



HITS Axis - ETV Solutions for Programmers Operational Guidelines

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Section 1. HITS Axis EBIF Provider Profile

General Overview

In preparation for deployment of ETV applications the HITS Axis team will need information about an EBIF application provider. The questions within this Provider Profile will help facilitate the launch of your services. Please answer them thoroughly and if you have further questions, there will be a technical call to make sure you get those questions answered.

The CMC completes this section

ETV Provider: _____

Hits Axis Account Manager: _____

HITS Axis Account Manager's Phone Number: _____

HITS Axis Account Manager's Email: _____

System Contacts

<u>ETV PID Provider Contact Information:</u>	
ETV Provider Name:	_____
Street address:	_____ _____
Country:	_____

System Contact Information

Type of Contact	Contact Name	Telephone	Cell Phone	E-Mail Address
Main Contact				
Additional				
Emergency				

ETV Application Feed Information

1. How many enhanced linear feeds do you want the CMC to carry?
Include all enhanced instance (Examples: SD & HD, East & West)
2. Are you using the same ETV application in each linear feed or do you have unique ETV applications in each linear feed?
3. List the type of ETV applications with which you are enhancing your linear feeds
(Examples: TCommerce, RFI, Vote/Poll, etc)
4. How have your ETV applications been developed (In-house or through a 3rd party developer)?
5. What is the average bandwidth that each instance of your application/s uses?
6. What EBIF specification version is/are your application/s compliant with?
(Examples: I04, I05, or I06)

7. What development environment was used to create your ETV application/s?
 (Examples: TVWorks XDK, Ensequence SDK, etc)

- Can you provide the version of the development environment?
 (Example: TVWorks XDK version 3.4)

8. What EBIF user agents have you validated your application/s to work with?

- TVWorks MAC-G on Motorola _____
- 4th Wall Media Passport UA on Motorola _____
- TVWorks MAC-A UA on Motorola _____
- 4th Wall Media UA for Cisco/SA _____
- Time Warner Cable UA on Cisco/SA _____
- Zodiac UA on Cisco/SA _____
- Verizon UA on Motorola _____

9. Please provide the following values for the EISS signaling of your application/s:
 (If you do not know all of these values please provide what you can)

- Test Flag Value _____
- Priority _____
- Authority or URI _____
- Version Major & Minor _____
- OrganizationID _____
- ApplicationID _____

10. How do you want the CMC to receive your feed/s?

Satellite Downlink at the CMC _____

Fiber cross-connect _____

Other

(Please complete the section below that correlates to the choice you made above)

SATELLITE DOWNLINK

- Name of feed: _____
- Name of satellite: _____
- Transponder ID: _____
- Polarity: _____
- Modulation: _____
- Symbol Rate: _____
- Code Rate: _____
- Program Number: _____
- Video Bitrate: _____
- Audio Bitrate: _____
- Video Resolution: _____
- PMT PID: _____
- Video PID: _____
- Audio PID: _____
- Data Carousel PID: _____
- EISS Signaling PID: _____

FIBER CROSS CONNECT

- Cross connect location: _____
- Destination IP: _____
- Port: _____
- Source IP: _____
- Program Number: _____
- Video Bitrate: _____
- Audio Bitrate: _____
- Video Resolution: _____
- PMT PID: _____
- Video PID: _____
- Audio PID: _____
- Data Carousel PID: _____
- EISS Signaling PID: _____

OTHER

- Please provide information below detailing the method you would like the CMC to use in receiving your feed/s:

Section 2. Application Test Specifications

General Overview

In preparation for deployment of eTV applications the HITS AxIS Test Lab will perform the tests outlined below (as applicable) for the programmers ETV application and provide a written report of findings. Applications which do not meet HITS AxIS specifications can be reworked by the programmers re-submitted for testing but will be subject to a testing fee.

Test Suite : App Developer Entrance Criteria

Test Case CMC_-12947: Application Memory Limits - DCT 2000 Family

Summary:

Verify the application does not exceed the 100k limitation on stb memory usage. This is due to a DCT 2000 limitation. Check that updating of data assets does not break application during update.

Note: Application developer will provide this information upon entry to test phase.

Steps:

1. Allow or trigger AUT to load on STB.
2. Press remote combination to see applications in memory.
3. Validate the application does not exceed 90k from this screen.

Expected Results:

The sum of these files should not exceed 100k.

Test Case CMC_-12949: Remote Key Usage ParametersSummary:

It is recommended by the CMC to use the keys on a basic remote in this fashion.

Steps:

Key	Rule	Comments
CHANNEL +/-	Application terminates immediately, channel changes	These keys will have no effect from within a VOD session.
Key 0-9	Numbers display in the OSD and LED as they would on any other channel. The AUT application will suspend when the numbers are displayed.	These keys will have no effect from within a VOD session.
OK	Selects the item on the page that currently has focus	
< Arrow	Navigates Left	
> Arrow	Navigates Right	
^ Arrow	Navigates Up	
v Arrow	Navigates Down	
Page ^	Not active	
Page v	Not active	
A	No effect	
B	No effect	
C	No effect	
MENU	Application suspends and the Guide Quick Menu displays. (A second MENU keypress displays the Guide Main Menu.	This key will have no effect from within a VOD session.
LAST	Application terminates immediately, channel changes to the previous channel.	This key will have no effect from within a VOD session.
GUIDE	Application suspends and the Guide displays.	This key will have no effect from within a VOD session.
EXIT	The application will terminate.	
INFO	Shows Application Name and Version	
FAVORITE	Application suspends and the Favorites interface displays.	This key will have no effect from within a VOD session.
HELP	No effect.	
LOCK	No effect.	
MUSIC	No effect.	
STOP		This key will have no effect from non-VOD pages.
PAUSE	Consumed by the active VOD page to pause VOD.	This key will have no effect from non-VOD pages.
PLAY	Consumed by the active VOD page to play VOD.	This key will have no effect from non-VOD pages.
REW	Consumed by the active VOD page to rewind VOD.	This key will have no effect from non-VOD pages.
FWD	Consumed by the active VOD page to fast forward VOD.	This key will have no effect from non-VOD pages.
RECORD	On non-VOD pages MAC will be suspended by default. On	

	VOD pages there is no effect. No effect on Guide banner.	
VOLUME +/-	Volume change occurs, volume UI is not displayed	
MUTE	Volume toggled on/off, mute UI is not displayed	

Test Case CMC_-12951: Organization ID Compliance

Summary:

Organization ID - Information on this can be found here: http://www.dvbservices.com/fee_structure/

Steps:

1. Allow or trigger AUT to load on STB.
2. Press remote combination to see applications in memory.
3. Validate the application has the Organization ID that was specified at handoff from the developer.

Expected Results:

Organization ID matches correct Organization ID for the particular app vendor.

Test Case CMC_-12953: Authority Compliance

Summary:

Authority - example of this is ib.cmc.comcast.com

Steps:

1. Allow or trigger AUT to load on STB.
2. Press remote combination to see applications in memory.
3. Validate the application has the Authority that was specified at handoff from the developer.

Expected Results:

Authority matches correct Authority for the particular app vendor.

Test Case CMC_-12955: QA Documentation ChecklistSummary:

In addition to the application itself, the app developer is responsible for creating the following software development artifacts. These will ensure a smooth transition of knowledge from the application developer to others who must understand the application. If an application developer does not have all the artifacts required to enter the CMC HITS AxIS lab, they must work to acquire them in a timely manner. These are the artifacts that ideally should be delivered:

Product Description Document which details the inputs and outputs, 2-way calls with respective byte counts, required URLs (if any), architectural diagrams and application design information.

Requirements, Test plan and written test procedures, including instructions for connecting to test servers, ports they use and any IPs the application uses for functionality.

Reports from running the tests and a current list of bugs

Installation instructions

Coverage analysis of the tests run by the application developer

Organization ID - Information on this can be found here: http://www.dvbservices.com/fee_structure/

Absolute path (carousel path) for the binary. This can be found in the meta file for the .pr. This would only apply to bound applications. This is needed for carousel configuration. The application will display on the screen quicker when all of this is correct and matches what's in the code.

Authority - example of this is ib.cmc.comcast.com. This is needed for carousel configuration. The application will display on the screen quicker when all of this is correct and matches what's in the code.

Test Case CMC_-12957: Adequate Method for Displaying Application VersionSummary:

When the application is active and the, the guide will display information about the application such as application version (1.3) with either a keypress such as INFO or a menu navigation.

Test Case CMC_-12959: Application terminates on channel change action.Summary:

It is believed that the majority of applications should terminate when the channel is changed whether bound or unbound. There will be minimal applications where this is not the case. The purpose of this test case is to verify the handle of the onChannelChange event should terminate the application. An example of the action in the code is:

```
<page style="style-transparent" onchannelchange="terminate()">
```

This test case is designed to find this behavior as well as any subroutines of this behavior.

Test Case CMC_-12961: 2-Way Connectivity loss handlingSummary:

Appropriate error reporting must exist for all applications and application servers. Fatal errors at the settop application level should be reported to the settop user. There should be a mechanism for application servers to report all errors, whether they are Fatal or Warning level errors.

This test case is designed to find this behavior.

Test Case CMC_-12963: The EXIT remote key terminates the appSummary:

The default behavior of the EXIT remote key is to move the application to the *suspended* state. A service selection is required before the application can become eligible to be moved to a *running* state. Thus, upon pressing the EXIT key, the application can only be moved, based on eligibility, back to a *running* state, if the user tunes away from the ETV channel, then tunes back, and receives an AUTOSTART or PRESENT signal.

To override the default behavior of the EXIT remote key, the author may define a <keypress> to process the EXIT key in the application. One potential use of this may be to call the suspend() action on EXIT keypress, and set timers or use triggers at various points in the program to call the resume() action to move the application, based on eligibility, to a *running* state.

There are some examples such as Caller ID and iRibbon where suspend is more appropriate. CMC believes that over 90% of eTV applications would need to call the terminate() action. This test case is designed to find this behavior.

Steps:

Validate all page resources call terminate() action for an EXIT keypress.

Expected Results:

Test Case CMC_-12967: STB Model Platform Name handlingSummary:

It is important to load appropriate applications and graphics on specific settop models. This test case is designed to find this behavior. A sample way to handle this is below:

```
<sub name="Init">
  <action value="..." />

  <if><test lhs="#client.hardware.model" rhs="2000" expr="eq" />
    <!-- actions specific to dct2000 -->
  </if>

  <if><test lhs="#client.software.profile" rhs="0" expr="eq" />
    <!-- actions specific to non-advanced STBs -->
  </if> <else>
    <!-- actions specific to ASTBs -->
  </else>

  <!-- ... -->
</sub>
```

Pressing EXIT will terminate the application.

Test Case CMC_-12969: Specific Remote buttons should get used rarely.Summary:

A, B, and C buttons are a good example. This test case is designed to find this behavior.

Test Case CMC_-12971: Enhanced_VOD_Entrance_CriteriaSummary:

The MAX Reference Guide states the following:

As the last action in the set of actions called by a Keypress event, it is suggested to always set #client.event-property.stop-propagation to either a zero (0) or non-zero value.

- If it is desired for the Keypress defined for a Container to be passed up to its parent for evaluation, you must set #client.event-property.stop-propagation to a zero (0) value to ensure it gets propagated up to its parent...
- If it is desired for the Keypress defined for a Container to be processed only by that Container and not propagated up to its parent to be evaluated afterwards, you must set #client.event-property.stop-propagation to a non-zero value. An example of this would be if a Container is processing the arrow directional keys and you want to execute an action, but do not want the Page to also perform its default navigation event in that direction after this set of actions has occurred.

While this has always been a recommended authoring practice, MAC 3.4 enforces this more strictly than previous versions of the User Agent did. One result we've seen in several applications is that if <keypress> elements are defined for the KEY_LEFT, KEY_RIGHT, KEY_UP, and KEY_DOWN directional arrow keys, and propagation is not explicitly stopped, the keys might inappropriately invoke the DVR behavior (rewind, ffwd, play, pause) on MAC 3.4.1 in situations where they did not on MAC 3.1.2. This is because MAC-G 3.1.2 had a bug in that it consumed these keys even when stop-propagation was not explicitly set.

Solution: Make sure to consume the arrow keys if that is your intention, for example:

```
<keypress keycode="KEY_UP" action="set(#client.event-property.default-canceled, 1);call(doCustomKeyUpActions);
```

```
set(#client.event-property.stop-propagation, 1);"/>
```

Test Case CMC_-12973: VOD_Telescope_Application_Entrance_CriteriaSummary:

There are different ways to handle VOD sessions. This test case is designed to validate those ways are done successfully.

selectservice(vod://tvworks.com/12345?i=1)

If the name/value pair 'i=1' is appended to the vod-locator as a query string parameter, then the bound application performing the service selection will remain running over the VOD asset (as opposed to the default behavior of suspending with selectservice(vod://tvworks.com/12345)). Upon ending the VOD session, the app will remain running until there is a loss of signaling for more than 4 seconds.

selectservice(vod://tvworks.com/12345?i=2)

If the name/value pair 'i=2' is appended to the vod-locator as a query string parameter, then the bound application performing the service selection will remain running over the VOD asset (as opposed to the default behavior selectservice of suspending selectservice(vod://tvworks.com/12345)). Upon ending the VOD session, the app will immediately suspend. If signaling exists, the application will resume as expected. This is supported in MAC 3.1.2 and later.

Test Case CMC_-12975: DVR Functionality Entrance CriteriaSummary:

Applications should perform a certain way while interacting with a DVR session. Currently there is not a use case for an application to be active in a DVR session. Until there is a use case, applications should not run in time-shifted, DVR, or VOD Startover mode.

Test Case CMC_-12977: Client Reference to Name instead of IP for Two-way PostsSummary:

When an application makes a two-way request via HTTP, the proxy device in the headend, called the two-way conduit, is responsible for routing that communication to the webserver back again to the settop box. Because of numerous variables which could cause communication to be lost if the hardcoded IP is not accessible, it is important to use a name instead of IP. This way, the name can be mapped in the /etc/hosts file on the two-way conduit to any backend IP for web related communication, logging, etc. Some application developers choose to use an FQDN for this name and some don't. Either way works, however, if a non FQDN is used, the name chosen will also have to be added to the backend /etc/hosts file to match what's coming from the two-way conduit.

An example of this is for the CMC iMenu application, "imenu_srv" is used. Here is the /etc/hosts entry:

```
#iMenu Data Feeds
10.10.10.10 imenu_srv
```

Test Case CMC_-12979: App Flow and ProgressionSummary:

Where necessary, text or other visual indicators should be used to indicate to end-users how to progress and retreat through the application UI.

When a user action is expected to transmit information to an external server, the user should be given visual confirmation when the transmission is complete. (For example, an RFI application would display a "thank you" message after a request is submitted.)

When application functionality requires that the user be in one of several discrete states (such as user logged in/logged out), the user should be given visual cues indicating the current application state.

Test Case CMC_-13094: Stop Propagation on Certain Remote Key PressesSummary:

In the 3.1.2 user agent, it is "recommended" to stop propagation on the certain keys but not enforced. In the 3.4.1 user agent, it is enforced, so if you don't stop propagation, the guide will get confused and try to use the arrow keys for time shift actions in addition to MAC-G reacting to the clicks. Below is a snippet of code.

```
<keypress keycode="KEY_EXIT"
action="set(#client.event-property.default-canceled,
1);set(#client.event-property.stop-propagation, 1); call(DoSomething)"/>
```

Section 3. MSO System Requirements

The MSOs for which the programmer requests delivery of its ETV applications by HITS AxIS must meet the following minimum requirements:

- Motorola Head-End
- Rovi guide-version is A25 or above (as applicable)
- MAC-G EBIF User Agent
- Existing 2-way conduit infrastructure
- Active VOD system (as applicable)
- Data PID capable mux

Systems outside the above requirements can be considered on an individual case basis.

Section 4. ETV Application Support

General Overview

The following outlines operational management monitoring and support processes for the programmer's ETV application as applicable.

1. AxIS Monitoring:

The AxIS IVIS (ITV control room) is responsible for 24x7x365 monitoring of programmer EBIF applications at the STB or customer-experience level. This level of monitoring will be achieved by the following process and event frequency:

1.1. Presence Monitoring:

The programmer feed will be displayed on the MID (Multi-Image Display) at the front of the room 24x7x365 at the STB level from the CMC in-house cable plant "C", channel XX on a 2500 or DCT 6200 series Motorola STB. Application presence will be monitored continually throughout the day as the operator scans the MID. Any variances or outages will be reported and documented in the daily shift report.

1.2. Level Monitoring Test:

Once per hour, IVIS staff will be responsible for calling up the programmer application on the full page monitor station, on a 2500 or DCT 6200 series Motorola STB, presence of the interactive button, navigate through the application. Any variances or outages will be reported and documented in the daily shift report.

1.3. Full end-to-end Enhanced Test:

1.3.1. Issue Isolation

In the event that there is a potential national issue with the programmer application/service, IVIS control will call up a 2500 or DCT 6200 series Motorola set top box view of the enhanced programmer signal MUXed on the CMC plant and on edge remote monitoring CPE stationed at the receiving MSO as applicable. By comparing the two feeds and the presence of the application, IVIS can promptly pinpoint the issue as either a programmer application issue or a CMC distribution issue. This information will be critical in the ability to troubleshoot / resolve issues efficiently.

1.3.2. National Outage Escalations

IVIS control room will utilize the CMC OMC team to escalate any nationally impacting issues with the application to the programmer. Prior to escalating to the programmer, the CMC IVIS control room staff will have validated the following information:

- 1.3.2.1. The application in question does not function on more than one STB in IVIS
- 1.3.2.2. Other ETV applications do function in IVIS
- 1.3.2.3. VOD interactivity is functioning in IVIS (as applicable)

- 1.3.2.4. The application does not function on edge remote monitoring CPE residing in another MSO

In the event that the IVIS team recognizes that the programmer originated feed is experiencing interactive issues or a loss of inactivity entirely, the CMC will work with the programmer in the following manner:

Programmer's on-call technical support staff will support the application on a 7x24x365 basis.

Primary Contact	Telephone	E-Mail
Secondary Contact	Telephone	E-Mail

2. **CMC Network Operations Responsibilities**

The CMC Network Operations team is responsible for the following equipment required for transport of data through the CMC:

- Virtual IP(s) (VIP)s, where required
- IP Switches
- General network connectivity
- Network Routers

These portions of the architecture are managed by the following:

2.1. SNMP Management System – Managing uptime on all network devices, and servers. Application gives a quick visual reference look at the network for any devices having issues. It also alerts when a device drops by sending all the Network Engineers an email including the On-Call Engineer which gets an alert via cell phone.

2.2. Syslog management – Application that collects syslogs from all network devices. This system catches smaller problems that may not be seen in the SNMP management System. This application is good at catching logs from devices that are starting to see problems either with interfaces or operating systems sending out appropriate alerts.

3. CMC Encoder Operations Responsibilities

The CMC Encoder Operations team is responsible for the following equipment required for the receipt and distribution of the enhanced programmer Data PID:

- 3.1. Inbound MUX (if required)
- 3.2. Outbound MUX

These portions of the architecture are managed under the standard CMC transmission equipment protocols.

4. CMC SST / Production Support Responsibilities

The CMC System SST / Production Support teams are responsible for managing Tier 1 and 2 application layer support for the following, if CMC data origination is required:

- 1. CMC Carousel based applications (as required)
- 2. CMC Carousel Vendor applications (as required)

The CMC SST / Production support team supports, maintains and monitors any additional application layer functionality if determined by the specific application system engineers. This requirement is met through HP Openview, receiving necessary alerts and status communications. Additionally SST / Production Support will manage any required Tier 3 escalations to the programmer.

5. CMC System Administration Responsibilities

The CMC Systems Administration team is responsible for the hardware and OS monitoring of the following equipment required for the service (as required).

- 1. Application Carousel interface servers
- 2. Application Carousel servers

The hardware and OC portions of the above devices are managed with CMC standard HP Openview and Hobbit server profiles related to server health system performance.

Section 5. Reporting

HITS AxIS will provide the following reporting information to programmers on a periodic basis as defined:

1. HITS AxIS Reporting
 - 1.1. Frequency
 - 1.1.1. Monthly
 - 1.1.2. Exceptions on an occurrence basis

2. Reporting Elements
 - 2.1. Signaling data PID value
 - 2.2. Bitrate of signaling data PID
 - 2.3. Application matched expected content

 - 2.4. Exceptions Report
 - 2.4.1. PID values do not match expected values
 - 2.4.2. eTV data PIDs exceed bandwidth threshold
 - 2.4.3. eTV data PIDs fall below bandwidth threshold during media time window
 - 2.4.4. eTV application instance is not found in data stream at scheduled start time
 - 2.4.5. eTV application instance is not detected in data stream within defined window of time
 - 2.4.6. eTV application instance is detected in data stream when it was not expected based on schedule data