invalid or incompatible with ..
  firmware of transmitter 'Emerald4K-TX-1'."
}
```

2.8.4.6 RESPONSE – ERROR: ATTEMPTING TO SET UNIQUE PROPERTIES FOR TRANSMITTER CONFIGURED WITH NON-UNIQUE PROPERTIES

This error response indicates that the specified transmitter in request parameters is configured with template or system properties at the moment. As northbound REST API version 1 supports unique device property configuration only, in this case the operation would be forbidden.

```
HTTP/1.1 403 Forbidden
Accept: application/json;
Content-Type: application/json;
Accept-version: v1
Body:
{
  "code": "403",
  "message": "Transmitter [device_name] is with template/system properties. Editing is enabled for
  unique properties only."
}
```

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2.8.4.7 RESPONSE – ERROR: TRANSMITTER FIRMWARE NOT SUPPORTING EDITING PROPERTIES

This error response indicates that the version of firmware deployed on the specified transmitter in request parameters does not support editing properties. Usually this is caused by older versions of firmware without the associated appliance southbound REST API.

```
HTTP/1.1 403 Forbidden
```

```
Accept: application/json;
```

```
Content-Type: application/json;
```

```
Accept-version: v1
```

```
Body:
```

```
{  
  "code": "403",  
  "message": "Firmware [firmware version] of [transmitter model] transmitter [device_name] does not  
  support editing settings."  
}
```

2.8.5 API FOR GETTING KVM APPLIANCE STATUS

This API is to obtain the real-time status of one or more KVM appliances managed by the host Boxilla, including the following contents:

- ◆ Information of logged-in users (receiver-only)
- ◆ Information of active connections
- ◆ Physical online/offline status
- ◆ Appliance setting update status:
 - Waiting: setting update is initializing.
 - Configuring: setting update is processing.
 - Configured: setting update is complete.

NOTE: as editing appliance settings using APIs in section 2.8.3 and 2.8.4 involve communications with appliances and may take extra time, this GET API should be used to monitor the configuration state of appliance settings as needed.

- ◆ Appliance details:
 - Basic: name; model number; serial number; firmware version
 - A unique identifier generated internally by individual Boxilla instance at the initialization state of managing the device
 - Operational details: total/free memory/storage; uptime; load average in 1/5/15 minutes
 - Network details: mac; ip; netmask; gateway; broadcast; primary/secondary DNS; multicast-ip and master port

Valid property parameters are listed in the parameter table shown next.

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2.8.5.1 REQUEST – URI

Uri	bxa-api/devices/kvm/status
Method	GET

2.8.5.2 REQUEST – PARAMS

REQUIREMENT	NAME	TYPE	DESCRIPTION
Optional	device_names	String array	Name of the KVM devices managed in Boxilla.

2.8.5.3 REQUEST BODY JSON FORMAT

```
{
  "device_names": ["[device-1]", "[device-2]", ...] // Optional, can be null or empty array
}
```

2.8.5.4 RESPONSE – SUCCESS

HTTP/1.1 200 OK

Accept: application/json;

Content-Type: application/json;

Accept-version: v1

Body:

```
{
  "code": "200",
  "message": {
    "devices": [
      {
        "uid": "[Unique identifier generated internally by Boxilla for each device]",
        "device_type": "receiver" | "transmitter",
        "logged_in user": { // Available for request to receivers only, empty if no user logged in
          "username": "[logged-in username]",
          "type": "active directory user" | "common user"
        },
      },
      "active_connections": [
        {
          "active_connection_name": "[active_connection_name]",

```

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```

        "active_connection_type": "Private" | "Shared",
        "active_connection_group": "ConnectViaTx" | "VM" | "VMPool" | "VMHorizon" | "TXPair",
    },
    {...}, // if there are more active connections
...
],
    "state": "Online" | "Offline",
    "status": "Waiting" | "Configuring" | "Configured",
    "device_name": "[appliance-name]",
    "mac": "[MAC address]",
    "ip": "[ip]"
},
{...}, // if there are more appliances
...
]
}
}

```

2.8.5.5 RESPONSE - ERROR: BAD REQUEST

This error response indicates any non-specific error (may be caused by internal errors within the API) returned, which might include:

- Parameters are passed in as empty or invalid (contain invalid characters; length exceeding limit; etc.) The associated error message in the response body is as follows:


```
"message": "Invalid parameter(s): [List of parameters detected as empty or invalid]."
```
- One or more KVM devices specified by the device_names parameter do not exist on Boxilla.
- The associated error message in the response body is as follows:


```
"message": "The following device(s)do(es) not exist: [non_exist_device_names]."
```
- One or more KVM devices specified by the parameter are currently offline. The associated error message in the response body is as follows:


```
"message": "[offline_device_names] currently offline."
```

2.8.6 API FOR REBOOTING ALL KVM APPLIANCES

This API is to send reboot command to all KVM appliances managed by the host Boxilla.

2.8.6.1 REQUEST - URI

Uri	bxapi/devices/kvm/reboot-all
Method	POST

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2.8.6.2 REQUEST – PARAMS

This API does not require any parameters within the request body. The version of API is required to be included in the request header.

2.8.6.3 RESPONSE – SUCCESS

```
HTTP/1.1 200 OK
Accept: application/json;
Content-Type: application/json;
Accept-version: v1
Body:
{
  "code": "200",
  "message": "All KVM devices are successfully rebooted."
}
```

2.8.6.4 RESPONSE – ERROR: BAD REQUEST

This error response indicates any non-specific error (may be caused by internal errors within the API) returned, which might include:

- ◆ One or more KVM devices to be rebooted are currently offline. The associated error message in the response body is as follows:
"message": "The following device(s) to reboot is(are) offline: [offline_device_names]."
- ◆ Rebooting operation fails on one or more devices due to internal issues. The associated error message in the response body is as follows:
"message": "Fail to reboot the following device(s): [List of device names where rebooting failed]."

2.8.6.5 RESPONSE - ERROR: REBOOTING VIA API NOT SUPPORTED BY DEVICE FIRMWARE

This error response indicates that the firmwares on one or more devices specified in the parameters do not support the associated device rebooting functionality required by this API.

```
HTTP/1.1 403 Forbidden
Accept: application/json;
Content-Type: application/json;
Accept-version: v1
Body:
{
  "code": "403",
  "message": "Rebooting via northbound REST API is not supported by the following device(s): [List of devices not supporting rebooting]."
```

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2.8.7 API FOR REBOOTING SELECTED KVM APPLIANCES

This API is to send reboot command to individual KVM appliance managed by the host Boxilla. Valid parameters are listed in the parameter table below.

2.8.7.1 REQUEST – URI

Uri	bxa-api/devices/kvm/reboot
Method	POST

2.8.7.2 REQUEST – PARAMS

REQUIREMENT	NAME	TYPE	DESCRIPTION
Optional	device_names	String array	List of names of KVM devices managed in Boxilla to be rebooted.

2.8.7.3 REQUEST BODY JSON FORMAT

```
{  
  "device_names": ["[device-1]", "[device-2]", ...], // Optional, can be null or empty array  
}
```

2.8.7.4 RESPONSE – SUCCESS

HTTP/1.1 200 OK

Accept: application/json;

Content-Type: application/json;

Accept-version: v1

Body:

```
{  
  "code": "200",  
  "message": "The selected KVM device(s) is(are) successfully rebooted."  
}
```



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2.8.7.5 RESPONSE – ERROR: BAD REQUEST

This error response indicates any non-specific error (may be caused by internal errors within the API) returned, which might include:

- ◆ Parameters are passed in as empty or invalid (contain invalid characters; length exceeding limit; etc.). The associated error message in the response body is as follows:
"message": "Invalid parameter(s): [List of parameters detected as empty or invalid]. "
- ◆ "device_names" parameter value is not an array or any elements within are not String type. The associated error message in the response body is as follows:
"message": "Invalid parameter device_names: [device_names], expecting a String array."
- ◆ One or more KVM appliances specified in the device_names parameter do not exist. The associated error message in the response body is as follows:
"message": "The following device(s) do(es) not exist: [List of device_names do not exist]."
- ◆ One or more KVM devices to be rebooted are offline. The associated error message in the response body is as follows:
"message": "The following device(s) to reboot is(are) offline: [offline_device_names]. "
- ◆ Rebooting operation fails on one or more devices due to internal issues. The associated error message in the response body is as follows:
"message": "Fail to reboot the following device(s): [List of device names where rebooting failed]."

2.8.7.6 RESPONSE – ERROR: REBOOTING VIA API NOT SUPPORTED BY DEVICE FIRMWARE

This error response indicates that the firmwares on one or more devices specified in the parameters do not support the associated device rebooting functionality required by this API.

HTTP/1.1 403 Forbidden

Accept: application/json;

Content-Type: application/json;

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Accept-version: v1

Body:

```
{
  "code": "403",
  "message": "Rebooting via northbound REST API is not supported by the following device(s): [List of devices not supporting rebooting]."
```

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2.9 APIS FOR CONNECTION-ORIENTED OPERATIONS

The APIs for connection-related operations include the following functionalities:

- ◆ Create new KVM connections between multiple BlackBox entities (transmitters/receivers, VMs, etc. that exchange traffic)
- ◆ Edit existing KVM connection properties
- ◆ Deleting existing KVM connection records
- ◆ Make/break KVM active connections

In Boxilla, each KVM connection active record is categorized into the following list of groups, based on the type of traffic source in the connection:

- ◆ ConnectViaTx: the traffic source is a transmitter device
- ◆ VM: the traffic source is a VM
- ◆ VMPool: the traffic source is a group of VMs
- ◆ VMHorizon: the traffic source is a VM with horizontal view
- ◆ TXPair: dual traffic sources exist from multiple transmitters

Creating/editing of each group of KVM connection is designed with the specific set of properties for as input parameters, whose associated requirements are defined as follows:

- ◆ Mandatory: the parameter is required
- ◆ Unique Params: the parameter is required when creating/editing unique connections, including the following categories:
 - ConnectViaTx Params: the parameter is optionally applicable for viaTx connections
 - VM Params: the parameter is optionally applicable for VM connections
 - VMPool Params: the parameter is optionally applicable for VM pool connections
 - VMHorizon Params: the parameter is optionally applicable for VM horizontal connections
 - TXPair Params: the parameter is optionally applicable for TXPair connections

The following table defines the conditional parameters for each category of unique connection:

Table 1. KVM Connection Property Dependency based on Group of Connection (viaTx/VM/VMPool/VMHorizon/TxPair)

REQUIREMENT	NAME	TYPE	DESCRIPTION
viaTx Params	extended_desktop	String	Enabled/disabled option for extended desktop configuration. Valid values are "Yes" or "No". (Case sensitive)
	usb_redirection	String	Enabled/disabled option for USB redirection. Valid values are "Yes" or "No". (Case sensitive)
	audio	String	Enabled/disabled option for audio. Valid values are "Yes" or "No". (Case sensitive)
	persistent	String	Enabled/disabled option for connection persistency. Valid values are "Yes" or "No". (Case sensitive)
VM Params	username	String	Username credential used for BlackBox VM login. Optional. Valid value needs to be the username of an existing user.
	password	String	Password credential used for BlackBox VM login. Optional unless "username" is provided. Valid value needs to be in pair with a valid username.

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REQUIREMENT	NAME	TYPE	DESCRIPTION
VM Params	extended_desktop	String	Enabled/disabled option for extended desktop configuration. Valid values are "Yes" or "No". (Case sensitive)
	usb_redirection	String	Enabled/disabled option for USB redirection. Valid values are "Yes" or "No". (Case sensitive)
	audio	String	Enabled/disabled option for audio. Valid values are "Yes" or "No". (Case sensitive)
	port	String	Port number (in numeric format) of the VM connected to (if applicable). Maximum length 5.
	domain	String	Domain name of the VM connected to (if applicable). Maximum length 255.
	nla	String	Enabled/disabled option for NLA. Valid values are "Yes" or "No". (Case sensitive)
VM-Pool Params	extended_desktop	String	Enabled/disabled option for extended desktop configuration. Valid values are "Yes" or "No". (Case sensitive)
	usb_redirection	String	Enabled/disabled option for USB redirection. Valid values are "Yes" or "No". (Case sensitive)
	audio	String	Enabled/disabled option for audio. Valid values are "Yes" or "No". (Case sensitive)
VM-Horizon Params	username	String	Username credential used for BlackBox VM login. Optional. Valid value needs to be the username of an existing user.
	password	String	Password credential used for BlackBox VM login. Optional unless "username" is provided. Valid value needs to be in pair with a valid username.
	protocol	String	Protocol used for VM Horizon view connections. Valid value is "PCoIP" only. (Case sensitive)
TxPair Params	host_2	String	IP/DNS address of the secondary traffic source of the KVM connection.
	audio	String	Enabled/disabled option for audio. Valid values are "Yes" or "No". (Case sensitive)
	persistent	String	Enabled/disabled option for connection persistency. Valid values are "Yes" or "No". (Case sensitive)
	pairing_type	String	Pairing type specified for TxPair connection. Valid values are "1" or "2".

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REQUIREMENT	NAME	TYPE	DESCRIPTION
TxPair Params	orientation	String	Orientation of dual paired views of TxPair connections. Required only when "pairing_type" is set to "2". Valid values are "H12", "H21", "V12" or "V21" (Case sensitive), where "H/V" stands for Horizontal/Vertical and "12/21" represents destination from view 1 to view 2 or reverse.
	audio_source	String	Address of the audio source. Required only when "audio" is set as "Yes". Valid values are "1" or "2", representing whether the audio source is specified as the value of host or host_2.

The details of the API for each group of KVM connection are introduced in the sections below, respectively.

2.9.1 API FOR CREATING KVM CONNECTIONS

This API is to create a new KVM connection with type, group and properties specified within the parameters in request body.

2.9.1.1 REQUEST - URI

Uri	bxa-api/connections/kvm
Method	POST

2.9.1.2 REQUEST - PARAMS

REQUIREMENT	NAME	TYPE	DESCRIPTION
Mandatory	name	String	Name of the KVM connection. Maximum length 64.
	host	String	IP/DNS address of the primary traffic source of the connection. Value cannot be set if "group" is "VMPool".
	group	String	Connection group category. Valid values are: "ConnectViaTx" "VM" "VMPool" "VMHorizon" "TxPair". (Case sensitive)
	connection_type	String	Connection type. Valid values are "Private" or "Shared". (Case sensitive) Value is fixed to be "Private" when "group" is set as "VM", "VMPool" or "VMHorizon".
	view_only	String	Enabled/disabled view-only option. Valid values are "Yes" or "No". (Case sensitive)



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REQUIREMENT	DESCRIPTION
viaTx Params	Required when "group" is "ConnectViaTx". "usb_redirection" parameter value cannot be "Yes" if "connection_type" is "Shared".
VM Params	Required when "group" is "VM".
VM-Pool Params	Required when "group" is "VMPool".
VM-Horizon Params	Required when "group" is "VMHorizon".
TxPair Params	Required when "group" is "TXPair".

2.9.1.3 REQUEST BODY JSON FORMAT – VIA TX CONNECTIONS

```
{
  "name": "[connection_name]",
  "host": "[host]",
  "group": "ConnectViaTx",
  "connection_type": "Private" | "Shared",
  "extended_desktop": "Yes" | "No",
  "usb_redirection": "Yes" | "No",
  "audio": "Yes" | "No",
  "persistent": "Yes" | "No",
  "view_only": "Yes" | "No"
}
```

2.9.1.4 REQUEST BODY JSON FORMAT – VM CONNECTIONS

```
{
  "name": "[connection_name]",
  "host": "[host]",
  "group": "VM",
  "connection_type": "Private",
  "username": "[VM-login username]",
  "password": "[VM-login password]",
  "extended_desktop": "Yes" | "No",
  "usb_redirection": "Yes" | "No",
  "audio": "Yes" | "No",
  "port": "[port]",
  "domain": "[domain]",
  "nla": "Yes" | "No",
}
```

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```
"view_only": "Yes" | "No"
}
```

2.9.1.5 REQUEST BODY JSON FORMAT – VM-POOL CONNECTIONS

```
{
  "name": "[connection_name]",
  "host": "[host]",
  "group": "VMPool",
  "connection_type": "Private",
  "extended_desktop": "Yes" | "No",
  "usb_redirection": "Yes" | "No",
  "audio": "Yes" | "No",
  "view_only": "Yes" | "No"
}
```

2.9.1.6 REQUEST BODY JSON FORMAT – VM-HORIZON CONNECTIONS

```
{
  "name": "[connection_name]",
  "host": "[host]",
  "group": "VMHorizon",
  "connection_type": "Private",
  "username": "[VM-login username]",
  "password": "[VM-login password]",
  "protocol": "PCoIP",
  "view_only": "Yes" | "No"
}
```

2.9.1.7 REQUEST BODY JSON FORMAT – TX PAIR CONNECTIONS

```
{
  "name": "[connection_name]",
  "host": "[host]",
  "host_2": "[host_2]", // Optional
  "group": "TXPair",
  "connection_type": "Private" | "Shared",
  "audio": "Yes" | "No",
  "persistent": "Yes" | "No",
  "view_only": "Yes" | "No",
}
```



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```
"pairing_type": "1" | "2",
"orientation": "H12" | "H21" | "V12" | "V21", // applicable only when "pairing_type" is "2"
"audio_source": "1" | "2" // applicable only when "audio" is "Yes"
}
```

2.9.1.8 RESPONSE – SUCCESS

```
HTTP/1.1 201 Created
Accept: application/json;
Content-Type: application/json;
Accept-version: v1
Body:
{
  "code": "201",
  "message": "Created [group] connection [name]."
```

2.9.1.9 RESPONSE – ERROR: BAD REQUEST

This error response indicates any non-specific error (may be caused by internal errors within the API) returned, which might include:

- ◆ Property-related parameters are passed in as empty or invalid (contain invalid characters; length exceeding limit; etc.). The associated error message in the response body is as follows:
"message": "Invalid parameter(s): [List of parameters detected as empty or invalid]."
- ◆ Multiple property-related parameters are not compatible with each other, e.g. passing the connection_type parameter as "shared" together with the group parameter as "VM", "VMPool" or "VMHorizon". (Check the parameter table for this API for details). The associated error message in the response body is as follows:
"message": "Parameters [List of incompatible parameters] are incompatible with [group] connection [name]."

The following response shows an example of incompatible parameters:

```
HTTP/1.1 400 Bad Request
Accept: application/json;
Content-Type: application/json;
Accept-version: v1
Body:
{
  "code": "400",
  "message": "Parameters 'connection_type': 'Shared' are incompatible with VM connection 'connection-1'."
```

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2.9.1.10 RESPONSE – ERROR: LICENSE-RELATED FAILURE

This error response indicates that the Boxilla license installed on the server is invalid, expired or limitation of the maximum number of users is reached.

HTTP/1.1 403 Forbidden

Accept: application/json;

Content-Type: application/json;

Accept-version: v1

Body:

```
{
  "code": "403",
  "message": "License limit reached."
}
```

2.9.1.11 RESPONSE - ERROR: CONNECTION ALREADY EXISTS

This error response indicates that a KVM connection with the name specified in request body already exists and the API is attempting to create a duplicate record.

HTTP/1.1 403 Forbidden

Accept: application/json;

Content-Type: application/json;

Accept-version: v1

Body:

```
{
  "code": "403",
  "message": "Duplicate name received."
}
```

2.9.2 API FOR EDITING KVM CONNECTION PROFILES/PROPERTIES

This API is to edit the profile/properties of an existing KVM connection whose type, group and properties are specified within the parameters in request body.

2.9.2.1 REQUEST – URI

Uri	bxapi/connections/kvm
Method	PUT



2.9.2.2 REQUEST – PARAMS

REQUIREMENT	NAME	TYPE	DESCRIPTION
Mandatory	name	String	Name of the KVM connection. Maximum length 64.
	host	String	IP/DNS address of the primary traffic source of the connection. Value cannot be set if "group" is "VMPool".
	group	String	Connection group category. Valid values are: "ConnectViaTx" "VM" "VMPool" "VMHorizon" "TxPair". (Case sensitive)
	connection_type	String	Connection type. Valid values are "Private" or "Shared". (Case sensitive) Value is fixed to be "Private" when "group" is set as "VM", "VMPool" or "VMHorizon".
	view_only	String	Enabled/disabled view-only option. Valid values are "Yes" or "No". (Case sensitive)
Optional	new_name	String	New name of the KVM connection to be edited. Maximum length 64. Connection name is updated if provided.
REQUIREMENT	DESCRIPTION		
viaTx Params	Required when "group" is "ConnectViaTx". "usb_redirection" parameter value cannot be "Yes" if "connection_type" is "Shared".		
VM Params	Required when "group" is "VM".		
VM-Pool Params	Required when "group" is "VMPool".		
VM-Horizon Params	Required when "group" is "VMHorizon".		
TxPair Params	Required when "group" is "TxPair".		

2.9.2.3 REQUEST BODY JSON FORMAT

For each group of connection (viaTx, VM, VM-Pool, VM-Horizon or TxPair), the request is individually defined in the same JSON format specified in section 2.9.1.3 - 2.9.1.7, respectively, with the additional "new_name" parameter available. If the "new_name" parameter is specified with a valid value (name-format string; max-length 64; obeying the naming rules defined in section 4.3.1), the name of the connection would be updated with the value.

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2.9.2.4 RESPONSE – SUCCESS

```
HTTP/1.1 200 OK
Accept: application/json;
Content-Type: application/json;
Accept-version: v1
Body:
{
  "code": "200",
  "message": "Updated properties for connection [name]."
```

2.9.2.5 RESPONSE – ERROR: BAD REQUEST

This error response indicates any non-specific error (may be caused by internal errors within the API) returned, which might include:

- ◆ Property-related parameters are passed in as empty or invalid (contain invalid characters; length exceeding limit; etc.). The associated error message in the response body is as follows:
"message": "Invalid parameter(s): [List of parameters detected as empty or invalid]."
- ◆ Multiple property-related parameters are not compatible with each other, e.g. passing the connection_type parameter as "shared" together with the group parameter as "VM", "VMPool" or "VMHorizon". (Check the parameter table for this API for details). The associated error message in the response body is as follows:
"message": "Parameters [List of incompatible parameters] are incompatible with [group] connection [name]."
- ◆ The associated KVM connection record does not exist. The associated error message in the response body is as follows:
"message": "Connection [name] does not exist."

2.9.2.6 RESPONSE – ERROR: ATTEMPTING TO EDIT PROPERTIES OF NON-UNIQUE CONNECTIONS

This error response indicates that the specified connection is with non-unique properties. Editing properties of the connection would be prohibited by the northbound REST API and a HTTP 403 error response is returned. The associated error message in the response body is as follows:

```
HTTP/1.1 403 Forbidden
Accept: application/json;
Content-Type: application/json;
Accept-version: v1
Body:
{
  "code": "403",
  "message": " Editing properties for non-unique connection [name] is not supported."
```



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2.9.2.7 RESPONSE – ERROR: CHANGING CONNECTION NAME TO NAME OF EXISTING CONNECTION

This error response indicates that the new connection name to be changed to belongs to an existing connection. The associated error message in the response body is as follows:

HTTP/1.1 403 Forbidden

Accept: application/json;

Content-Type: application/json;

Accept-version: v1

Body:

```
{
  "code": "403",
  "message": "Cannot update connection name to [new_name]. Connection [new_name] already exists."
}
```

2.9.3 API FOR DELETING ALL KVM CONNECTIONS

This API is to delete all the existing KVM connections with unique properties in Boxilla.

2.9.3.1 REQUEST – URI

Uri	bxapi/connections/kvm/all
Method	DELETE

2.9.3.2 REQUEST – PARAMS

This API does not require any parameters within the request body. The version of API is included in the request header.

2.9.3.3 RESPONSE – SUCCESS

HTTP/1.1 200 OK

Accept: application/json;

Content-Type: application/json;

Accept-version: v1

Body:

```
{
  "code": "200",
  "message": "Successfully deleted all connections."
}
```

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2.9.3.4 RESPONSE – ERROR: CONNECTION IS ACTIVE

This error response indicates that one or more KVM connections to be deleted are active with traffic delivery when the request is being operated.

HTTP/1.1 409 Conflict

Accept: application/json;

Content-Type: application/json;

Accept-version: v1

Body:

```
{
  "code": "409",
  "message": " Fail to delete connection(s) [connection_names] because one or more connections are active."
}
```

2.9.4 API FOR DELETING SPECIFIC KVM CONNECTIONS

This API is to delete one or more existing KVM connections with unique properties in Boxilla, specified by the request parameter which contains a list of existing connection names to be deleted.

2.9.4.1 REQUEST – URI

Uri	bxa-api/connections/kvm
Method	DELETE

2.9.4.2 REQUEST – PARAMS

REQUIREMENT	NAME	TYPE	DESCRIPTION
Mandatory	connection_names	String array	List of names of the KVM connections to be deleted. If an array is empty with no connection names inside, the API request is successful but no connection would be deleted.

2.9.4.3 REQUEST BODY JSON FORMAT

```
{
  "connection_names": ["[connection_1]", "[connection_2]", ...] // Mandatory, can be empty array
}
```

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2.9.4.4 RESPONSE – SUCCESS

```
HTTP/1.1 200 OK
Accept: application/json;
Content-Type: application/json;
Accept-version: v1
Body:
{
  "code": "200",
  "message": "Successfully deleted connection(s) [connection_names]."
```

2.9.4.5 RESPONSE – SUCCESS WITH EMPTY CONNECTION_NAMES PARAMETER

```
HTTP/1.1 204 No Content
Accept: application/json;
Content-Type: application/json;
Accept-version: v1
```

2.9.4.6 RESPONSE – ERROR: BAD REQUEST

This error response indicates any non-specific error (may be caused by internal errors within the API) returned, which might include:

- ◆ Required parameters are passed in as empty (null parameter, not parameter as an empty array) or invalid. The associated error message in the response body is as follows:
"message": "Invalid parameter(s): [List of parameters detected as empty or invalid]"
- ◆ "connection_names" parameter is not an array (for example, an integer is given instead) or any elements within are not String type. The associated error message in the response body is as follows:
"message": "Invalid parameter connection_names: [connection_names], expecting a String array."
- ◆ One or more KVM connections specified in the connection_names parameter do not exist. The associated error message in the response body is as follows:
"message": "The following connection(s) [connection_names] do(es) not exist."

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2.9.4.7 RESPONSE – ERROR: ATTEMPTING TO DELETE CONNECTIONS WITH NON-UNIQUE PROPERTIES

This error response indicates that one or more KVM connections specified in the parameters are with non-unique properties. Deleting these connections would be prohibited by the northbound REST API and a HTTP 403 error response is returned. Meanwhile all the other valid connections specified in the parameters would still be successfully deleted.

The associated error message in the response body is as follows:

```
HTTP/1.1 403 Forbidden
Accept: application/json;
Content-Type: application/json;
Accept-version: v1
Body:
{
  "code": "403",
  "message": "The following connections are with non-unique properties: [List of connection names]."
```

2.9.4.8 RESPONSE – ERROR: CONNECTION IS ACTIVE

This error response indicates that one or more KVM connections to be deleted are active with traffic delivery when the request is being operated.

```
HTTP/1.1 409 Conflict
Accept: application/json;
Content-Type: application/json;
Accept-version: v1
Body:
{
  "code": "409",
  "message": " Fail to delete connection(s) [connection_names] because one or more connections are active."
```

2.9.5 API FOR GETTING KVM CONNECTION STATUS

This API is for obtaining status and related information of one or more KVM connections in Boxilla, including the following contents:

- ◆ Name of user that logs into the KVM appliance of the connection
- ◆ Connection type: Private or Shared
- ◆ Connection group: ConnectViaTx, VM, VM-pool, VM-horizon or TXPair
- ◆ A unique identifier generated internally by individual Boxilla instance at the initialization state of creating the connection



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Valid property parameters are listed in the parameter table below.

2.9.5.1 REQUEST – URI

Uri	bxa-api/connections/kvm
Method	GET

2.9.5.2 REQUEST – PARAMS

REQUIREMENT	NAME	TYPE	DESCRIPTION
Optional	connection_names	String array	<p>List of names of the queried KVM connections.</p> <p>NOTES:</p> <p>If no parameter is provided by the API request (parameter is null, not an empty array), the operation would be considered as getting status of all KVM connections and the response is returned accordingly.</p> <p>If the "connection_names" parameter is an empty array, the API request is successful but no connection status is returned in the response (the "connections" JSON array in response body is empty).</p>

Note: If no parameter is provided by the API request (parameter is null, not an empty array), the operation would be considered as getting status of all KVM connections and the response is returned accordingly. If the "connection_names" parameter is an empty array, the API request is successful but no connection status is returned in the response (the "connections" JSON array in response body is empty).

2.9.5.3 REQUEST BODY JSON FORMAT

```
{
  "connection_names": ["[connection_1]", "[connection_2]", ...] // Optional, can be null or
empty array
}
```

2.9.5.4 RESPONSE – SUCCESS

```
HTTP/1.1 200 OK
Accept: application/json;
Content-Type: application/json;
Accept-version: v1
Body:
{
  "code": "200",
```

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```
"message": {
  "connections": [
    {
      "uid": "[Unique identifier generated internally by Boxilla for each connection]",
      "name": "[connection_name]",
      "host": "[IP/DNS of primary connection source]",
      "connection_type": "Private" | "Shared",
      "group": "ConnectViaTx" | "VM" | "VMPool" | "VMHorizon" | "TXPair",
      "view_only": "Yes" | "No",
      [List of supported properties]
    },
    {...}, // if there are more connections
  ]
}
....
]
```

NOTE: In the response body, the "list of supported properties" tag composes of the properties of the requested KVM connection, which may be different based on the group of connection. The full supported list of properties for each group of connection is listed at the beginning of Section 2.9.

"Password" property for VM/VMHorizon connection would NOT be returned.

The following three examples show cases of the JSON element in "connections" JSON array in response body for various groups of KVM connections.

Example 1:

```
{
  "name": "tx-connection-1",
  "host": "10.0.2.20",
  "connection_type": "Shared",
  "group": "ConnectViaTx",
  "extended_desktop": "Yes",
  "usb_redirection": "No",
  "audio": "Yes",
  "persistent": "Yes",
  "view_only": "No"
}
```



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Example 2:

```
{
  "name": "vm-connection-2",
  "host": "10.0.2.21",
  "connection_type": "Private",
  "group": "VM",
  "username": "James",
  "extended_desktop": "Yes",
  "usb_redirection": "No",
  "audio": "Yes",
  "port": "3389",
  "domain": "test.com",
  "nla": "Yes",
  "view_only": "No"
}
```

Example 3:

```
{
  "name": "txpair-connection-3",
  "host": "10.0.2.22",
  "connection_type": "Private",
  "group": "TXPair",
  "host_2": "10.0.2.23",
  "audio": "Yes",
  "persistent": "Yes",
  "view_only": "No",
  "pairing_type": "2",
  "orientation": "H12",
  "audio-source": 1
}
```

2.9.5.5 RESPONSE – ERROR: BAD REQUEST

This error response indicates any non-specific error (may be caused by internal errors within the API) returned, which might include:

- ◆ Required property parameters are passed in as invalid. The associated error message in the response body is as follows:
"message": "Invalid parameter(s): [List of parameters detected as invalid]."
- ◆ "connection_names" parameter is not an array (for example, an integer is given instead) or any elements within are not String type. The associated error message in the response body is as follows:
"message": "Invalid parameter connection_names: [connection_names], expecting a String array."
- ◆ One or more KVM connections within the connection_name parameter do not exist. The associated error message in the response body is as follows:
"message": "The following connection(s) do(es) not exist: [List of connections do not exist]"

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2.9.6 API FOR LAUNCHING KVM ACTIVE CONNECTIONS

This API is for launching a KVM active connection based on an existing KVM connection record.

Requests of this API require authentication using the credentials of the REST API user described in Section 2.3.2.

2.9.6.1 REQUEST – URI

Uri	bxa-api/connections/kvm/active
Method	POST

2.9.6.2 REQUEST - PARAMS

REQUIREMENT	NAME	TYPE	DESCRIPTION
Mandatory	username	String	Name of the KVM user logged in to the receiver.
	connection_name	String	Name of KVM connection as the active connection traffic source.
	receiver_name	String	Name of the receiver used to launch the active connection.

2.9.6.3 REQUEST BODY JSON FORMAT

```
{
  "username": "[username]",
  "connection_name": "[connection_name]",
  "receiver_name": "[receiver_name]"
}
```

2.9.6.4 RESPONSE – SUCCESS

HTTP/1.1 201 Created

Accept: application/json;

Content-Type: application/json;

Accept-version: v1

Body:

```
{
  "code": "201",
  "message": "Active connection [connection_name] is successfully launched."
}
```



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2.9.6.5 RESPONSE – ERROR: BAD REQUEST

This error response indicates any non-specific error (may be caused by internal errors within the API) returned, which might include:

- ◆ The source or destination (the receiver and transmitter/VM) does not exist. The associated error message in the response body is as follows:
"message": "Active connection [connection_name] or receiver [receiver_name] does not exist."
- ◆ The user specified in the username parameter does not exist. The associated error message in the response body is as follows:
"message": "User [username] does not exist."
- ◆ The source or destination (the receiver and transmitter/VM) is offline. The associated error message in the response body is as follows:
"message": "Active connection [connection_name] or receiver [receiver_name] is unreachable."
- ◆ The embedded software on the KVM devices is mal-functional. The associated error message in the response body is as follows:
"message": "Active connection [connection_name] or receiver [receiver_name] is currently not functional."

2.9.6.6 RESPONSE – ERROR: LAUNCHING ACTIVE CONNECTION NOT SUPPORTED BY DEVICE FIRMWARE

This error response indicates that the version of firmware deployed on the specified receiver in request parameters does not support launching active connections. Usually this is caused by older versions of firmware without the associated appliance southbound REST API.

```
HTTP/1.1 403 Forbidden
```

```
Accept: application/json;
```

```
Content-Type: application/json;
```

```
Accept-version: v1
```

```
Body:
```

```
{  
  "code": "403",  
  "message": " Launching active connection is not supported by firmware type [receiver model] version  
[firmware version] of receiver [receiver_name]."  
}
```

2.9.6.7 RESPONSE – ERROR: CONNECTION NOT ASSIGNED TO LOGGED-IN USER

This error response indicates that the source KVM connection to be launched is not assigned to the logged-in KVM user on the receiver.

```
HTTP/1.1 403 Forbidden
```

```
Accept: application/json;
```

```
Content-Type: application/json;
```

```
Accept-version: v1
```

```
Body:
```

```
{  
  "code": "403",  
  "message": "Connection [connection_name] not assigned to user [username]."  
}
```

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2.9.6.8 RESPONSE - ERROR: USER NOT LOGGED-IN ON RECEIVER

This error response indicates that the specified user is not logged-in on the receiver. In this case launching the specified active connection is forbidden.

HTTP/1.1 403 Forbidden

Accept: application/json;

Content-Type: application/json;

Accept-version: v1

Body:

```
{
  "code": "403",
  "message": "The specified user [username] is not logged on receiver [receiver_name]."
```

2.9.6.9 RESPONSE - ERROR: ACTIVE CONNECTION EXISTS FOR PRIVATE CONNECTION

This error response indicates that an active connection already exists for the specified private-type KVM connection, and the API operation is prohibited as private connections only support single active connection being launched.

HTTP/1.1 403 Forbidden

Accept: application/json;

Content-Type: application/json;

Accept-version: v1

Body:

```
{
  "code": "403",
  "message": "Active connection already exists for private KVM connection [connection_name]."
```

2.9.7 API FOR TERMINATING KVM ACTIVE CONNECTIONS

This API is to break an existing KVM active connection between a source/destination pair. Requests of this API require authentication using the credentials of the REST API user described in Section 2.3.2.

2.9.7.1 REQUEST – URI

Uri	bxapi/connections/kvm/active
Method	DELETE



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2.9.7.2 REQUEST – PARAMS

REQUIREMENT	NAME	TYPE	DESCRIPTION
Mandatory	username	String	Name of the KVM user logged in to the receiver.
	connection_name	String	Name of KVM connection as the active connection traffic source.
	receiver_name	String	Name of the receiver used to terminate the active connection.

2.9.7.3 REQUEST BODY JSON FORMAT

```
{
  "username": "[username]",
  "connection_name": "[connection_name]",
  "receiver_name": "[receiver_name]"
}
```

2.9.7.4 RESPONSE – SUCCESS

HTTP/1.1 200 OK

Accept: application/json;

Content-Type: application/json;

Accept-version: v1

Body:

```
{
  "code": "200",
  "message": "Active connection [connection_name] is successfully terminated."
}
```

2.9.7.5 RESPONSE – ERROR: BAD REQUEST

This error response indicates any non-specific error (may be caused by internal errors within the API) returned, which might include:

- ◆ The source or destination (the receiver and transmitter/VM) does not exist. The associated error message in the response body is as follows:
"message": "Active connection [connection_name] or receiver [receiver_name] does not exist."
- ◆ The user specified in the username parameter does not exist. The associated error message in the response body is as follows:
"message": "User [username] does not exist."
- ◆ Receiver is offline. The associated error message in the response body is as follows:
"message": "Receiver [receiver_name] is unreachable."

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- ♦ The embedded software on the KVM device is mal-functional. The associated error message in the response body is as follows:
"message": "Active connection [connection_name] or receiver [receiver_name] is currently not functional."

2.9.7.6 RESPONSE – ERROR: TERMINATING ACTIVE CONNECTION NOT SUPPORTED BY DEVICE FIRMWARE

This error response indicates that the version of firmware deployed on the specified receiver in request parameters does not support terminating active connections. Usually this is caused by older versions of firmware without the associated appliance API.

HTTP/1.1 403 Forbidden

Accept: application/json;

Content-Type: application/json;

Accept-version: v1

Body:

```
{
  "code": "403",
  "message": " Terminating active connection is not supported by firmware type [receiver model]
  version [firmware version] of receiver [receiver_name]."
```

2.9.7.7 RESPONSE – ERROR: CONNECTION NOT ACTIVE

This error response indicates that the specified connection in the parameter to be terminated is not active at the moment.

HTTP/1.1 403 Forbidden

Accept: application/json;

Content-Type: application/json;

Accept-version: v1

Body:

```
{
  "code": "403",
  "message": "Connection [connection_name] is not active."
```



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2.9.7.8 RESPONSE - ERROR: CONNECTION NOT ASSIGNED TO LOGGED-IN USER

This error response indicates that the source KVM connection to be launched is not assigned to the logged-in KVM user on the receiver.

HTTP/1.1 403 Forbidden

Accept: application/json;

Content-Type: application/json;

Accept-version: v1

Body:

```
{
  "code": "403",
  "message": "Connection [connection_name] is not assigned to user [username]."
```

2.9.8 API FOR GETTING ALL KVM ACTIVE CONNECTION STATUS

This API is for obtaining status and related information of all existing KVM active connections in Boxilla, including the following contents:

- ◆ Connection source/destination names
- ◆ Name of logged-in user
- ◆ Connection type: private or shared
- ◆ Active duration
- ◆ Video/audio/USB and total bandwidth
- ◆ RTT and user latency
- ◆ FPS/dropped-FPS
- ◆ Status of audio/USB

2.9.8.1 REQUEST – URI

Uri	bxapi/connections/kvm/active
Method	GET

2.9.8.2 REQUEST – PARAMS

This API does not require any parameters within the request body.

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2.9.8.3 RESPONSE – SUCCESS

HTTP/1.1 200 OK

Accept: application/json;

Content-Type: application/json;

Accept-version: v1

Body:

```
{
  "code": "200",
  "message": {
    "active_connections": [
      {
        "connection_name": "[name of the associated KVM connection]",
        "receiver_name": "[name of the receiver]",
        "host": {
          "type": "ConnectViaTx" | "VM" | "VMPool" | "VMHorizon" | "TXPair",
          "value": "[name of the target, either transmitter name or VM/VMPool IP]"
        },
        "host_2": {
          "type": "TXPair",
          "value": "[name of the secondary transmitter]"
        }, // Conditional
        "active_user": "[name of the logged-in user]",
        "type": "Private" | "Shared",
        "duration": "[active duration in seconds]",
        "total_bandwidth": "[total average bandwidth in mbps]",
        "video_bandwidth": "[average video bandwidth in mbps]",
        "audio_bandwidth": "[average audio bandwidth in mbps]",
        "usb_bandwidth": "[average USB bandwidth in mbps]",
        "rtt": "[RTT in milliseconds]",
        "user_latency": "[user latency in milliseconds]",
        "fps": "[FPS]",
        "dropped_fps": "[dropped FPS]"
      },
      ... // Potentially multiple KVM active connections
    ]
  }
}
```



CHAPTER 3: REST SPECIFIC HTTP ERROR CODE STATUS

As described in Chapter 2, the response messages of the APIs are divided into the success/error categories based on the HTTP status code. The 200 and 201 status codes are used in the success case and the rest of the codes are used in the error case, with a brief summary of the commonly accepted usage as follows:

- ◆ 200 (OK) – General success status code. Most common code to indicate success.
- ◆ 201 (CREATED) – Successful creation occurred (via either POST or PUT). Set the Location header to contain a link to the newly-created resource. Response body content may or may not be present.
- ◆ 204 (NO CONTENT) – Status when wrapped responses are not used and nothing is in the body (e.g. DELETE).
- ◆ 304 (NOT MODIFIED) – Used in response to conditional GET calls to reduce band-width usage. If used, must set the Date, Content-Location, Etag headers to what they would have been on a regular GET call. There must be no response body.
- ◆ 400 (BAD REQUEST) – General error when fulfilling the request would cause an invalid state such as domain validation errors, missing data, etc.
- ◆ 401 (UNAUTHORIZED) – Error code for a missing or invalid authentication token.
- ◆ 403 (FORBIDDEN) – Error code for user not authorized to perform the operation, doesn't have rights to access the resource, or the resource is unavailable for some reason (e.g. time constraints, etc.).
- ◆ 404 (NOT FOUND) – Used when the requested resource is not found, whether it doesn't exist or if there was a 401 or 403 that, for security reasons, the service wants to mask.
- ◆ 409 (CONFLICT) – Whenever a resource conflict would be caused by fulfilling the request. Duplicate entries, deleting root objects when cascade-delete not supported are a couple of examples.
- ◆ 500 (INTERNAL SERVER ERROR) – The general catch-all error when the server-side throws an exception.

4.1 APPLIANCE PROPERTY (SETTINGS) CAPABILITIES BASED ON DEVICE CLASS AND FIRMWARE VERSION

Table 2. KVM Appliance Property Capability based on Firmware

SUPPORTED DEVICE TYPE	PROPERTY	VALID VALUES	SUPPORTED DEVICE CLASS	FIRMWARE
Transmitter	Video Quality	["Best Quality", "2", "Default", "4", "Best Compression"]	Emerald-SE, Emerald-PE (single/dual-head); ZeroU	
	Video Source Optimization	["Off", "DVI Optimized", "VGA - High Performance", "VGA - Optimized", "VGA - Low Bandwidth"]	Emerald-SE, Emerald-PE (single-head); ZeroU	
	HID Configurations	0-5 Value representation: 0 - "Default" 1 - "Basic" 2 - "MAC" 3 - "Absolute" 4 - "Absolute MAC" 5 - "Dual Mouse"	Emerald-SE, Emerald-PE (single/dual-head); ZeroU	0-3: all firmware versions 4: >= 5.3.0 5: >= 5.4.1
			Emerald-4K	0-3: all firmware versions 4-5: >= 1.3.1
	Mouse_Keyboard_Timeout	0-5 (seconds)	Emerald-SE, Emerald-PE(single/dualhead); ZeroU	
			Emerald-4K	>= 1.4.0
	EDID Setting DVI 1		["1920x1080", "1920x1200", "1680x1050", "1280x1024", "1024x768", "Clone"]	Emerald-SE, Emerald-PE (single/dualhead); ZeroU
["Default", "3840x2160p-60Hz", "3840x2160p-30Hz", "2560x1440p-60Hz", "1920x1080p-60Hz", "Clone"]			Emerald-4K	>= 1.4.0
EDID Setting DVI 2		["1920x1080", "1920x1200", "1680x1050", "1280x1024", "1024x768", "Clone"]	Emerald-SE, Emerald-PE (single/dual-head)	
Receiver	HTTP-Enabled	["Enabled", "Disabled"]	Emerald-SE, Emerald-PE (single/dual-head); Emerald-4K	



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4.2 API REQUESTS INVOLVING MULTIPLE OPERATIONS

The following APIs involve potentially multiple operations on Boxilla objects, which are specified by the parameter as arrays:

SCOPE	REQUEST TYPE	URI
Users	GET	bxapi/users/kvm
	PUT	bxapi/users/kvm/connections
	DELETE	bxapi/users/kvm
Devices	GET	bxapi/devices/kvm
		bxapi/devices/kvm/properties
		bxapi/devices/kvm/status
	POST	bxapi/devices/kvm/reboot
		bxapi/devices/kvm/reboot-all
Connections	GET	bxapi/connections/kvm
		bxapi/connections/kvm/active
	DELETE	bxapi/connections/kvm
		bxapi/connections/kvm/all

On failure of one or more individual operation, the corresponding API returns an error response with status code 400, 401, 403 or 409 accordingly, together with the response message listing each operation that fails. The other operations successfully executed are not affected. In this case, any external manager using the northbound REST API should send the GET request associated to the failed operations to confirm the non-reported operations (no error messages) were successful.

For example, when deleting a list of KVM connections using the API specified in Section 2.9.4 and some specified connections did not get deleted due to existence of active connections, the API returns an HTTP 409 response with the message listing all the connections to be deleted that are currently active. When the API external manager receives the error response, it should send the GET request for connection status (API specified in Section 2.9.5) to make sure that the other inactive connections specified in the parameter of the previous DELETE request have been successfully deleted.

4.3 NAMING VALIDATION RULES

Username/password credentials and names of Boxilla resources such as KVM device/connection names are used for multiple features included in the northbound REST APIs, which are validated at each request. This section briefly describes the naming rules used for validation by the APIs.

4.3.1 RULES FOR VALID NAME

In general, names (including usernames/device_names/connection_names) should be set as easy-to-read, using ASCII characters to guarantee interoperability with external usage. The following subsections define some rules for name validation.

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4.3.1.1 ALLOWED CHARACTERS

A valid name can contain only alphabetical characters (A-Z), numeric characters (0-9), and the following special characters:

- ◆ dash sign (-)
- ◆ underscore (_)
- ◆ period (.)
- ◆ parentheses (())
- ◆ white space (blank)

4.3.1.2 DISALLOWED CHARACTERS

- ◆ comma (,)
- ◆ tilde (~)
- ◆ colon (:)
- ◆ exclamation point (!)
- ◆ at sign (@)
- ◆ number sign (#)
- ◆ dollar sign (\$)
- ◆ percent (%)
- ◆ caret (^)
- ◆ ampersand (&)
- ◆ apostrophe (')
- ◆ braces ({})

4.3.1.3 LENGTH

The length of every name field should not be shorter than 2 characters and not longer than 64 characters.

4.3.1.4 CHARACTER ENCODING

As Unicode characters are commonly supported in the Windows-based systems only, the use of Unicode characters should be avoided if requests via the northbound REST APIs use any non-Microsoft implementations.

It is recommended to use UTF-8 as the default encoding scheme.



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4.3.2 RULES FOR VALID PASSWORD

Passwords should be set as easy-to-remember using the following rules.

4.3.2.1 RECOMMENDED CHARACTERS

Any password is recommended to contain the following contexts:

- ♦ At least one lower case letter
- ♦ At least one upper case letter
- ♦ At least one digit
- ♦ At least one of the special characters ~!@#\$\$%^&*()_+

4.3.2.2 LENGTH

The length of every password should not be shorter than 4 characters.

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