Boxilla Communication to Appliance using SSH

Tech Note

Document Number: ENG-0007-144

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Status: Draft

Rev: 0.3

Date: 4-Apr-22

This Tech Note describes how Boxilla fetches/updates the data from/to the appliance.

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MASTER DOCUMENT REVISION HISTORY

Date	Version	Description	Author / Editor
Mar 1th, 2022	0.1	Initial Draft	Shravan Chandrashekharaiah
Mar 28th, 2022	0.2	Applied updates from the internal Review	Shravan Chandrashekharaiah
Mar 29th, 2022	0.3	Template / Structure Updates from the internal review	Shravan Chandrashekharaiah

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2. Introduction

This Tech Note describes Boxilla communication with the appliances using SSH. Boxilla executes SSH commands directly on the appliances to operate/modify and fetch various data to manage and monitor the Appliances. Appliance by default will have the local IP set and Boxilla helps discover the appliances using discovery protocol. Once the Appliance is discovered it can be Managed based on the Appliance availability (when the state of the appliance is 'UnManaged'). Appliance can be assigned the IP address from the edit setting modal and can then be managed by Boxilla. Once the Appliance is managed, Boxilla provides various features to maintain the Appliance. Various features involves, obtaining performance statistics, Upgrade device firmware, Manage firmware versions, Monitor connections, Fetch details about the device, Check Online/Offline status, etc.

2.1 Purpose

The purpose of this Tech Note is to list down all the SSH commands that is executed directly on the appliances to perform various actions by each actions and the name of the plugins that is using it and its corresponding file name.

2.2 References

Ref 1. https://limerick.blackbox.com/Engineering/SoftwareEmbedded/ENG-0005-020.docx

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3. Description

Boxilla helps manage, upgrade and monitor appliances, for this it communicates with the Appliance in three different approach:

- SSH
- libsystem_cli
- REST

Intention of this document is to list down the use of **SSH** and **libsystem_cli** commands and to replace it with the equivalent **REST** API of that of the Appliance.

SSH:

 SSH or Secure Shell is a network communication protocol that enables two computers to communicate and share data

Libsystem_cli:

Utility command which can be run on device command line to fetch information about the devices like model, serial number, type, etc.
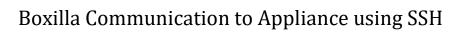
REST:

REST or Representational State Transfer is an architectural style to communicate between two computers using predefined methods. It provides a stateless communication between client and the server.

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4. List of Devices and its details:

Model	SPN	Type	Brand	Class	Resolution
300-010-001	DTX1000-R	Barrow	Blackbox	Receiver	2K
300-011-001	DTX1000-T	Barrow	Blackbox	Transmitter	2K
300-012-001	DTX1002-R	Corrib	Blackbox	Receiver	2K
300-013-001	DTX1000-R	Corrib	Blackbox	Receiver	2K
300-014-001	DTX1002-T	Corrib	Blackbox	Transmitter	2K
300-015-001	DTX1000-T	Corrib	Blackbox	Transmitter	2K
300-016-001	DTX1000SA-R	Deel	Blackbox	Receiver	2K
300-017-001	DTX1000SA-T	Deel	Blackbox	Transmitter	2K
300-020-001	VCA2100	Barrow	Cloudium	Receiver	2K
300-021-001	VSA2100	Barrow	Cloudium	Transmitter	2K
300-022-001	VCA2200	Corrib	Cloudium	Receiver	2K
300-023-001	VCA2100	Corrib	Cloudium	Receiver	2K
300-024-001	VSA2200	Corrib	Cloudium	Transmitter	2K
300-025-001	VSA2100	Corrib	Cloudium	Transmitter	2K
300-030-001	DTX1032-R	Corrib	Blackbox	Manager	2K
300-031-001	CLM2000	Corrib	Cloudium	Manager	2K
300-040-001	EMD4000R	Emerald	Blackbox	Receiver	4K
300-041-001	EMD4000T	Emerald	Blackbox	Transmitter	4K
300-046-001	EMD2000SE-R	EmeraldSE1	Blackbox	Receiver	2K
300-047-001	EMD2000SE-T	EmeraldSE1	Blackbox	Transmitter	2K
300-052-001	EMS1G48	Dell	Blackbox	Switch	
300-053-001	EMS10G28	Dell	Blackbox	Switch	
300-054-001	EMS100G32	Dell	Blackbox	Switch	
300-055-001	EMX1-48	Dell	Blackbox	Switch	
300-056-001	EMX10-28	Dell	Blackbox	Switch	
300-057-001	EMX100-32	Dell	Blackbox	Switch	
300-058-001	EMS10G12	Dell	Blackbox	Switch	
300-059-001	EMX10-12	Dell	Blackbox	Switch	
300-060-001	EMD2002SE-R	EmeraldSE2	Blackbox	Receiver	2K
300-061-001	EMD2002SE-T	EmeraldSE2	Blackbox	Transmitter	2K
300-063-001	EMD-TC100	EmeraldTC1	Blackbox	Receiver	2K
300-064-001	EMD-TC200	EmeraldTC2	Blackbox	Receiver	2K
300-065-001	EMD-TC300	EmeraldTC3	Blackbox	Receiver	2K
300-066-001	EMD2000PE-R	EmeraldPE1	Blackbox	Receiver	2K
300-067-001	EMD2000PE-T-P	EmeraldPE1	Blackbox	Transmitter	2K
300-068-001	EMD2002PE-R	EmeraldPE2	Blackbox	Receiver	2K
300-069-001	EMD2002PE-T-P	EmeraldPE2	Blackbox	Transmitter	2K
300-070-001	EMD200DV-T	EmeraldDV1	Blackbox	Transmitter	2K

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300-071-001	EMD200EDV-T	EmeraldDV2	Blackbox	Transmitter	2K
300-072-001	EMD200DP-T	EmeraldDP1	Blackbox	Transmitter	2K
300-073-001	EMD200DP-T-N	EmeraldDP2	Blackbox	Transmitter	2K
300-081-001	EMD2000PE-R-P	EmeraldPE3	Blackbox	Receiver	2K
300-082-001	EMD2000PE-T-P2	EmeraldPE3	Blackbox	Transmitter	2K
300-083-001	EMD2002PE-R-P	EmeraldPE4	Blackbox	Receiver	2K
300-084-001	EMD2002PE-T-P2	EmeraldPE4	Blackbox	Transmitter	2K
300-085-001	EMD200DV-T-NXL	EmeraldDV3	Blackbox	Transmitter	2K
300-086-001	EMD200DP-T-NXL	EmeraldDP3	Blackbox	Transmitter	2K
300-090-001	EMD4000PE-DP-T	Emerald1	Blackbox	Transmitter	4K
300-102-001	EMD2002PE-DP-T	EmeraldPE5	Blackbox	Transmitter	2K
300-103-001	EMD2000PE-DP-T	EmeraldPE5	Blackbox	Transmitter	2K
300-106-001	EMD2002SE-DP-T	EmeraldSE3	Blackbox	Transmitter	2K

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5. SSH/libsystem_cli integration for Appliance Management

1. Reboot
2. Restore/UnManage via restore script
3. Get Details
4. Software Upgrade
5. Manage Appliance or Manually Add
6. Set IP once managed

5.1. Reboot:

Reboot:

/sbin/reboot

REST Equivalent in CURL:

```
curl --location --request PUT 'https://10.211.129.223:8888/control' \
--
header 'Authorization: Bearer eyJ0eXAiOiJKV1QiLCJhbGciOiJIUzUxMiJ9.eyJpYXQiOjYwOTQy
NCwiaXNzIjoid3d3LmJsYWNrYm94LmNvbSIsInJlZiI6IlNFQkIxOEE5OTAxMyIsInN1YiI6InJlc3RfYXB
pIn0.neahC4erb1A6cp0necpSHQyf8YBmBSu64iCKuJd2uklXMzn_a0CXkNd4n7AC_3Zh_OfFvlfbmTXuha
jN9ZV3dg' \
--header 'Connection: keep-alive' \
--header 'Content-Type: application/json' \
--data-raw '{"action": "reboot_device"}'
```

Plugins Using	Name of the File using the commands
cloudium_example_plugin	/usr/share/moy/gems/cloudium_example_plugin/app/controllers/cloudium_example_plugin/appliances_controller.rb
cloudium_example_plugin	/usr/share/moy/gems/cloudium_example_plugin/app/controllers/cloudium_example_plugin/hosts_controller_ssh.rb
cloudium_example_plugin	/usr/share/moy/gems/cloudium_example_plugin/app/controllers/cloudium_example_plugin/upgrades_controller.rb
blackbox_invisa_pc_plugin	/usr/share/moy/gems/blackbox_invisa_pc_plugin/app/controllers/api_helpers/devices.rb

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5.2. Restore/UnManage via restore script:

Boxilla provides action to unmanage a device from the Boxilla Manager for the device to be used elsewhere. Once the device is unmanaged, it can be discover and managed by any other Boxilla unit. To unmanage a device from Boxilla, Boxilla connects to the device and runs the restore command stored in the device at specific location based on the device type. Below are the set of commands that Boxilla executes on the device via SSH.

Appliance Type	Device Type	Command
Receiver	Emerald (4K)	nohup /opt/blackbox/RX_restore.sh > /dev/null 2>&1 &
Receiver	Others	nohup /opt/cloudium/RX_restore.sh > /dev/null 2>&1 &
Transmitter	Emerald (4K)	nohup /opt/blackbox/TX_restore.sh > /dev/null 2>&1 &
Transmitter	Others	nohup /opt/cloudium/TX_restore.sh > /dev/null 2>&1 &

Others Include: Barrow / Corrib / Deel / EmeraldSE1 / EmeraldSE1 / EmeraldSE2 / EmeraldSE2 / EmeraldTC1 / EmeraldTC2 / EmeraldTC3 / EmeraldPE1 / EmeraldPE1 / EmeraldPE2 / EmeraldPE2 / EmeraldDV1 / EmeraldDV2 / EmeraldDP1 / EmeraldDP2 / EmeraldPE3 / EmeraldPE3 / EmeraldPE4 / EmeraldPE4 / EmeraldDV3 / EmeraldDP3 / Emerald1 (4K) / EmeraldPE5 / EmeraldPE5 / EmeraldSE3

5.2.1 Receiver Commands:

Emerald device restore (EMD4000R and EMD4000T):

nohup /opt/blackbox/RX_restore.sh > /dev/null 2>&1 &

Others:

nohup /opt/cloudium/RX_restore.sh > /dev/null 2>&1 &

5.2.2 Transmitter Commands:

Emerald device restore (EMD4000R and EMD4000T):

nohup /opt/blackbox/TX_restore.sh > /dev/null 2>&1 &

Others:

nohup /opt/cloudium/TX_restore.sh > /dev/null 2>&1 &

REST Equivalent in CURL:

N/A

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Plugins Using	Name of the File using the commands
cloudium_example_plugin	app/controllers/cloudium_example_plugin/appliances_controller.rb

5.3 Get Details:

Description: In the Device listing tab, Boxilla provides a way to get the details of the Appliance. Details page provides information about the device type, serial number, firmware version, Operational details, Network details and LACP details.

Boxilla manages to get the details by connecting to the device via SSH and perform Linux commands or libsystem_cli commands to then create a JSON for front end to display.

List of commands used to fetch details are as below:

5.3.1 Model Number:

Device Type	Commands
Device SPN starting with DTX1	cat /dev/mtd8 |grep model= | cut -c 7-
Others	cat /dev/mtd2 |grep model= | cut -c 7-
Device SPN starting with EMD4 and all the device which supports libsystem_cli	/usr/bin/libsystem_cli –model

Others include: VCA2100 / VSA2100 / VCA2200 / VCA2100 / VSA2200 / VSA2100 / CLM2000

Device SPN starting with DTX1:

cat /dev/mtd8 |grep model= | cut -c 7-

Other devices Model Number:

cat /dev/mtd2 |grep model= | cut -c 7-

All the devices which supports libsystem_cli:

/usr/bin/libsystem_cli –model

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Rest Equivalent in CURL:

curl --location --request GET 'https://10.211.129.223:8888/version' \

--header 'Authorization: Bearer
eyJ0eXAiOiJKV1QiLCJhbGciOiJIUzUxMiJ9.eyJpYXQiOjYwOTAyNCwiaXNzIjoid3d3LmJsYWNrYm94LmN
vbSIsInJlZiI6IlNFQkIxOEE5OTAxMyIsInN1YiI6InJlc3RfYXBpIn0.neahC4erb1A6cp0necpSHQyf8YBmBSu6
4iCKuJd2uklXMzn_a0CXkNd4n7AC_3Zh_OfFvlfbmTXuhajN9ZV3dg' \

--header 'Connection: keep-alive'

Response:

```
{

    "api_version": "1.0.9",

    "software_version": "V6.3.10_r9988",

    "manufacturing_partnumber": "300-061-001",

    "serial_number": "SEBB18A99013",

    "product_type": "Transmitter",

    "product_brand": "Black Box",

    "product_configuration": "Dual Head",

    "ethernet_speed": 1000

}
```

Plugins Using	Name of the File using the commands
cloudium_example_plugin	app/controllers/cloudium_example_plugin/hosts_controller_utils.rb

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5.3.2 Serial Number:

Device Type	Commands
Device SPN starting with DTX1	cat /dev/mtd8 |grep serial=	cut -c 8-
Others	cat /dev/mtd2 |grep serial=	cut -c 8-
Device SPN starting with EMD4 and all the device which supports libsystem_cli	/usr/bin/libsystem_cli –serial

Others include: VCA2100 / VSA2100 / VCA2200 / VCA2100 / VSA2200 / VSA2100 / CLM2000

Devices SPN starting with "**DTX1**":

cat /dev/mtd8 |grep serial= | cut -c 8-

Other devices:

cat /dev/mtd2 |grep serial= | cut -c 8-

All the devices which supports libsystem_cli:

/usr/bin/libsystem_cli –serial

Rest Equivalent in CURL:

curl --location --request GET 'https://10.211.129.223:8888/version' \

--header 'Authorization: Bearer
eyJ0eXAiOiJKV1QiLCJhbGciOiJIUzUxMiJ9.eyJpYXQiOjYwOTAyNCwiaXNzIjoid3d3LmJsYWNrYm94LmN
vbSIsInJlZiI6IlNFQkIxOEE5OTAxMyIsInN1YiI6InJlc3RfYXBpIn0.neahC4erb1A6cp0necpSHQyf8YBmBSu6
4iCKuJd2uklXMzn_a0CXkNd4n7AC_3Zh_OfFvlfbmTXuhajN9ZV3dg' \

--header 'Connection: keep-alive'

Error! Unknown document property name.

Response:

```
{

    "api_version": "1.0.9",

    "software_version": "V6.3.10_r9988",

    "manufacturing_partnumber": "300-061-001",

    "serial_number": "SEBB18A99013",

    "product_type": "Transmitter",

    "product_brand": "Black Box",

    "product_configuration": "Dual Head",

    "ethernet_speed": 1000

}
```

Plugins Using	Name of the File using the commands
cloudium_example_plugin	app/controllers/cloudium_example_plugin/hosts_controller_utils.rb

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5.3.3 Total Memory:

Device Type	Commands
Device SPN starting with DTX1 and EMD2	vmstat -s |grep 'total memory' | awk '{print $1}'
Others	cat /proc/meminfo |grep 'total memory' | cut -c 15-
Device SPN starting with EMD4	cat /proc/meminfo |grep 'MemTotal' |awk -F MemTotal: '{print $2}' |awk '{print $1}'

Others include: VCA2100 / VSA2100 / VCA2200 / VCA2100 / VSA2200 / VSA2100 / CLM2000

Corrib Total Memory for SPN starting with "**DTX1**" and "**EMD2**":

vmstat -s |grep 'total memory' | awk '{print $1}'

Other devices Total Memory:

cat /proc/meminfo |grep 'total memory' | cut -c 15-

Emerald Total Memory for SPN starting with "**EMD4**":

cat /proc/meminfo |grep 'MemTotal' |awk -F MemTotal: '{print $2}' |awk '{print $1}'

Rest equivalent in CURL:

curl --location --request GET 'https://10.211.129.223:8888/statistics/facts/system_facts' \

--header 'Authorization: Bearer
eyJ0eXAiOiJKV1QiLCJhbGciOiJIUzUxMiJ9.eyJpYXQiOjYwOTAyNCwiaXNzIjoid3d3LmJsYWNrYm94LmN
vbSIsInJlZiI6IlNFQkIxOEE5OTAxMyIsInN1Yil6InJlc3RfYXBpIn0.neahC4erb1A6cp0necpSHQyf8YBmBSu6
4iCKuJd2uklXMzn_a0CXkNd4n7AC_3Zh_OfFvlfbmTXuhajN9ZV3dg' \

--header 'Connection: keep-alive'

Response:

{

  "kvm_system_facts": [

    {

      "id": 26309,

      "mac": "1c:37:bf:00:12:62",

      "**total memory**": 244108,

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```
            "free memory": 677520,

            "total disk": 368.0,

            "free disk": 339.0,

            "uptime": 601795,

            "load_avg_1min": 0.029999999999999999,

            "load_avg_5min": 0.080000000000000002,

            "load_avg_15min": 0.080000000000000002,

            "capture_time": 0.0,

            "crcs": 0.0,

            "temperature": 0,

            "user_response": 510.0,

            "timestamp": 601794677

        }

    ]

}
```

Plugins Using	Name of the File using the commands
cloudium_example_plugin	app/controllers/cloudium_example_plugin/hosts_controller_utils.rb

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5.3.4 Free Memory:

Device Type	Commands
Device SPN starting with DTX1 and EMD2	vmstat -s |grep 'free memory' | awk '{print $1}'
Others	cat /proc/meminfo |grep 'MemFree' | cut -c 15-
Device SPN starting with EMD4	cat /proc/meminfo |grep MemFree |awk -F MemFree: '{print $2}' |awk '{print $1}'

Others include: VCA2100 / VSA2100 / VCA2200 / VCA2100 / VSA2200 / VSA2100 / CLM2000

Corrib Free Memory for SPN starting with "**DTX1**" and "**EMD2**":

vmstat -s |grep 'free memory' | awk '{print $1}'

Others devices Free Memory:

cat /proc/meminfo |grep 'MemFree' | cut -c 15-

Emerald Free Memory for SPN starting with "**EMD4**":

cat /proc/meminfo |grep MemFree |awk -F MemFree: '{print $2}' |awk '{print $1}'
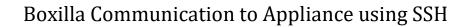

Rest equivalent in CURL:

curl --location --request GET 'https://10.211.129.223:8888/statistics/facts/system_facts' \

--header 'Authorization: Bearer
eyJ0eXAiOiJKV1QiLCJhbGciOiJIUzUxMiJ9.eyJpYXQiOjYwOTAyNCwiaXNzIjoid3d3LmJsYWNrYm94LmN
vbSIsInJlZiI6IlNFQkIxOEE5OTAxMyIsInN1Yil6InJlc3RfYXBpIn0.neahC4erb1A6cp0necpSHQyf8YBmBSu6
4iCKuJd2uklXMzn_a0CXkNd4n7AC_3Zh_OfFvlfbmTXuhajN9ZV3dg' \

--header 'Connection: keep-alive'

Error! Unknown document property name.

Response:

{

  "kvm_system_facts": [

    {

      "id": 26309,

      "mac": "1c:37:bf:00:12:62",

      "total memory": 244108,

      "**free memory**": 677520,

      "total disk": 368.0,

      "free disk": 339.0,

      "uptime": 601795,

      "load_avg_1min": 0.029999999999999999,

      "load_avg_5min": 0.080000000000000002,

      "load_avg_15min": 0.080000000000000002,

      "capture_time": 0.0,

      "crcs": 0.0,

      "temperature": 0,

      "user_response": 510.0,

      "timestamp": 601794677

    }

  ]

}

Plugins Using	Name of the File using the commands
cloudium_example_plugin	app/controllers/cloudium_example_plugin/hosts_controller_utils.rb

Error! Unknown document property name.

5.3.4 Total Disk:

Device Type	Commands
Device SPN starting with DTX1 and EMD2	df /usr/local/ |grep mtd |awk '{print $2}'
Others	df /usr/local/ |grep mtd |awk '{print $2}'
Device SPN starting with EMD4	NA

Others include: VCA2100 / VSA2100 / VCA2200 / VCA2100 / VSA2200 / VSA2100 / CLM2000

Device SPN starting with "**DTX1**", "**EMD2**"

df /usr/local/ |grep mtd |awk '{print $2}'

Other Devices:

df /usr/local/ |grep mtd |awk '{print $2}'

Device SPN starting with **EMD4**:

N/A

Rest equivalent in CURL:

curl --location --request GET 'https://10.211.129.223:8888/statistics/facts/system_facts' \

--header 'Authorization: Bearer eyJ0eXAiOiJKV1QiLCJhbGciOiJIUzUxMiJ9.eyJpYXQiOjYwOTAyNCwiaXNzIjoid3d3LmJsYWNrYm94LmN vbSIsInJlZiI6IlNFQkIxOEE5OTAxMiIsInN1YiI6InJlc3RfYXBpbn0.neahC4erb1A6cp0necpSHQyf8YBmBSu6 4iCKuJd2uklXMzn_a0CXkNd4n7AC_3Zh_OfFvlfbmTXuhajN9ZV3dg' \

--header 'Connection: keep-alive'

Response:

{

  "kvm_system_facts": [

    {

      "id": 26309,

      "mac": "1c:37:bf:00:12:62",

      "total memory": 244108,

      "free memory": 677520,

Error! Unknown document property name.

        "**total disk**": 368.0,

        "free disk": 339.0,

        "uptime": 601795,

        "load_avg_1min": 0.029999999999999999,

        "load_avg_5min": 0.080000000000000002,

        "load_avg_15min": 0.080000000000000002,

        "capture_time": 0.0,

        "crcs": 0.0,

        "temperature": 0,

        "user_response": 510.0,

        "timestamp": 601794677

      }

  ]

}

Plugins Using	Name of the File using the commands
cloudium_example_plugin	app/controllers/cloudium_example_plugin/hosts_controller_utils.rb

Error! Unknown document property name.

5.3.5 Free Disk:

Device Type	Commands
Device SPN starting with DTX1 and EMD2	df /usr/local/ |grep mtd |awk '{print $4}'
Others	df /usr/local/ |grep mtd |awk '{print $4}'
Device SPN starting with EMD4	N/A

Others include: VCA2100 / VSA2100 / VCA2200 / VCA2100 / VSA2200 / VSA2100 / CLM2000

Devices Free Disk for SPN starting with "**DTX1**", "**EMD2**" :

df /usr/local/ |grep mtd |awk '{print $4}'

Other devices:

df /usr/local/ |grep mtd |awk '{print $4}'

Device SPN starting with "**EMD4**":

N/A

Rest equivalent in CURL:

curl --location --request GET 'https://10.211.129.223:8888/statistics/facts/system_facts' \

--header 'Authorization: Bearer
eyJ0eXAiOiJKV1QiLCJhbGciOiJIUzUxMiJ9.eyJpYXQiOjYwOTAyNCwiaXNzIjoid3d3LmJsYWNrYm94LmN
vbSIsInJlZiI6IlNFQkIxOEE5OTAxMyIsInN1YiI6InJlc3RfYXBpIn0.neahC4erb1A6cp0necpSHQyf8YBmBSu6
4iCKuJd2uklXMzn_a0CXkNd4n7AC_3Zh_OfFvlfbmTXuhajN9ZV3dg' \

--header 'Connection: keep-alive'

Response:

{

   "kvm_system_facts": [

     {

       "id": 26309,

       "mac": "1c:37:bf:00:12:62",

       "total memory": 244108,

       "free memory": 677520,

       "total disk": 368.0,

Error! Unknown document property name.

```
        "free disk": 339.0,

        "uptime": 601795,

        "load_avg_1min": 0.029999999999999999,

        "load_avg_5min": 0.080000000000000002,

        "load_avg_15min": 0.080000000000000002,

        "capture_time": 0.0,

        "crcs": 0.0,

        "temperature": 0,

        "user_response": 510.0,

        "timestamp": 601794677
      }
   ]
}
```

Plugins Using	Name of the File using the commands
cloudium_example_plugin	app/controllers/cloudium_example_plugin/hosts_controller_utils.rb

Error! Unknown document property name.

5.3.6 Mac Id:

Device Type	Commands
Device SPN starting with DTX1 and EMD2	/sbin/ifconfig eth0|grep 'HWaddr' |awk '{print $5}'
Other	Obtained from databse
Device SPN starting with EMD4	/sbin/ifconfig eth1|grep 'HWaddr'|awk '{print $5}'

Others include: VCA2100 / VSA2100 / VCA2200 / VCA2100 / VSA2200 / VSA2100 / CLM2000

Corrib Mac ID for SPN starting with "**DTX1**" and "**EMD2**":

/sbin/ifconfig eth0|grep 'HWaddr' |awk '{print $5}'

Other devices:

Obtained from the database

Emerald Mac ID for SPN starting with "**EMD4**":

/sbin/ifconfig eth1|grep 'HWaddr'|awk '{print $5}'

Rest equivalent in CURL:

curl --location --request GET 'https://10.211.129.223:8888/statistics/facts/system_facts' \

--header 'Authorization: Bearer
eyJ0eXAiOiJKV1QiLCJhbGciOiJIUzUxMiJ9.eyJpYXQiOjYwOTAyNCwiaXNzIjoid3d3LmJsYWNrYm94LmN
vbSIsInJlZiI6IlNFQkIxOEE5OTAxMyIsInN1Yil6InJlc3RfYXBpIn0.neahC4erb1A6cp0necpSHQyf8YBmBSu6
4iCKuJd2uklXMzn_a0CXkNd4n7AC_3Zh_OfFvlfbmTXuhajN9ZV3dg' \

--header 'Connection: keep-alive'

Error! Unknown document property name.

Response:

{

  "kvm_system_facts": [

    {

      "id": 26309,

      "**mac**": "1c:37:bf:00:12:62",

      "total memory": 244108,

      "free memory": 677520,

      "total disk": 368.0,

      "free disk": 339.0,

      "uptime": 601795,

      "load_avg_1min": 0.029999999999999999,

      "load_avg_5min": 0.080000000000000002,

      "load_avg_15min": 0.080000000000000002,

      "capture_time": 0.0,

      "crcs": 0.0,

      "temperature": 0,

      "user_response": 510.0,

      "timestamp": 601794677

    }

  ]

}

Plugins Using	Name of the File using the commands
cloudium_example_plugin	app/controllers/cloudium_example_plugin/hosts_controller_utils.rb

Error! Unknown document property name.

5.3.7 IP Address:

Device Type	Commands
Device SPN starting with DTX1 and EMD2	/sbin/ifconfig eth0|grep 'inet addr:'|awk '{print $2}'|awk -F : '{print $2}'
Other	""
Device SPN starting with EMD4	""

Others include: VCA2100 / VSA2100 / VCA2200 / VCA2100 / VSA2200 / VSA2100 / CLM2000

Device SPN starting with DTX1 and EMD2:

/sbin/ifconfig eth0\|grep 'inet addr:'\|awk '{print $2}'\|awk -F : '{print $2}'

Other Devices:

""

Deice SPN starting with EMD4:

""

Rest Equivalent in CURL:

N/A

Plugins Using	Name of the File using the commands
cloudium_example_plugin	app/controllers/cloudium_example_plugin/hosts_controller_utils.rb

Error! Unknown document property name.

5.3.8 Netmask:

Device Type	Commands
Device SPN starting with DTX1 and EMD2	/sbin/ifconfig eth0|grep 'Mask:' |awk '{print $4}'|awk -F : '{print $2}'
Other	""
Device SPN starting with EMD4	""

Others include: VCA2100 / VSA2100 / VCA2200 / VCA2100 / VSA2200 / VSA2100 / CLM2000

Device starting with **DTX1** and **EMD2**:

/sbin/ifconfig eth0|grep 'Mask:' |awk '{print $4}'|awk -F : '{print $2}'

Other devices:

""

Device Starting with **EMD4**:

""

Rest Equivalent in CURL:

N/A

Plugins Using	Name of the File using the commands
cloudium_example_plugin	app/controllers/cloudium_example_plugin/hosts_controller_utils.rb

Error! Unknown document property name.

5.3.9 Gateway:

Device Type	Commands
Device SPN starting with DTX1 and EMD2	/sbin/route -n |grep UG |awk '{print $2}'
Other	""
Device SPN starting with EMD4	""

Others include: VCA2100 / VSA2100 / VCA2200 / VCA2100 / VSA2200 / VSA2100 / CLM2000

DTX1 and EMD2:

/sbin/route -n |grep UG |awk '{print $2}'

Other devices:

""

Device Starting with **EMD4**:

""

Rest Equivalent:

N/A

Plugins Using	Name of the File using the commands
cloudium_example_plugin	app/controllers/cloudium_example_plugin/hosts_controller_utils.rb

Error! Unknown document property name.

5.3.10 Broadcast:

Device Type	Commands
Device SPN starting with DTX1 and EMD2	/sbin/ifconfig eth0|grep 'inet addr:'|awk '{print $3}'|awk -F : '{print $2}'
Other	NA
Device SPN starting with EMD4	/sbin/ifconfig eth1|grep inet |awk '{print $3}'|awk -F : '{print $2}'

Others include: VCA2100 / VSA2100 / VCA2200 / VCA2100 / VSA2200 / VSA2100 / CLM2000

DTX1 and EMD2:

/sbin/ifconfig eth0|grep 'inet addr:'|awk '{print $3}'|awk -F : '{print $2}'

Others:

N/A

EMD4:

/sbin/ifconfig eth1|grep inet |awk '{print $3}'|awk -F : '{print $2}'

Rest Equivalent:

N/A

Plugins Using	Name of the File using the commands
cloudium_example_plugin	app/controllers/cloudium_example_plugin/hosts_controller_utils.rb

Error! Unknown document property name.

5.3.11 DNS-1:

Device Type	Commands
Device SPN starting with DTX1 and EMD2	NA
Other	""
Device SPN starting with EMD4	if test -f /etc/resolv.conf; then cat /etc/resolv.conf |grep nameserver|awk 'NR<2'|awk '{print $2}'; fi

Others include: VCA2100 / VSA2100 / VCA2200 / VCA2100 / VSA2200 / VSA2100 / CLM2000

Device Starting with DTX1 and EMD2:

N/A

Other Devices:

""

EMD4:

if test -f /etc/resolv.conf; then cat /etc/resolv.conf |grep nameserver|awk 'NR<2'|awk '{print $2}'; fi

Rest Equivalent:

N/A

Plugins Using	Name of the File using the commands
cloudium_example_plugin	app/controllers/cloudium_example_plugin/hosts_controller_utils.rb

Error! Unknown document property name.

5.3.11 DNS-2:

Device Type	Commands
Device SPN starting with DTX1 and EMD2	NA
Other	""
Device SPN starting with EMD4	if test -f /etc/resolv.conf; then cat /etc/resolv.conf |grep nameserver|awk 'NR>1'|awk '{print $2}'; fi

Others include: VCA2100 / VSA2100 / VCA2200 / VCA2100 / VSA2200 / VSA2100 / CLM2000

Device Starting with DTX1 and EMD2:

N/A

Other Devices:

""

Device starting with EMD4:

if test -f /etc/resolv.conf; then cat /etc/resolv.conf |grep nameserver|awk 'NR>1'|awk '{print $2}'; fi

Rest Equivalent:

N/A

Plugins Using	Name of the File using the commands
cloudium_example_plugin	app/controllers/cloudium_example_plugin/hosts_controller_utils.rb

Error! Unknown document property name.

5.3.12 CPU, Kernel and Hostname:

Description	Commands
CPU	uname –m
Kernel	uname –r
Hostname	uname –n

For all type of device:

CPU:

uname –m

Kernel:

uname – r

Hostname:

uname –n

Rest Equivalent in CURL:

N/A

Plugins Using	Name of the File using the commands
blackbox_invisa_pc_plugin	./blackbox_invisa_pc_plugin/app/controllers /api_helpers/ssh.rb

Error! Unknown document property name.

5.3.13 Uptime and Load Average Time:

Description	Commands
Uptime	cat /proc/uptime | awk '{print $1}'
Load Average 1 min	uptime |awk -F average: '{print $2}'| awk '{print $1}' \| sed 's/.$//'
Load Average 5 min	uptime |awk -F average: '{print $2}'| awk '{print $2}' \| sed 's/.$//'
Load Average 15 min	uptime |awk -F average: '{print $2}'| awk '{print $3}'

For all type of device:

Uptime:

cat /proc/uptime | awk '{print $1}'

Load Average one minute:

uptime |awk -F average: '{print $2}'| awk '{print $1}' | sed 's/.$//'

Load Average 5 minute:

uptime |awk -F average: '{print $2}'| awk '{print $2}' | sed 's/.$//'

Load Average 15 minute:

uptime |awk -F average: '{print $2}'| awk '{print $3}'

Rest Equivalent in CURL:

curl --location --request GET 'https://10.211.129.223:8888/statistics/facts/system_facts' \

--header 'Authorization: Bearer eyJ0eXAiOiJKV1QiLCJhbGciOiJIUzUxMiJ9.eyJpYXQiOjYwOTAyNCwiaXNzIjoid3d3LmJsYWNrYm94LmNvbSIsInJlZiI6IlNFQkIxODE5OTAxMyIsInN1Yil6InJlc3RfYXBpIn0.neahC4erb1A6cp0necpSHQyf8YBmBSu64iCKuJd2uklXMzn_a0CXkNd4n7AC_3Zh_OfFvlfbmTXuhajN9ZV3dg' \

--header 'Connection: keep-alive'

Error! Unknown document property name.

Response:

```
{

  "kvm_system_facts": [

    {

      "id": 26309,

      "mac": "1c:37:bf:00:12:62",

      "total memory": 244108,

      "free memory": 677520,

      "total disk": 368.0,

      "free disk": 339.0,

      "uptime": 601795,

      "load_avg_1min": 0.029999999999999999,

      "load_avg_5min": 0.080000000000000002,

      "load_avg_15min": 0.080000000000000002,

      "capture_time": 0.0,

      "crcs": 0.0,

      "temperature": 0,

      "user_response": 510.0,

      "timestamp": 601794677

    }

  ]

}
```

Plugins Using	Name of the File using the commands
cloudium_example_plugin	app/controllers/cloudium_example_plugin/hosts_controller_utils.rb

Error! Unknown document property name.

5.4. Software Upgrade:

5.4.1 Emerald Device with SPN starting with EMD4:

Description	Command
Model Number	/usr/bin/libsystem_cli –model
Version	cat /VERSION
Compatibility	cat /COMPATIBILITY
Check Space in /tmp directory	df -h /tmp
Remove .fit files	rm /tmp/*.fit
Upload file	sshpass -p '{password}' scp -o UserKnownHostsFile=/dev/null -o StrictHostKeyChecking=no -o PubkeyAuthentication=no -o PasswordAuthentication=yes /usr/share/moy/public/uploads /{upgradeFile} root@{IP}:/tmp/
Md5sum	md5sum /tmp/{upgradeFile}
Upgrade	/usr/bin/emerald_upgrade -f /tmp/{upgradeFile}
Check Status	/bin/echo $?
Reboot	/sbin/reboot
Remove Extracted Files	rm /usr/local/status_code.log rm -rf /usr/local/{extractFileName} rm /usr/local/{upgradeFile} rm /usr/local/target_{macID}.sh rm /usr/local/*.clu rm -rf /usr/local/RELEASE_V* rm -rf /usr/local/DECODER_V*

Model:

/usr/bin/libsystem_cli –model

Software Version:

cat /VERSION

Compatibility:

cat /COMPATIBILITY

Check Space in tmp directory:

df -h /tmp

Error! Unknown document property name.

Remove any .fit files or upgrade directories:

rm /tmp/*.fit

Upload File:

sshpass -p '{password}' scp -o UserKnownHostsFile=/dev/null -o StrictHostKeyChecking=no -o PubkeyAuthentication=no -o PasswordAuthentication=yes /usr/share/moy/public/uploads /{upgradeFile} root@{IP}:/tmp/

md5emd:

md5sum /tmp/{upgradeFile}

Upgrade:

/usr/bin/emerald_upgrade -f /tmp/{upgradeFile}

Check Status:

/bin/echo $?

Reboot:

/sbin/reboot

Remove Extract File:

rm /usr/local/status_code.log

rm -rf /usr/local/{extractFileName}

rm /usr/local/{upgradeFile}

rm /usr/local/target.sh

Rest Equivalent in CURL:

N/A

Plugins Using	Name of the File using the commands
cloudium_example_plugin	app/controllers/cloudium_example_plugin/upgrades_controller_ssh.rb
cloudium_example_plugin	app/controllers/cloudium_example_plugin/hosts_controller_ssh.rb

Error! Unknown document property name.

5.4.2 Other Device Upgrades:

Description	Command
Model Number	cat /dev/mtd8 |grep model= | cut -c 7-
Version	cat /VERSION
Compatibility	cat /COMPATIBILITY |cut -c 23-
Display	libsystem_cli –display
Check Space in /tmp directory	df -h /tmp
Remove .clu files	rm /tmp/*.clu
Upload file	scp.upload!("/usr/share/moy/public/uploads/target_{macID}.sh", "/usr/local/target.sh")
Change File Permission	chmod 755 /usr/local/target.sh
Upgrade	sh /usr/local/target.sh
Check Status	/bin/echo $?
Reboot	/sbin/reboot
Remove Extracted Files	rm -rf /usr/local/{extractFileName} rm /usr/local/{upgradeFile} rm /usr/local/target.sh rm /usr/local/*.clu rm -rf /usr/local/RELEASE_V* rm -rf /usr/local/DECODER_V*

Other Devices includes: DTX1000-R / DTX1000-T / DTX1002-R / DTX1000-R / DTX1002-T / DTX1000-T / DTX1000SA-R / DTX1000SA-T / VCA2100 / VSA2100 / VCA2200 / VCA2100 / VSA2200 / VSA2100 / DTX1032-R / CLM2000 / EMD4000R / EMD4000T / EMD2000SE-R / EMD2000SE-T / EMS1G48 / EMS10G28 / EMS100G32 / EMX1-48 / EMX10-28 / EMX100-32 / EMS10G12 / EMX10-12 / EMD2002SE-R / EMD2002SE-T / EMD-TC100 / EMD-TC200 / EMD-TC300 / EMD2000PE-R / EMD2000PE-T-P / EMD2002PE-R / EMD2002PE-T-P / EMD200DV-T / EMD200EDV-T / EMD200DP-T / EMD200DP-T-N / EMD2000PE-R-P / EMD2000PE-T-P2 / EMD2002PE-R-P / EMD2002PE-T-P2 / EMD200DV-T-NXL / EMD200DP-T-NXL / EMD4000PE-DP-T / EMD2002PE-DP-T / EMD2000PE-DP-T / EMD2002SE-DP-T

Rest Equivalent in CURL:

N/A

Plugins Using	Name of the File using the commands
cloudium_example_plugin	app/controllers/cloudium_example_plugin/upgrades_controller_ssh.rb
cloudium_example_plugin	app/controllers/cloudium_example_plugin/hosts_controller_ssh.rb

Error! Unknown document property name.

5.5 Manage Device:

Description	Command
File Upload	scp.upload!("/mnt/perm/CloudDataA.xml", "/usr/local/gui_files")
File Upload	scp.upload!("/mnt/perm/checksumA", "/usr/local/gui_files")
File Upload	scp.upload!("/mnt/perm/CloudDataB.xml", "/usr/local/gui_files")
File Upload	scp.upload!("/mnt/perm/checksumB", "/usr/local/gui_files")
Kill Cloud GUI	/usr/bin/killall cloudgui

Upload XML file from Boxilla system to Device:

scp.upload!("/mnt/perm/CloudDataA.xml", "/usr/local/gui_files")

scp.upload!("/mnt/perm/checksumA", "/usr/local/gui_files")

scp.upload!("/mnt/perm/CloudDataB.xml", "/usr/local/gui_files")

scp.upload!("/mnt/perm/checksumB", "/usr/local/gui_files")

Kill Cloud GUI Command:

/usr/bin/killall cloudgui

Rest equivalent in CURL:

N/A

Plugins Using	Name of the File using the commands
cloudium_example_plugin	./cloudium_example_plugin/hosts_controller_smartproxy.rb

Error! Unknown document property name.

5.6 Edit Network Settings:

5.6.1 Emerald 4k Devices (EMD4000R and EMD4000T):

Description	Command
IP	/sbin/ifconfig eth0|grep inet |awk '{print $2}'|awk -F : '{print $2}'
Netmask	/sbin/ifconfig eth0|grep inet |awk '{print $4}'|awk -F : '{print $2}'
Broadcast	/sbin/ifconfig eth0|grep inet |awk '{print $3}'|awk -F : '{print $2}'
Configure interface file	echo "auto lo" > /usr/local/interfaces echo "iface lo inet loopback" >> /usr/local/interfaces echo "" >> /usr/local/interfaces

Fetch IP:

/sbin/ifconfig eth0|grep inet |awk '{print $2}'|awk -F : '{print $2}'

Fetch Netmask:

/sbin/ifconfig eth0|grep inet |awk '{print $4}'|awk -F : '{print $2}'

Fetch Broadcast:

/sbin/ifconfig eth0|grep inet |awk '{print $3}'|awk -F : '{print $2}'

Configure interface:

echo "auto lo" > /usr/local/interfaces

echo "iface lo inet loopback" >> /usr/local/interfaces

echo "" >> /usr/local/interfaces

Rest Equivalent in CURL:

N/A

Plugins Using	Name of the File using the commands
cloudium_example_plugin	./cloudium_example_plugin/hosts_controller_smartproxy.rb

Error! Unknown document property name.

5.6.2 Emerald (EMD4000R and EMD4000T) IP Configuration Update:

echo "auto eth0" >> /usr/local/interfaces

echo "iface eth0 inet static" >> /usr/local/interfaces

echo "\taddress {eth0_ip}" >> /usr/local/interfaces

echo "\tnetmask {eth0_netmask}" >> /usr/local/interfaces

echo "\tbroadcast {eth0_broadcast}" >> /usr/local/interfaces

echo "" >> /usr/local/interfaces

echo "auto eth1" >> /usr/local/interfaces

echo "iface eth1 inet static" >> /usr/local/interfaces

echo "\taddress {IP}" >> /usr/local/interfaces

echo "\tnetmask {NETMASK}" >> /usr/local/interfaces

echo "\tbroadcast {BROADCAST}" >> /usr/local/interfaces

echo "\tgateway {GATEWAY}" >> /usr/local/interfaces

echo "nameserver {DNS1}" > /usr/local/resolv.conf

echo "nameserver {DNS2}" >> /usr/local/resolv.conf

Multicast IP

libsystem_cli --db --set multicast-ip –value "MULTICAST_IP "

libsystem_cli --db --set master-port –value "MULTICAST_PORT"

Rest Equivalent in CURL:

N/A

Plugins Using	Name of the File using the commands
cloudium_example_plugin	./cloudium_example_plugin/hosts_controller_smartproxy.rb

Error! Unknown document property name.

5.6.3 Devices other than (EMD4000R and EMD4000T) IP Configuration Update:

echo "auto eth0" >> /usr/local/interfaces

echo "iface eth0 inet static" >> /usr/local/interfaces

echo "\taddress {IP}" >> /usr/local/interfaces

echo "\tnetmask {NETMASK}" >> /usr/local/interfaces

echo "\tbroadcast {BROADCAST}" >> /usr/local/interfaces

echo "\tgateway {GATEWAY}" >> /usr/local/interfaces

echo "nameserver {DNS1}" > /usr/local/resolv.conf

echo "nameserver {DNS2}" >> /usr/local/resolv.conf

Flush Command:

/opt/cloudium/flush_eth0.sh >/dev/null 2>&1 &

Rest Equivalent in CURL:

N/A

Plugins Using	Name of the File using the commands
cloudium_example_plugin	./cloudium_example_plugin/hosts_controller_smartproxy.rb

Error! Unknown document property name.

6 Missing REST Attributes and Endpoints

6.1 Available and Missing in below two GET Endpoint:

6.1.1 Version API

curl --location --request GET 'https://10.211.129.223:8888/version' \

--header 'Authorization: Bearer eyJ0eXAiOiJKV1QiLCJhbGciOiJIUzUxMiJ9.eyJpYXQiOjYwOTAyNCwiaXNzIjoid3d3LmJsYWNrYm94LmN vbSIsInJlZiI6IlNFQkIxOEE5OTAxMyIsInN1YiI6InJlc3RfYXBpIn0.neahC4erb1A6cp0necpSHQyf8YBmBSu6 4iCKuJd2uklXMzn_a0CXkNd4n7AC_3Zh_OfFvlfbmTXuhajN9ZV3dg' \

--header 'Connection: keep-alive'

Response:

```
{

   "api_version": "1.0.9",

   "software_version": "V6.3.10_r9988",

   "manufacturing_partnumber": "300-061-001",

   "serial_number": "SEBB18A99013",

   "product_type": "Transmitter",

   "product_brand": "Black Box",

   "product_configuration": "Dual Head",

   "ethernet_speed": 1000

}
```

Error! Unknown document property name.

6.1.2 System Facts API:

curl --location --request GET 'https://10.211.129.223:8888/statistics/facts/system_facts' \

--header 'Authorization: Bearer
eyJ0eXAiOiJKV1QiLCJhbGciOiJIUzUxMiJ9.eyJpYXQiOjYwOTAyNCwiaXNzIjoid3d3LmJsYWNrYm94LmN
vbSIsInJlZiI6IlNFQkIxxOEE5OTAxMyIsInN1Yil6InJlc3RfYXBpIn0.neahC4erb1A6cp0necpSHQyf8YBmBSu6
4iCKuJd2uklXMzn_a0CXkNd4n7AC_3Zh_OfFvlfbmTXuhajN9ZV3dg' \

--header 'Connection: keep-alive'

Response:

{

    "kvm_system_facts": [

        {

            "id": 26309,

            "mac": "1c:37:bf:00:12:62",

            "total memory": 244108,

            "free memory": 677520,

            "total disk": 368.0,

            "free disk": 339.0,

            "uptime": 601795,

            "load_avg_1min": 0.029999999999999999,

            "load_avg_5min": 0.080000000000000002,

            "load_avg_15min": 0.080000000000000002,

            "capture_time": 0.0,

            "crcs": 0.0,

            "temperature": 0,

            "user_response": 510.0,

            "timestamp": 601794677

        }

    ]

}

Error! Unknown document property name.

6.1.3 Attributes that are missing

Available	Missing
Model Number	IP Address
Serial Number	Netmask
Total Memory	Gateway
Free Memory	Broadcast IP
Total Disk	DNS-1
Free Disk	DNS-2
Mac ID	Compatibility
	Disk space availability in /tmp directory for uploading .fit or .clu file for upgrade
	Multicast IP and Multicast PORT
	CPU / Kernel / Hostname

6.2 Missing End Points:

1. Endpoint to restore the Transmitter or Receiver. Execute the restore shell script on the device when Boxilla performs an Unmanage operation and return success or failure status.

Currently Boxilla creates a new ssh connection and runs the shell script on behalf of device.

2. Endpoint to clear out all the previous image files (.clu or .fit) to avoid possible failure with no space available error. Boxilla can call the REST API and check if available space is there in the device and then can start uploading the upgrade file to the device.

3. Endpoint to upload the **.clu** or **.fit** file to the appliance. Which then gets stored into **/tmp** directory at the appliance side, to accommodate the current flow followed in the Boxilla.

4. Endpoint to get the md5sum of the uploaded file. Boxilla validates the file is correctly uploaded to the appliance by generating md5sum on the device machine itself and compare it the md5sum on the file local to that of Boxilla and compares it to be valid.

5. Endpoint to run the Upgrade process on the new uploaded file.

6. Endpoint to check if the upgrade has started.

7. Endpoint to remove/clean the uploaded file once the upgrade process is completed.