

**Arris (C-COR)
Switched Digital Video (SDV) Training
SDV System Architecture**

Introductions

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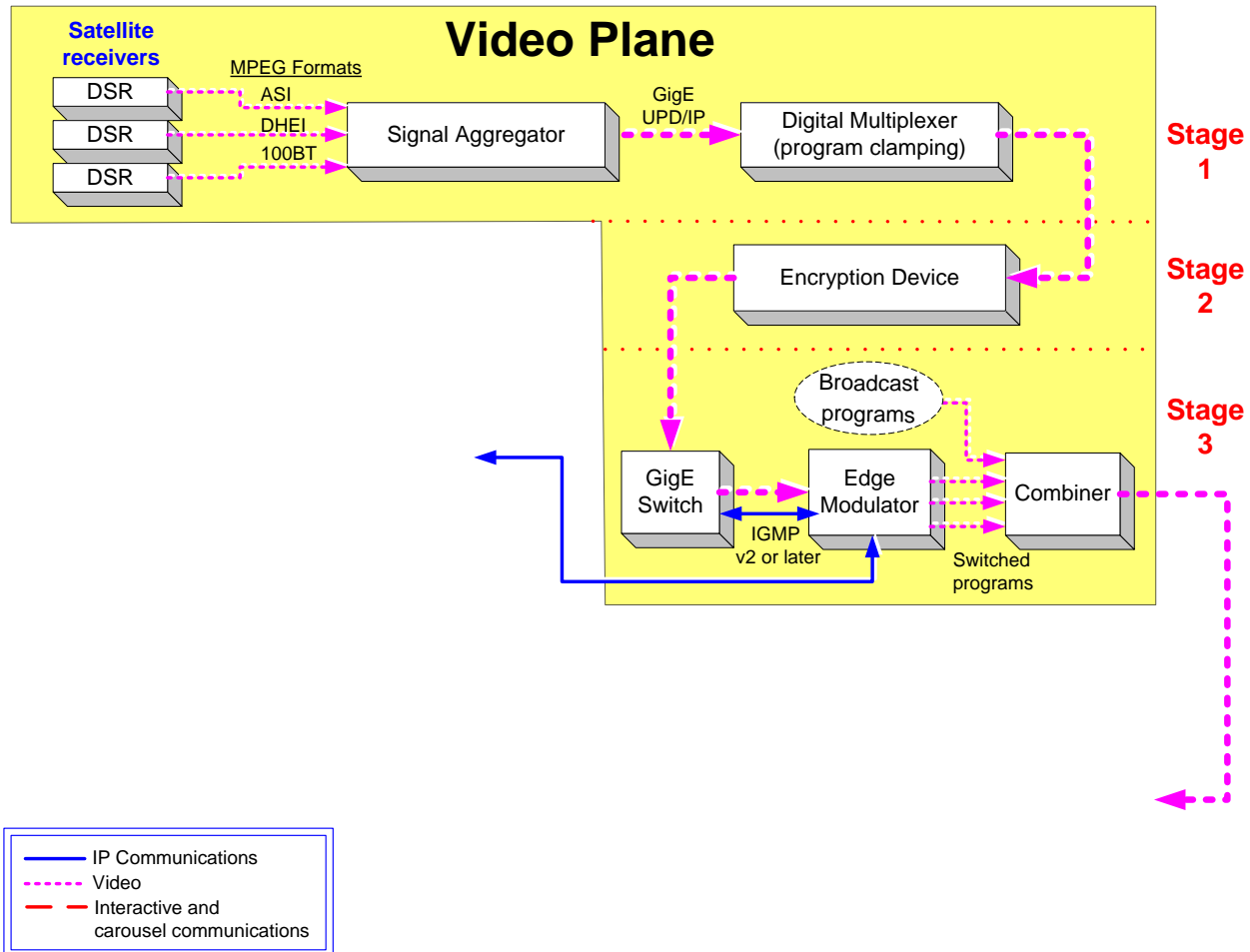
Course Contents:

- **General System Architecture**
 - Basic SDV Architecture
 - Failover Configuration
- **Communication Protocols**
 - MCP
 - CCP
 - Mechanics of Communication
- **Event Flows**

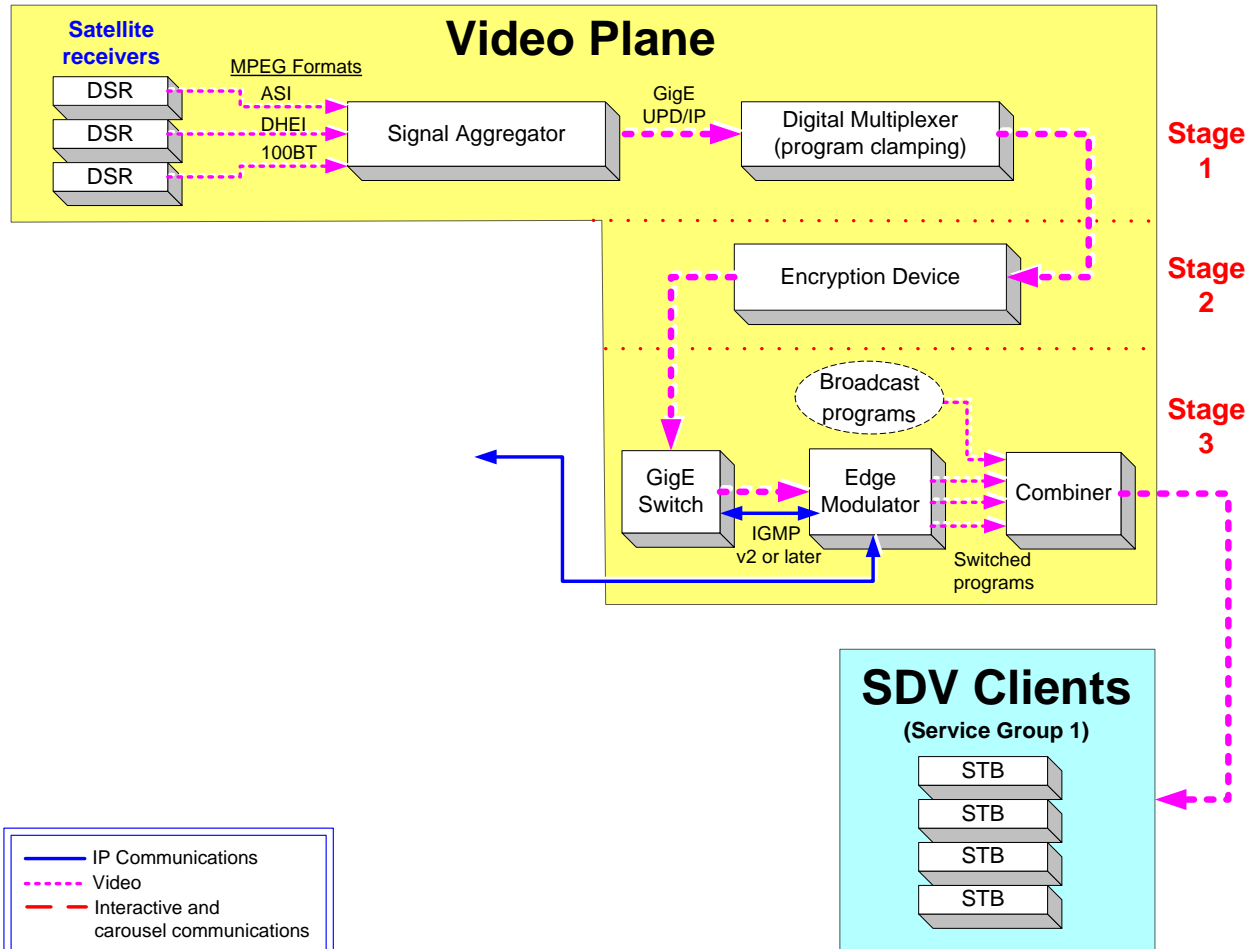
Motorola STB Requirements

- **EPG A25.x** (version number of the STB)
- Requires an IP address (Interactive)
- Must be a 'responder' (two-way IP communication with **SM**)
- Must be assigned a **channel map** with **mini-car service** defined
 - **Mini-car** is the **carousel** and is sent by the Session Manger
 - The '**Mini-car**' reference is hard-coded into the IPG

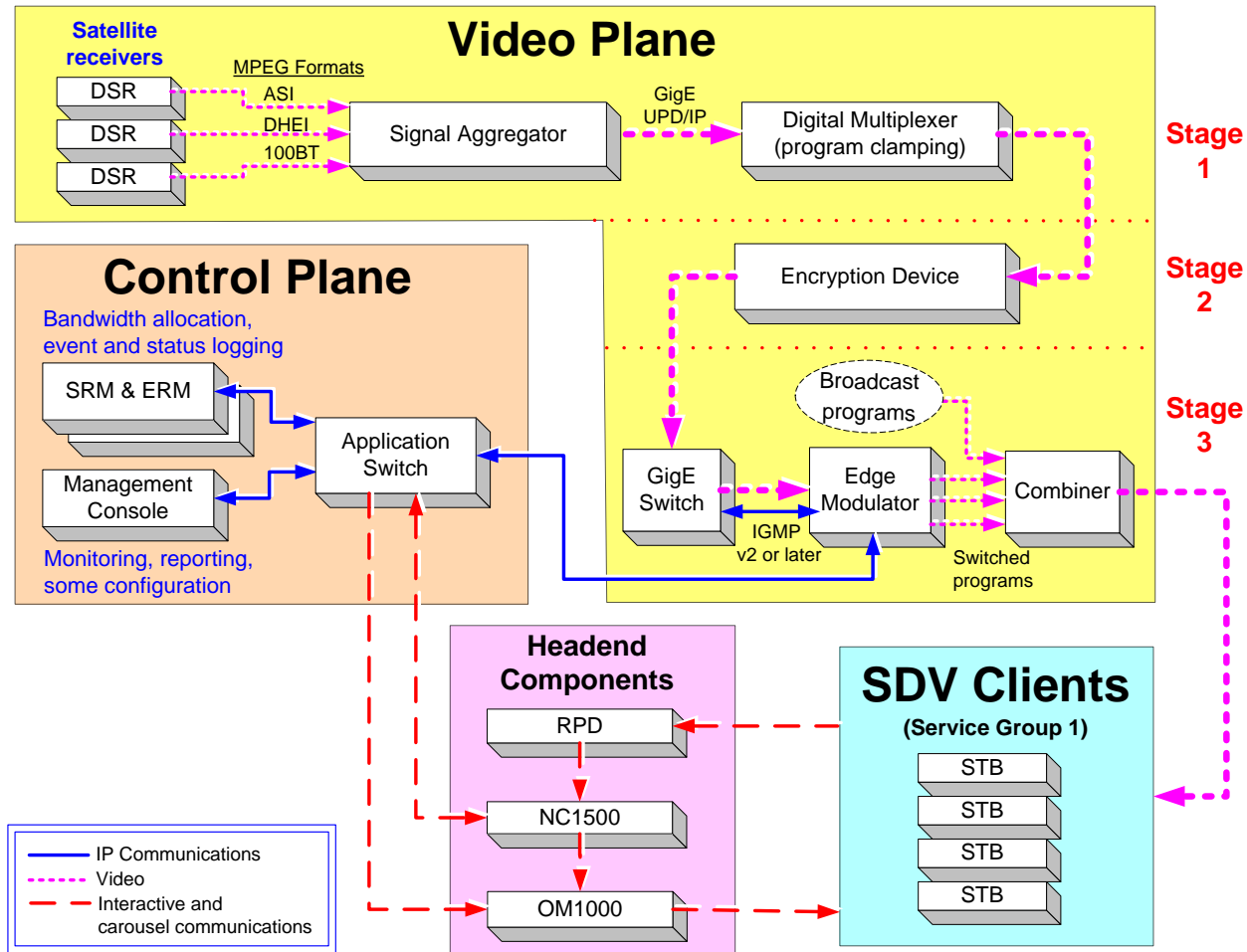
Detailed SDV System Architecture



Detailed SDV System Architecture



Detailed SDV System Architecture



Acronyms Explained

- NGOD: Comcast speak for Next Generation On Demand
- ERM: Edge Resource Manager
- SDV-SM: Session Manager
- MC: Management Console
- RPD: Reverse Path Demod
- OM: Forward Path Modulator
- NC1500: Network Gateway between Applications Net and Headend Net
- SEM: Smartstream Edge Mod (Motorola encryption)
- TSID: Transport Stream ID

NGOD SDV Protocols

Protocol:	Specifies Communication Between:
S6 (Session Management) (NGOD)	Session Manager and Edge Resource Manager
D6 (Discovery) (NGOD)	<ul style="list-style-type: none"> • Edge Resource Manager and Edge Modulator • Edge Modulator and Session Manager
R6 (Resource Management—RTSP protocol) (NGOD)	Edge Resource Manager and Edge Modulator
N (Logging/SNMP) (NGOD)	nABLE Management Console and external logging application
MCP (Mini-Carousel Protocol) (NGOD)	Between SM and SDV clients
CCP (Channel Change Protocol) (NGOD)	Between SM and SDV clients

How SDV and Broadcast Switch Channels

Broadcast

Source Name	Virtual Channel Number (VCN)	Source ID	Frequency (EIA No.)	Program Number
Slapstick	54	542	131	18
History	73	9276	131	58
WTU	58	10673	119	182
A&E	19	389	118	5

SDV

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- In SDV environments EIA frequencies are allocated to channels **dynamically** and thus the 'Slapstick' channel may be streamed to service group 1 over one EIA and at another time a different EIA
- Broadcast environments assign **static** frequencies and program numbers

Creating/Configuring Mini-car Background Service

Start

- 1 On each OM1000 to be used, open port no. **8857**



OM 1000

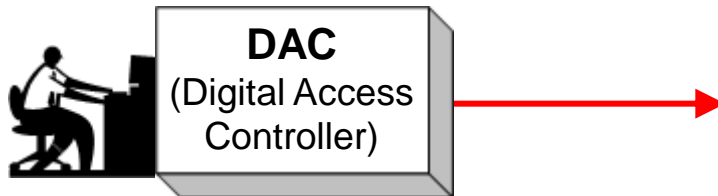
(Forward Path Out-Of-Band Modulator)

Input socket:

10.10.10.1:8857

Creating/Configuring Mini-car Background Service

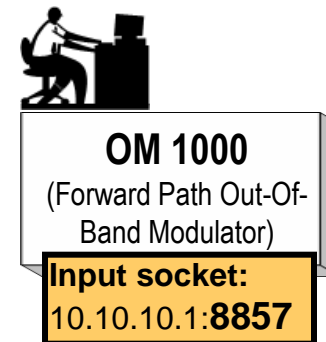
- 2 Create a background service named "mini_car".



- 3 Assign "mini_car" service to each OM1000 to be used. This generates a Program ID (PID) for each OM1000.

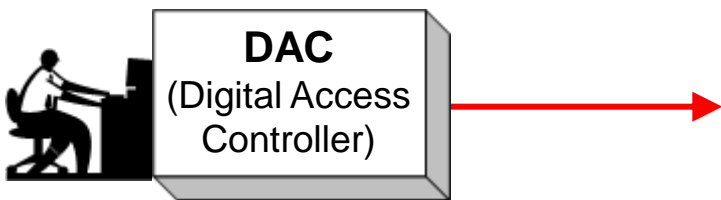
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Creating/Configuring Mini-car Background Service

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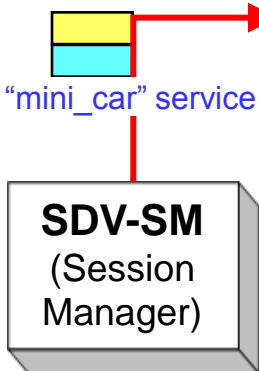


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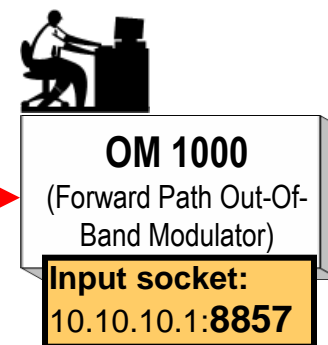
4 On MC, configure SDV-SM to stream mini-carousel to OM1000's. For each OM1000 to be used, specify:

- IP address of the OM1000 input.
- Input port no. 8857
- PID generated in step 3.
- TTL value of "1".



Start

1 On each OM1000 to be used, open port no. 8857



5 Mini-carousel streams to each OM1000 for which SDV-SM was configured in step 4.

Creating/Configuring Mini-car Background Service

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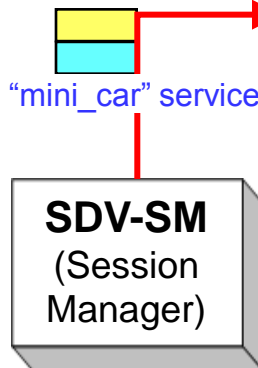


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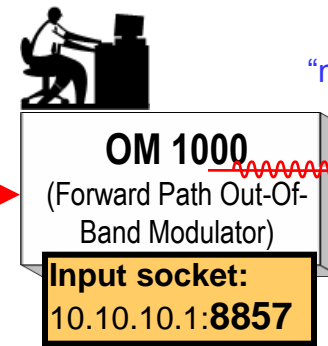
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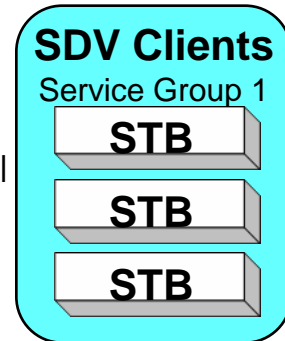


5 Mini-carousel streams to each OM1000 for which SDV-SM was configured in step 4.

SDV Client is pre-programmed to look for a service named "mini_car".

"mini_car" service

6 Mini-carousel streams to service group(s)



End

SDV Error Conditions

- The **Right** thing happens
- The **Wrong** thing happens
- The **Right** thing that **looks like the Wrong** thing

SDV Error Codes

Tera Term

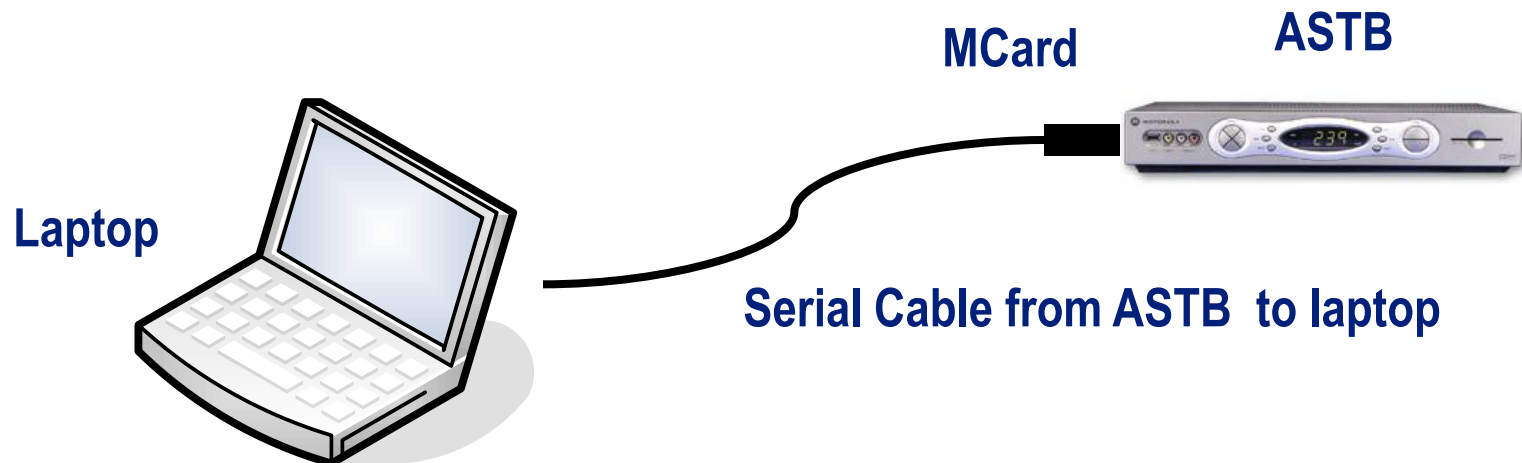
- Open source software terminal emulator
- Emulates multiple types of terminals
- Supports telnet, SSH 1 & 2, and serial port connections
- Built in scripting language

A25.2.x

- The latest generation of iGuide
- Contains embedded SDV Client Software
- Serial port debug supported on ASTB only

ASTB (only) Set-up

- Select **Menu** and Go to **Setup**
- Select **Cable Box** and Select **Configuration**
- Press **FAV** key **seven** times
- This brings you to a table, arrow down to last row, **SDB**, right arrow to **All** and hit **Select**. This turns on debug output via the serial port.



STB Events

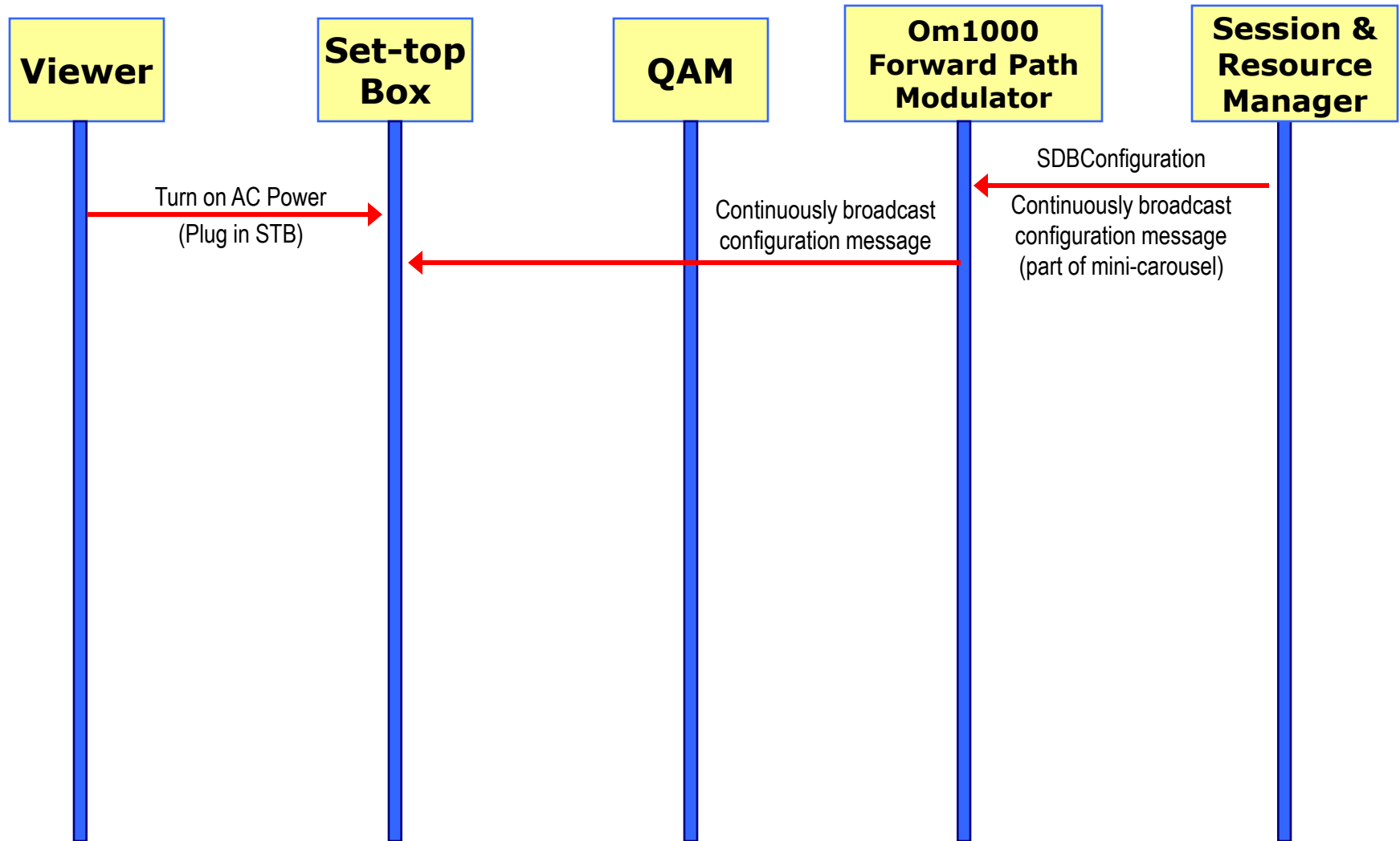
- **Auto Discovery** (Determines the service group and region to which subscriber belongs)
- **Channel Change** requests for both broadcast and switched video programming
- **Mini-car** carries “**active map**” message so **SDV client** can determine if switched program exists in service group or not
- **Forced tune** events occur when service group is out of bandwidth
- **Forced tune** events occur when client inactivity exceeds limits
- ALL user activity is monitored and reported

NOTE: “Forced tune” is not an EAS event (“force tune”)

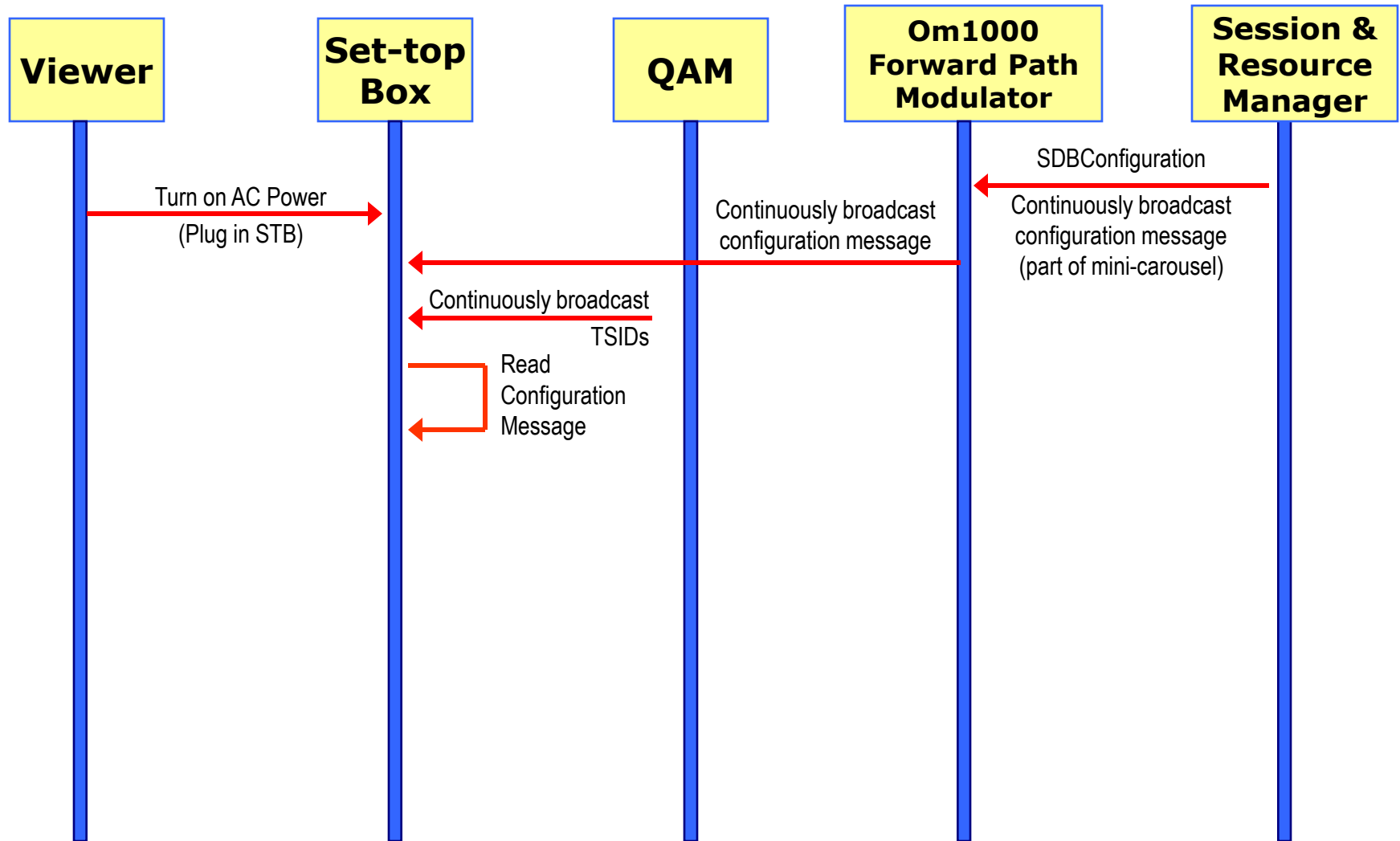
Auto Discovery

Animated Flow Diagram

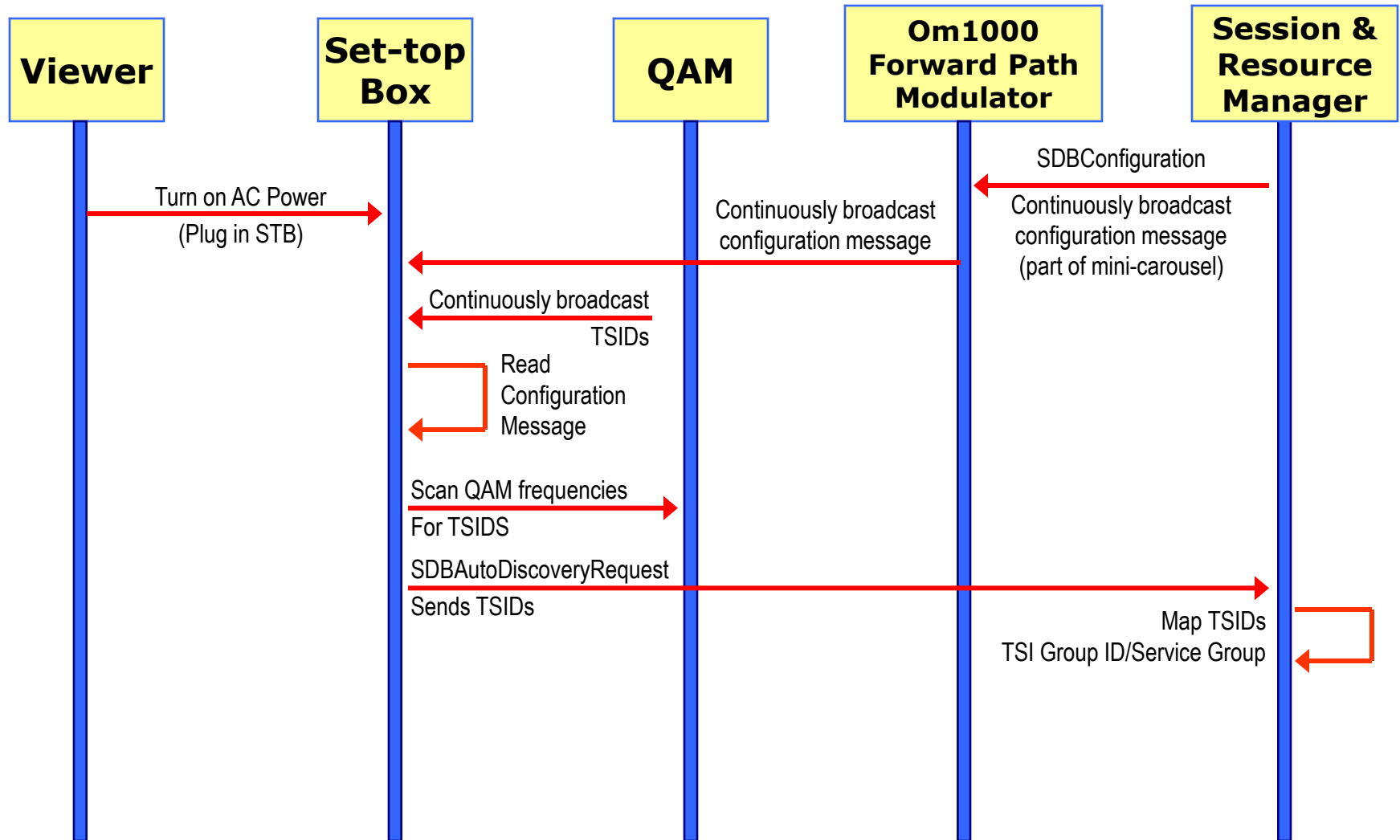
Auto Discovery



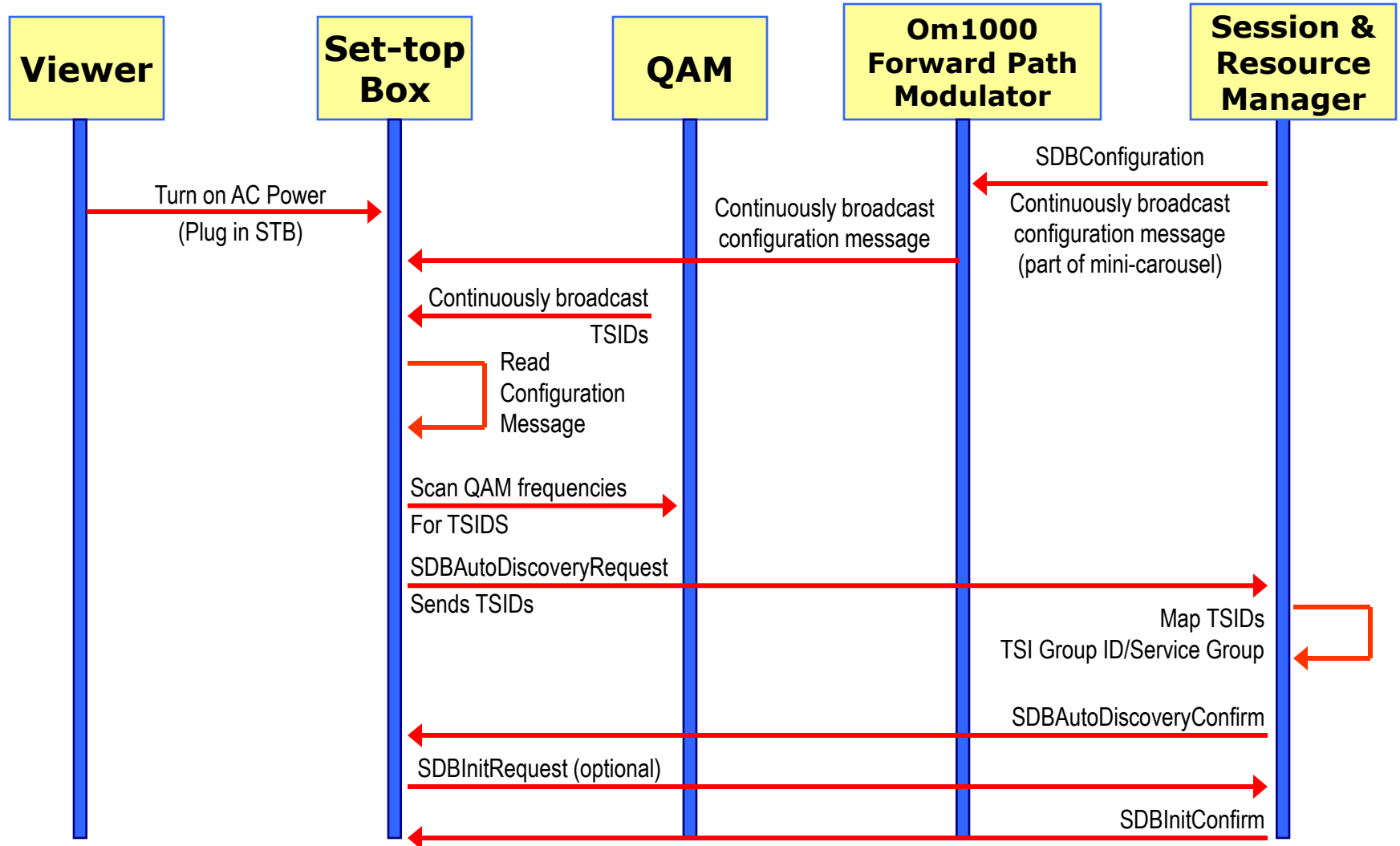
Auto Discovery



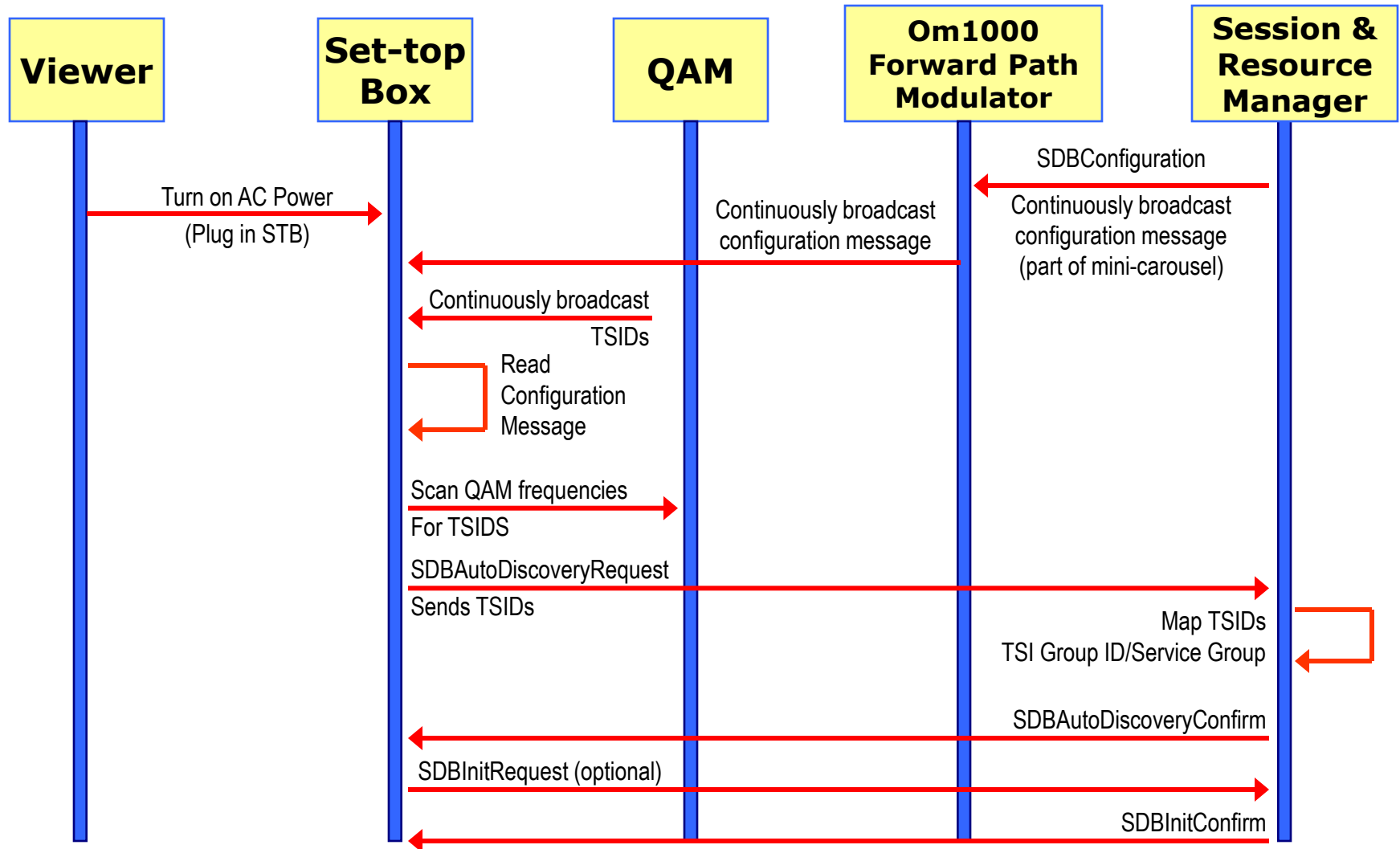
Auto Discovery



Auto Discovery



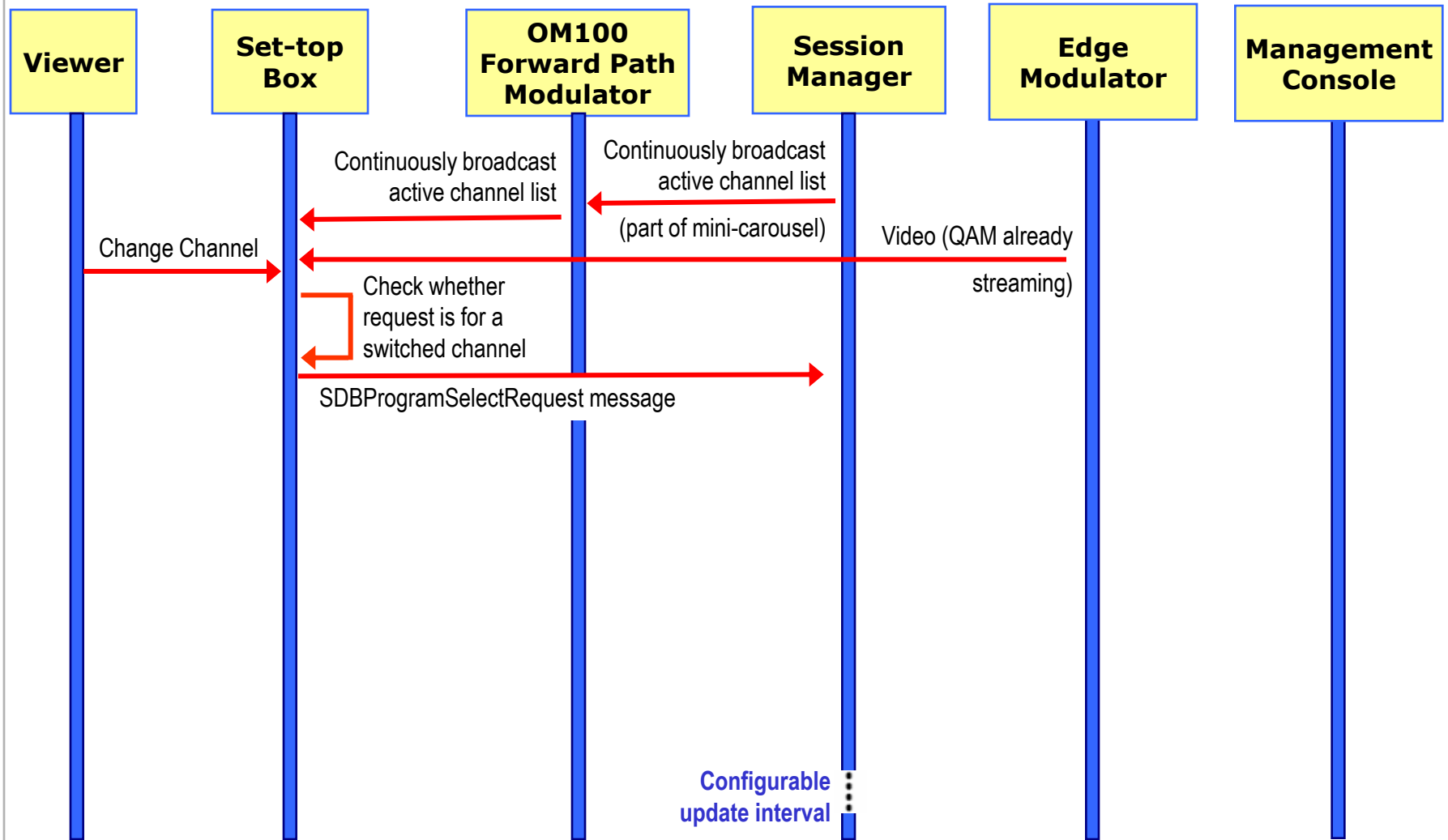
Auto Discovery



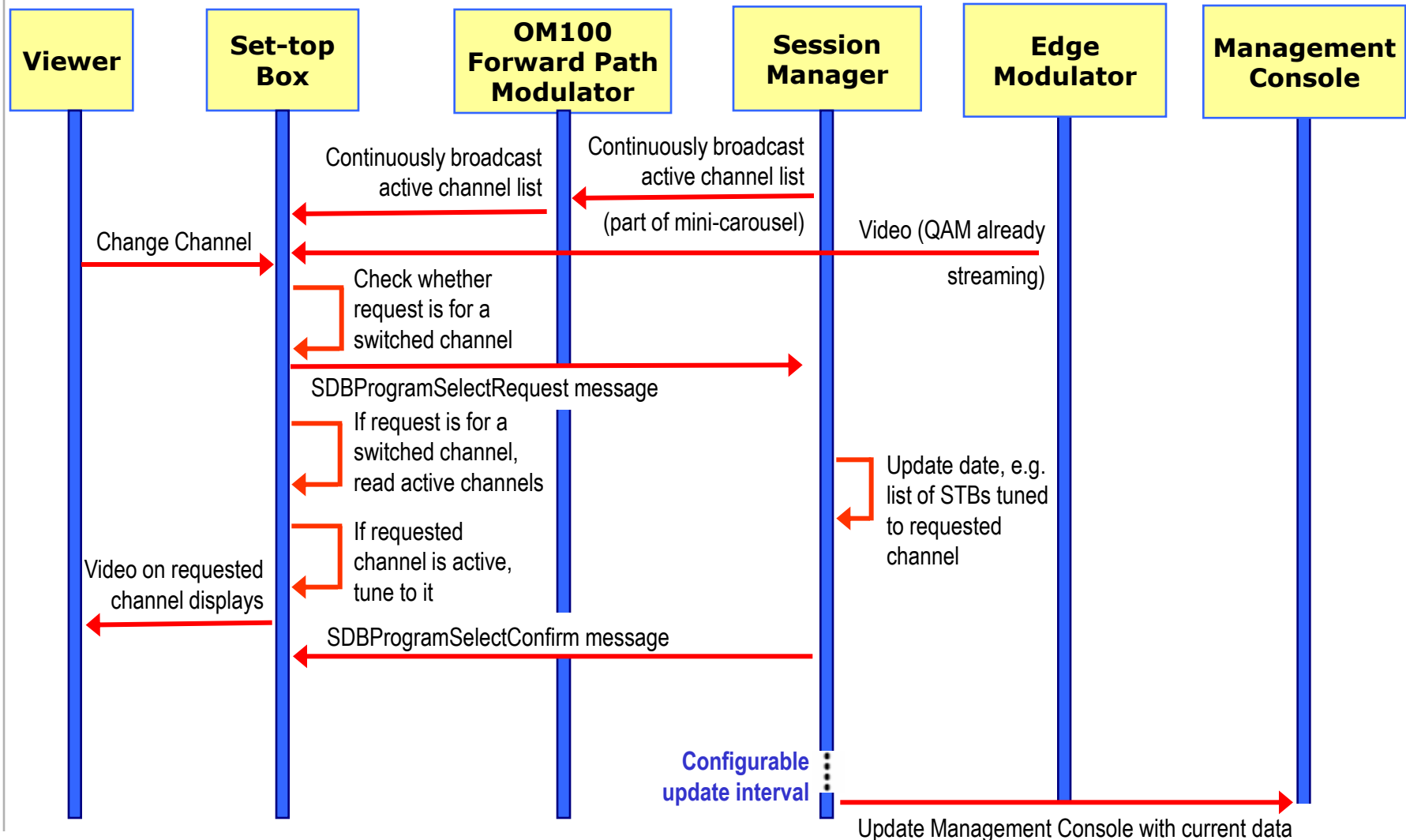
Channel Change with *Active* Channel in Carousel

Animated Flow Diagram

Channel Change with Active Channel in Carousel



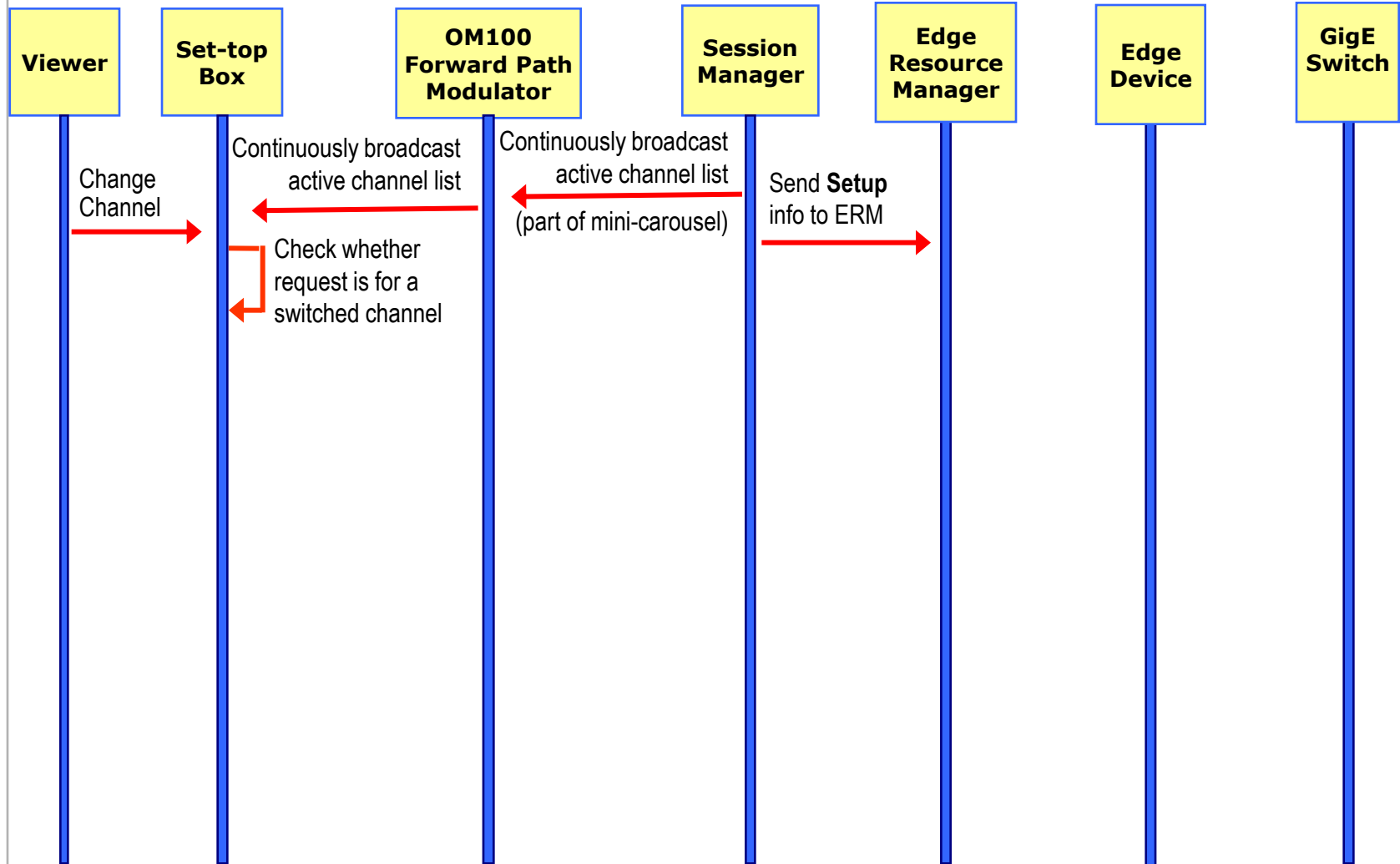
Channel Change with Active Channel in Carousel



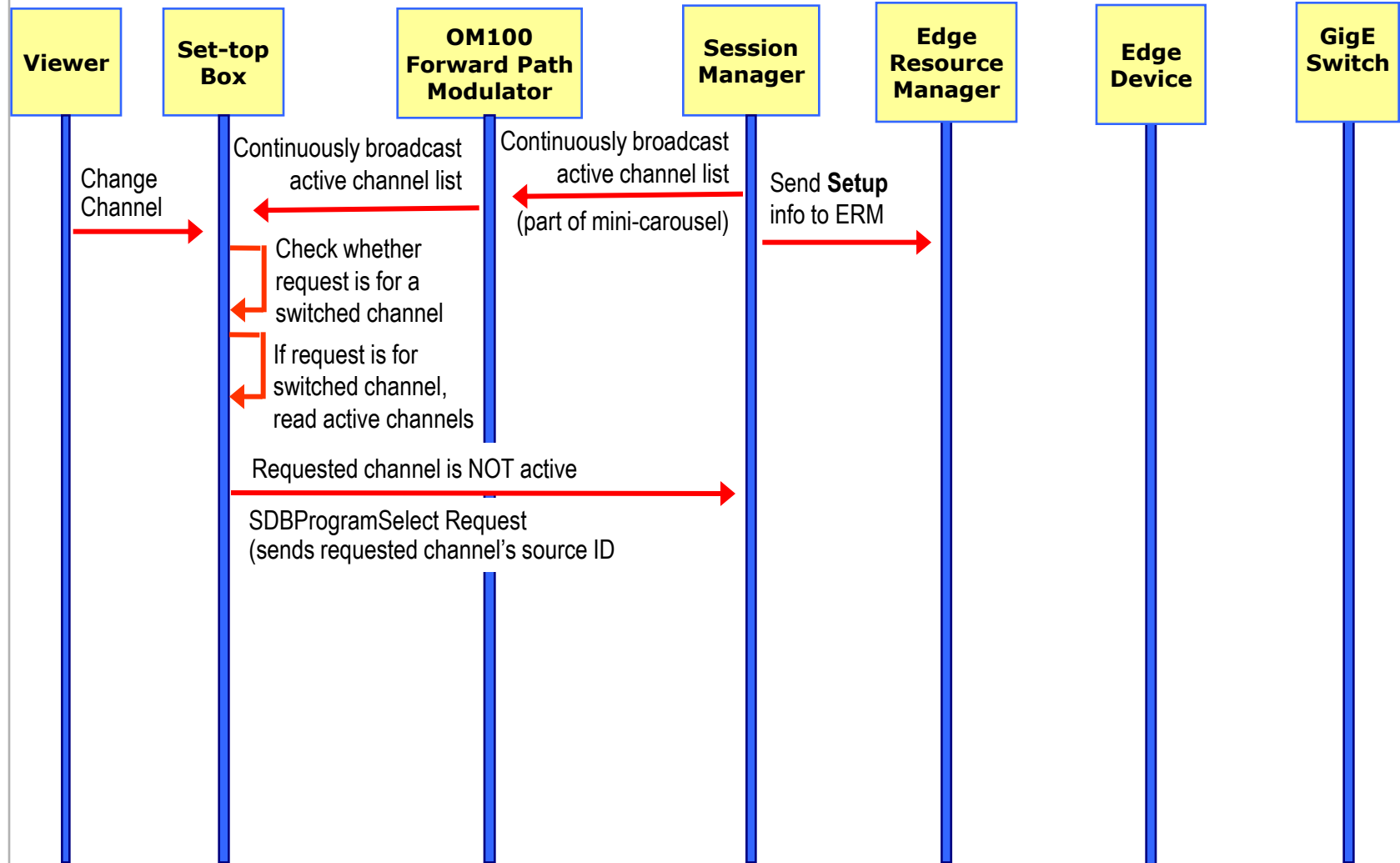
Channel Change with *Non-Active* Channel in Carousel

Animated Flow Diagram

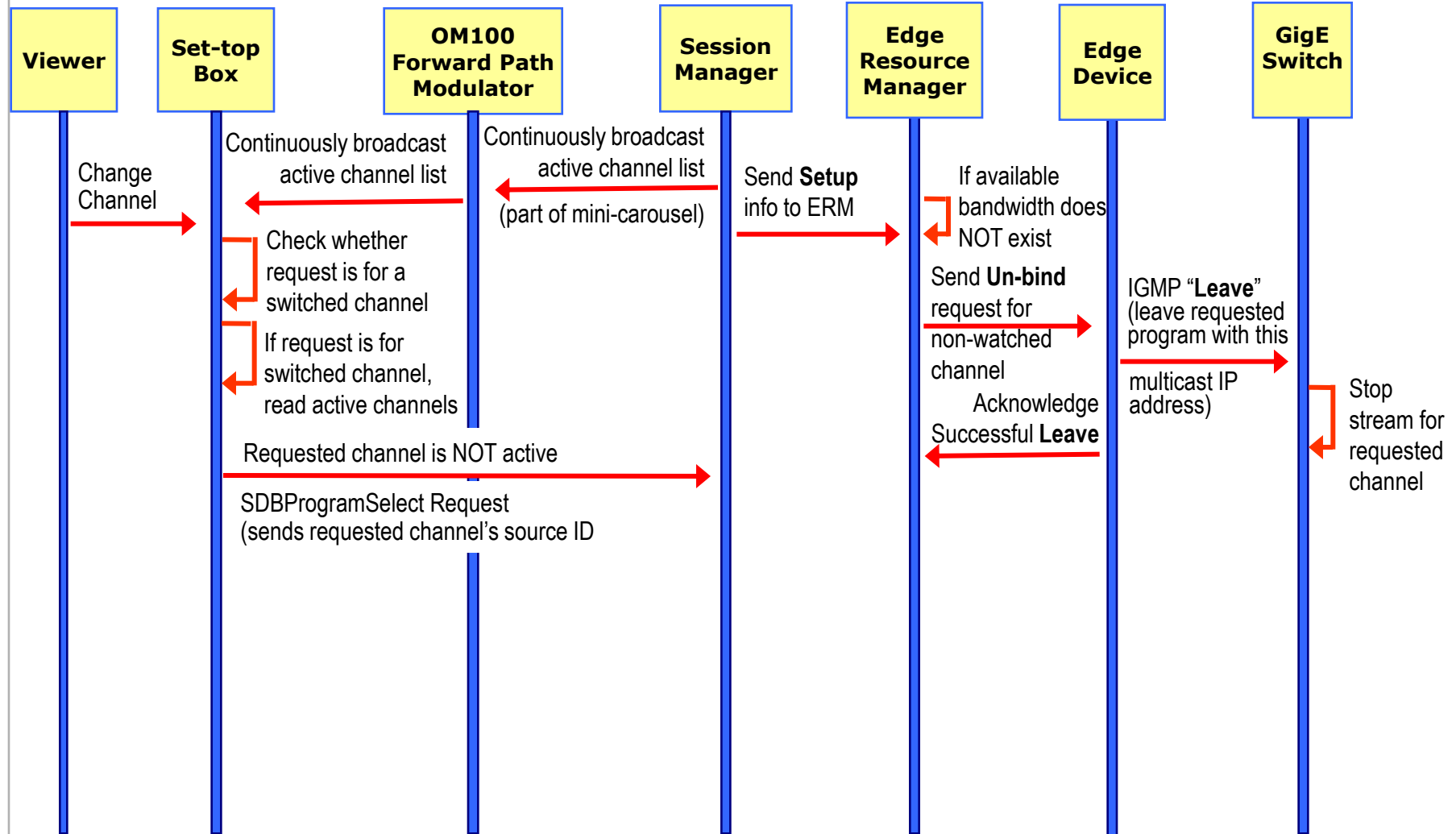
Channel Change with Non-Active Channel in Carousel



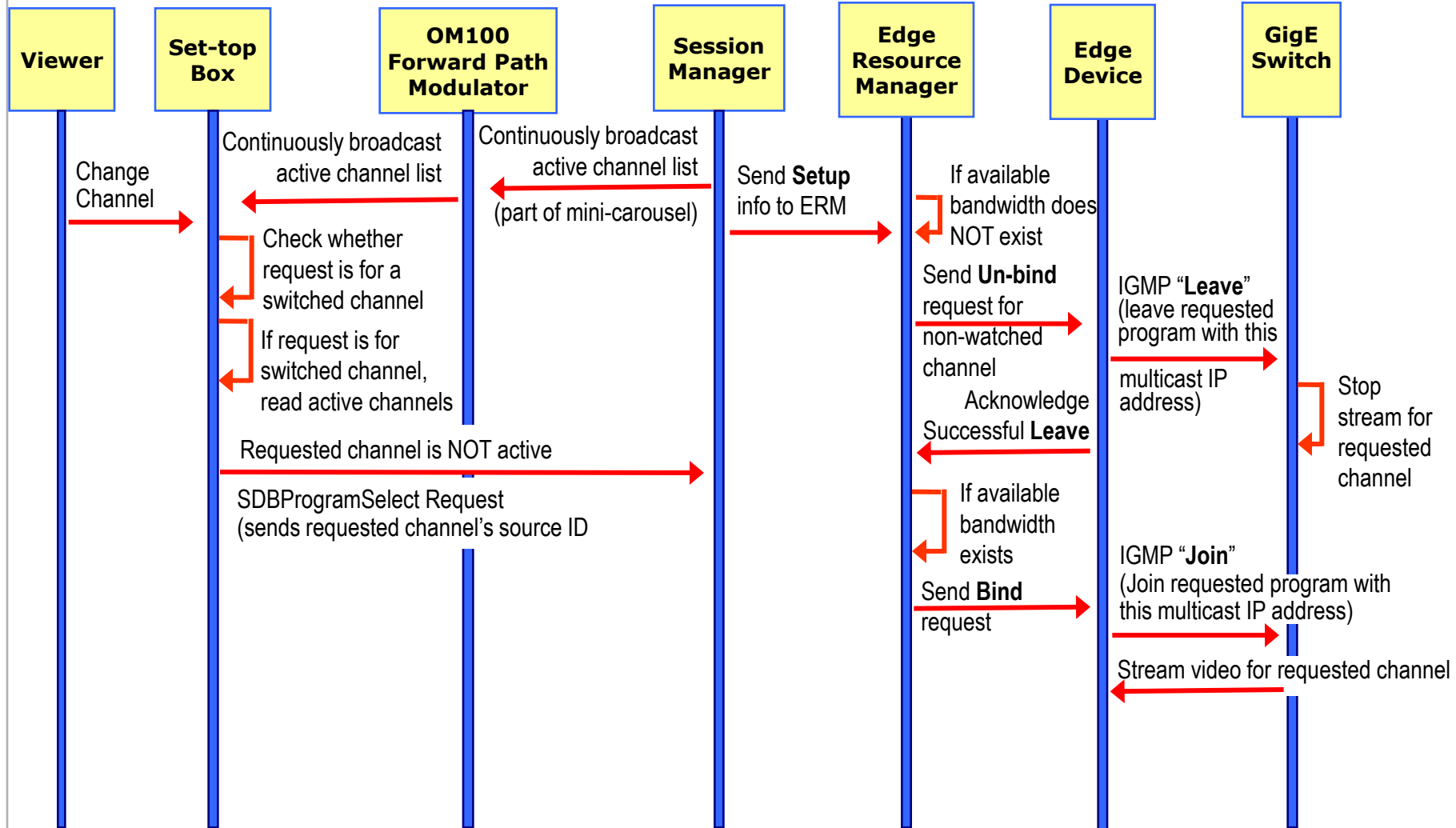
Channel Change with Non-Active Channel in Carousel



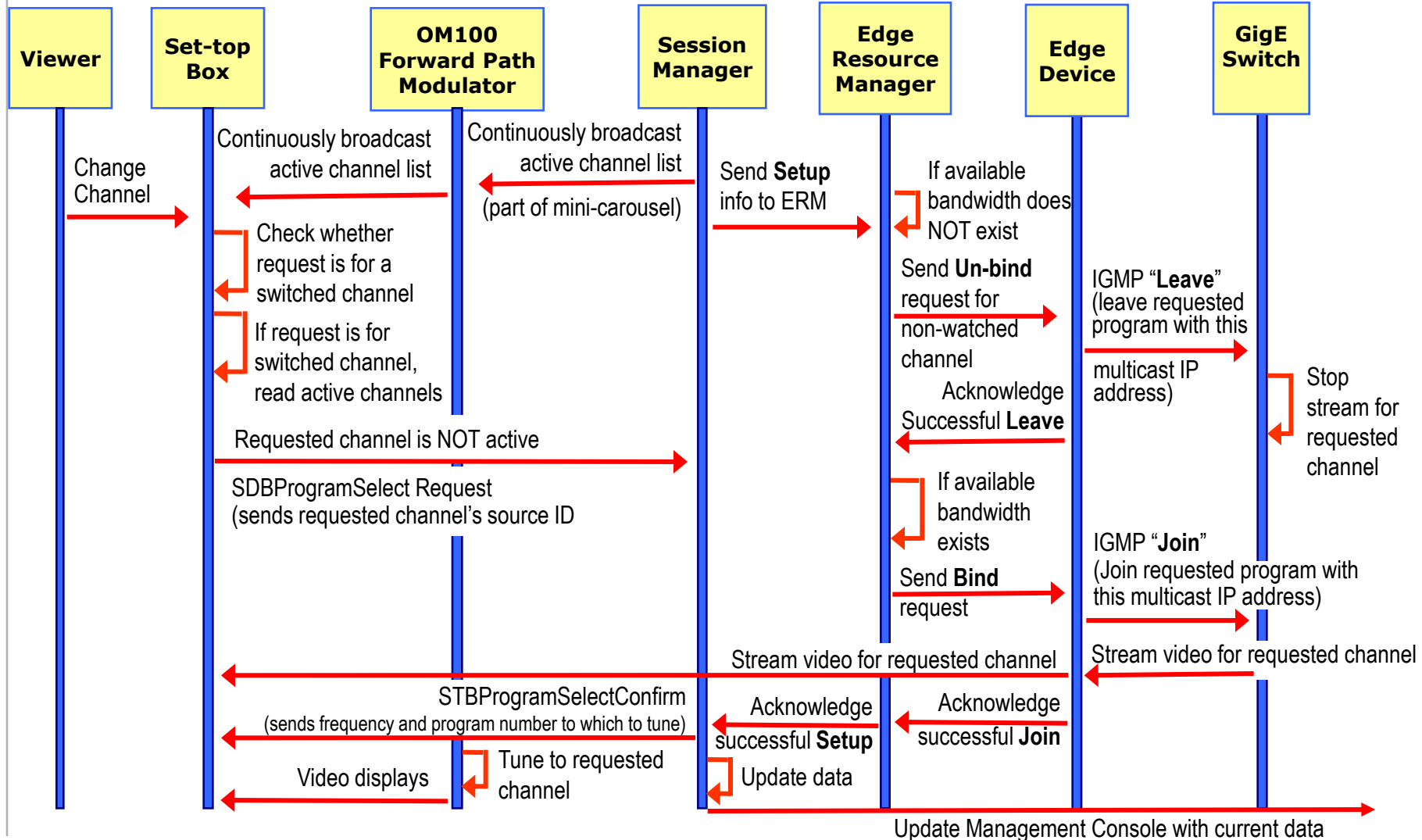
Channel Change with Non-Active Channel in Carousel



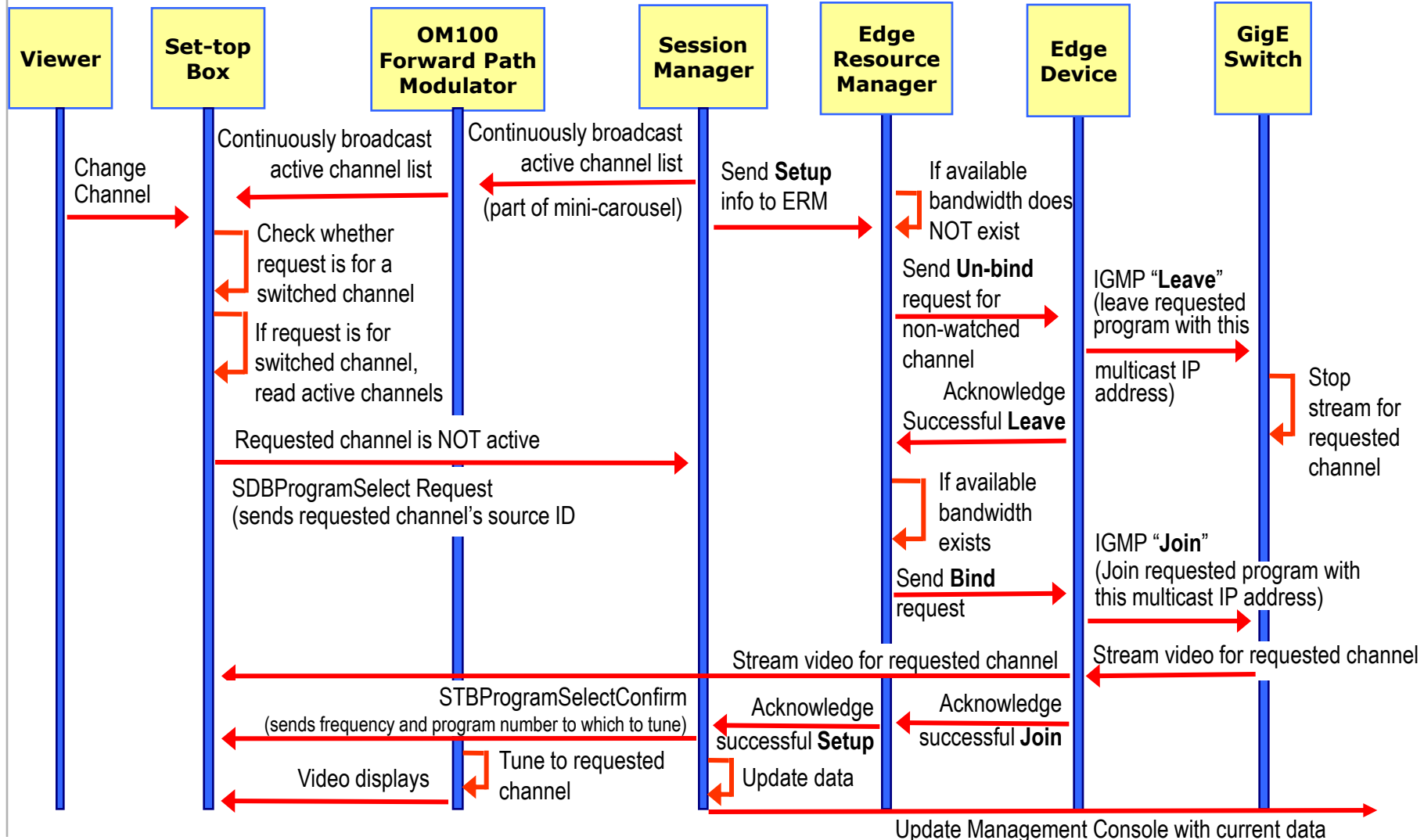
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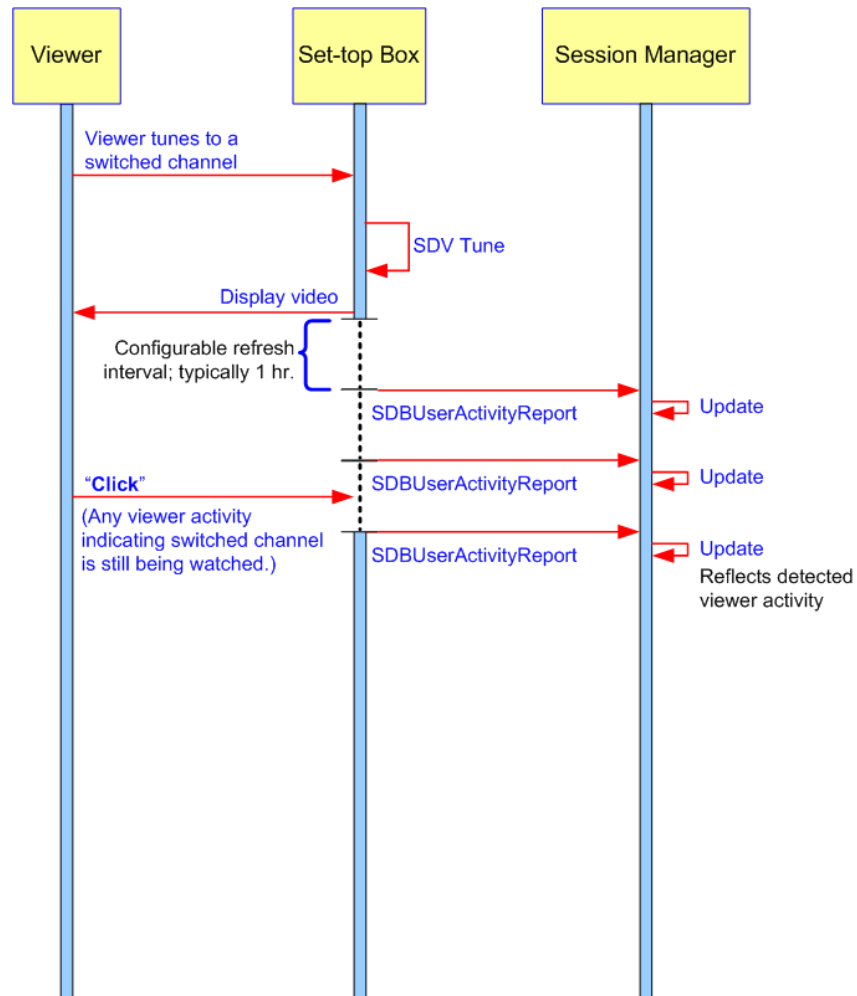
Channel Change with Non-Active Channel in Carousel



Channel Change with Non-Active Channel in Carousel



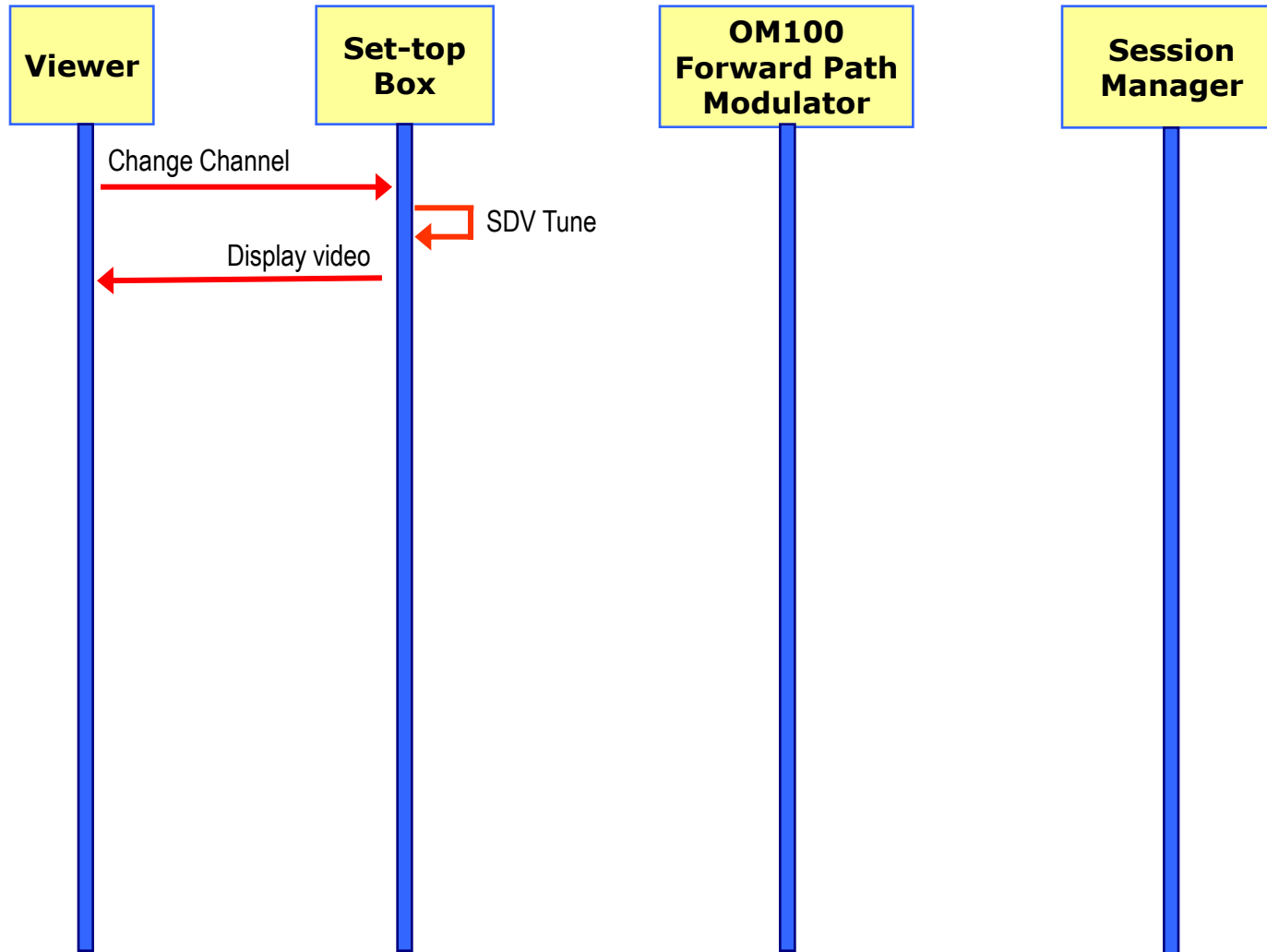
User Activity Reports



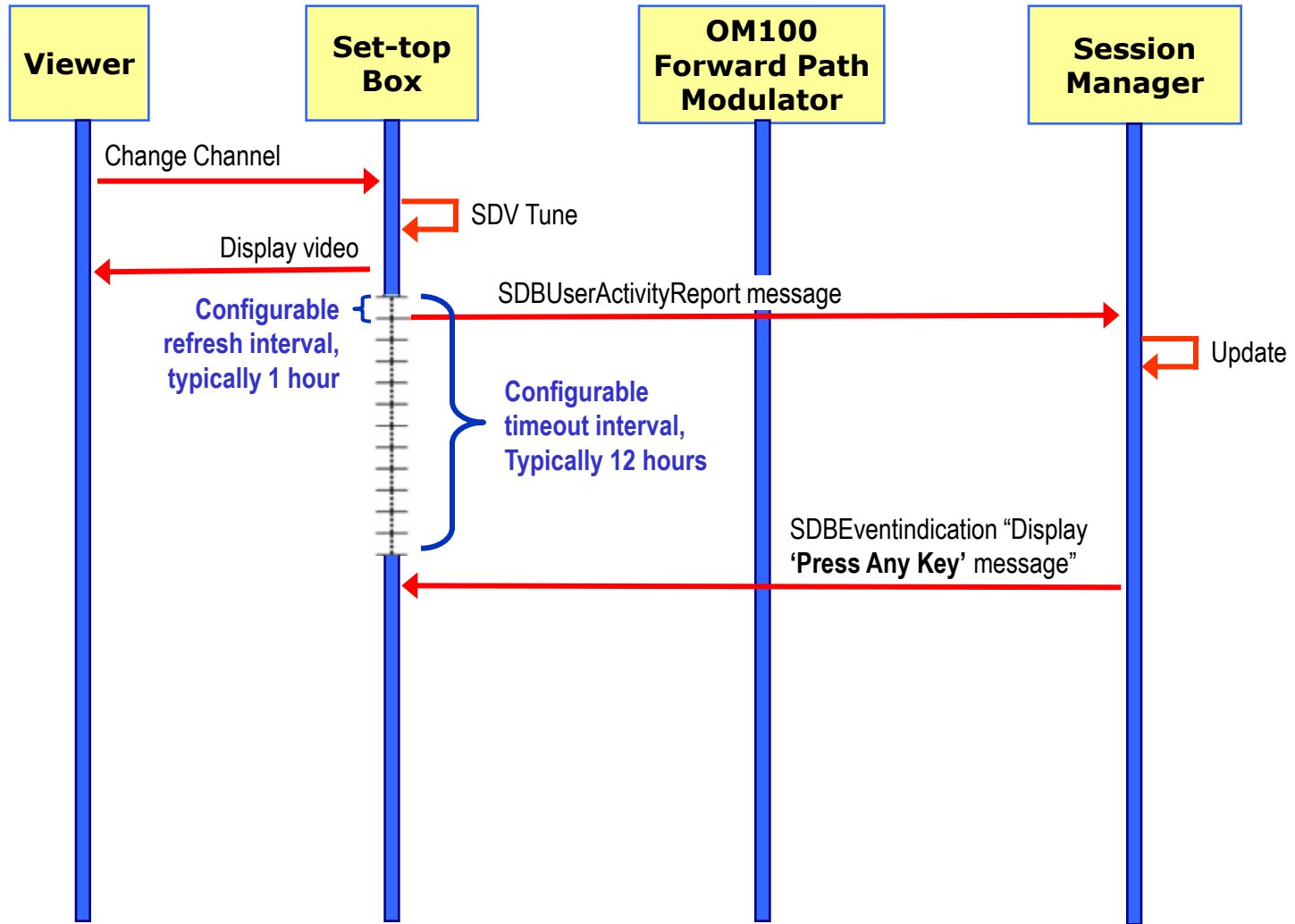
Client Inactivity (No Response)

Animated Flow Diagram

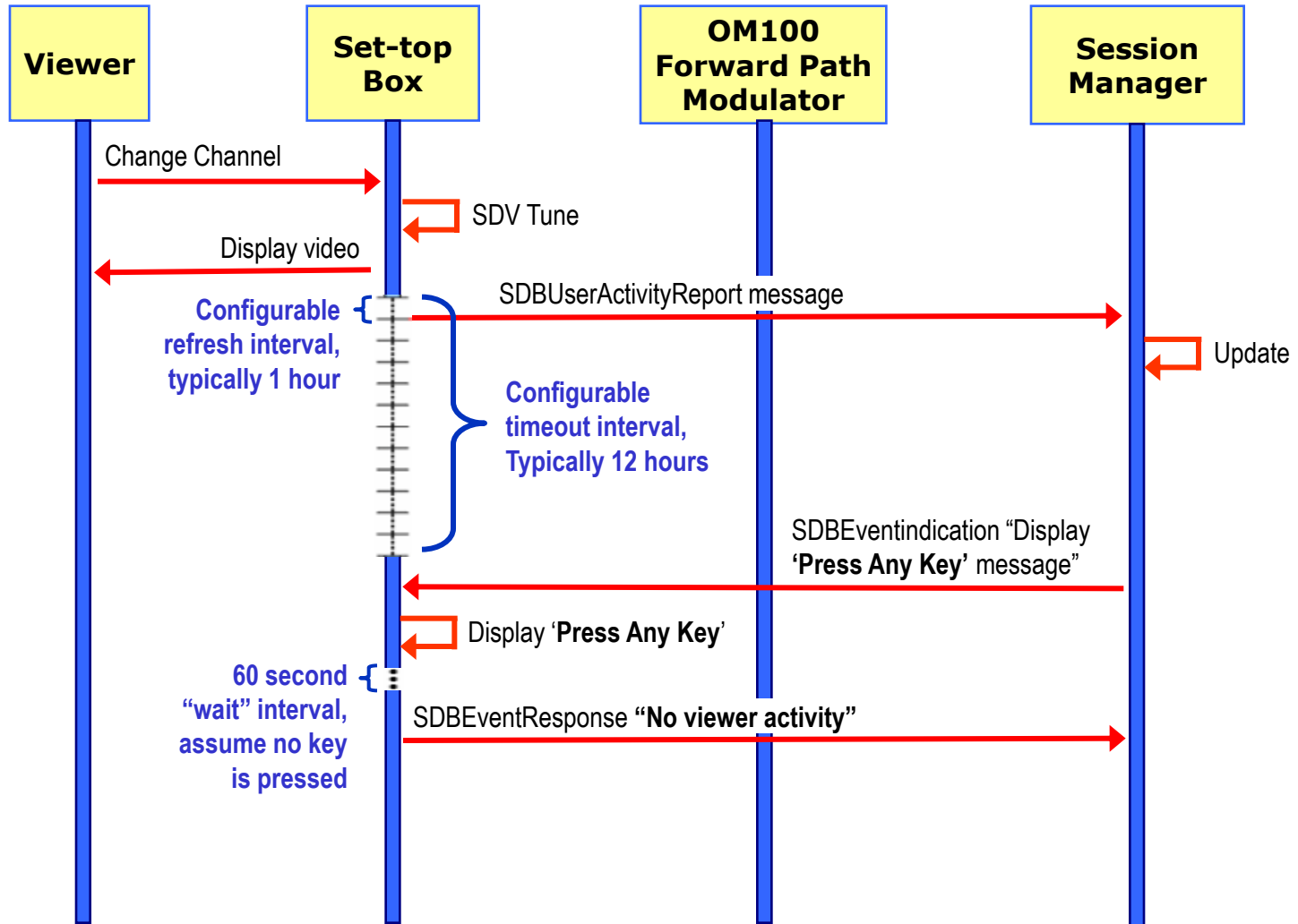
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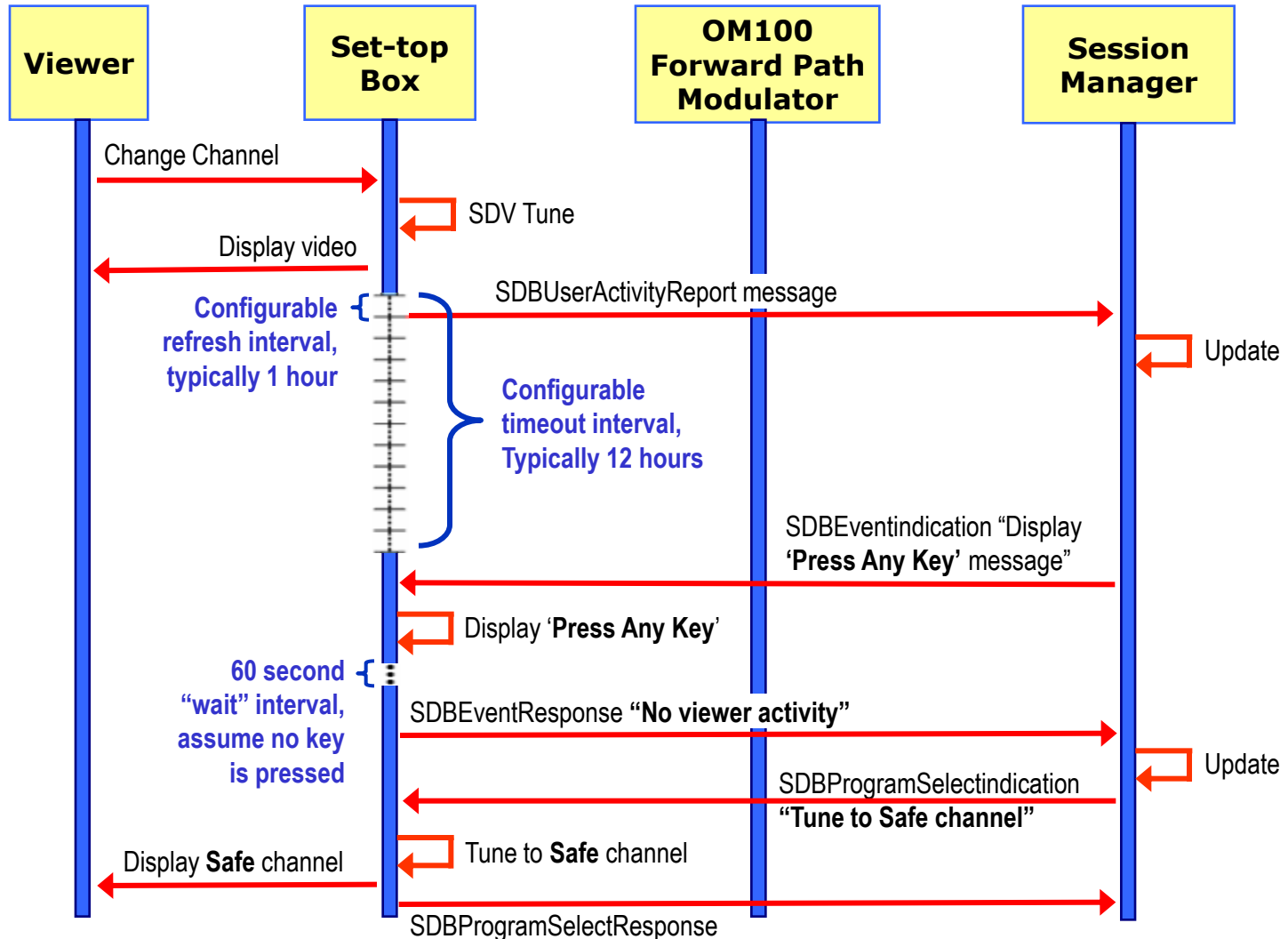
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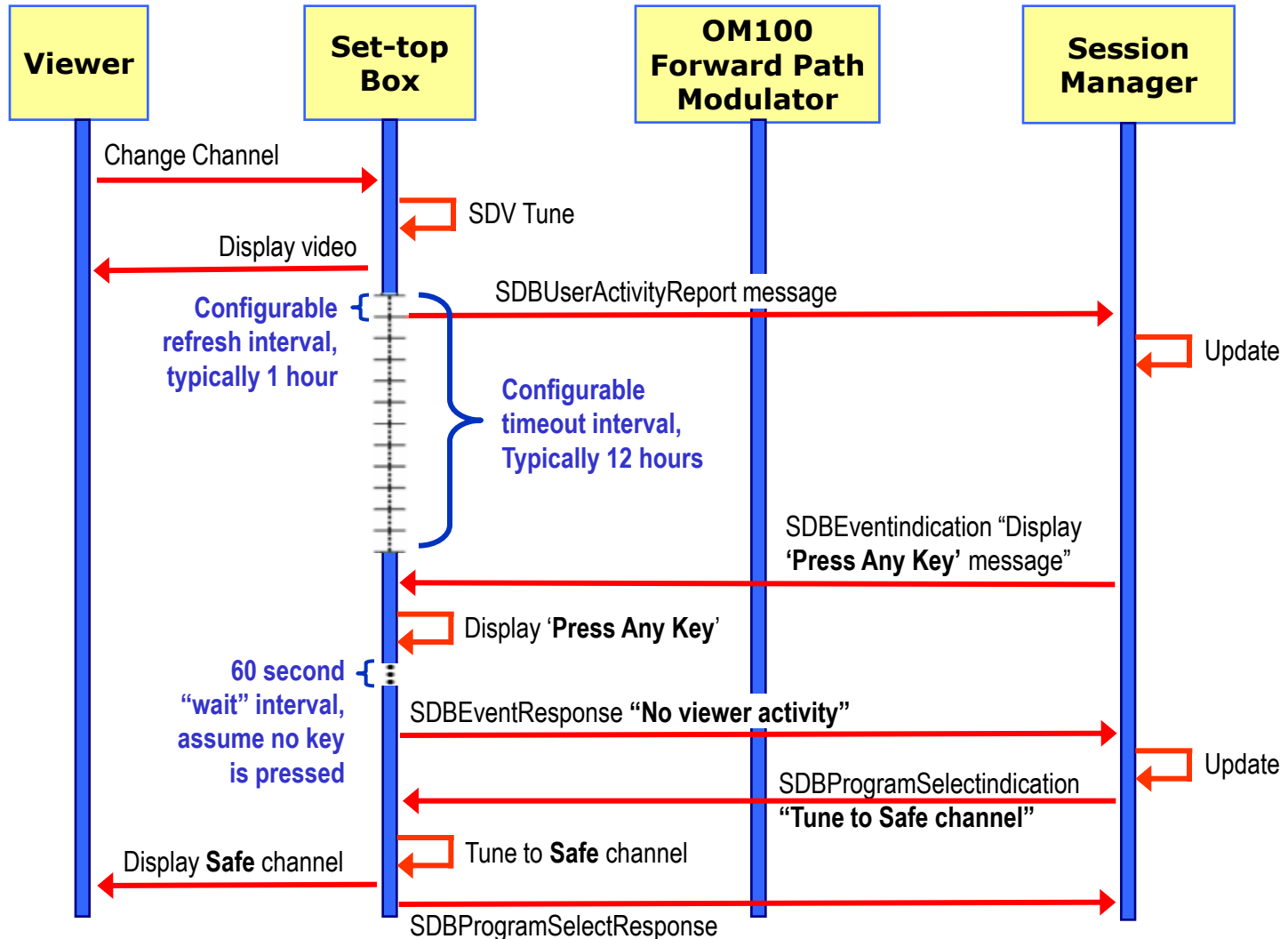
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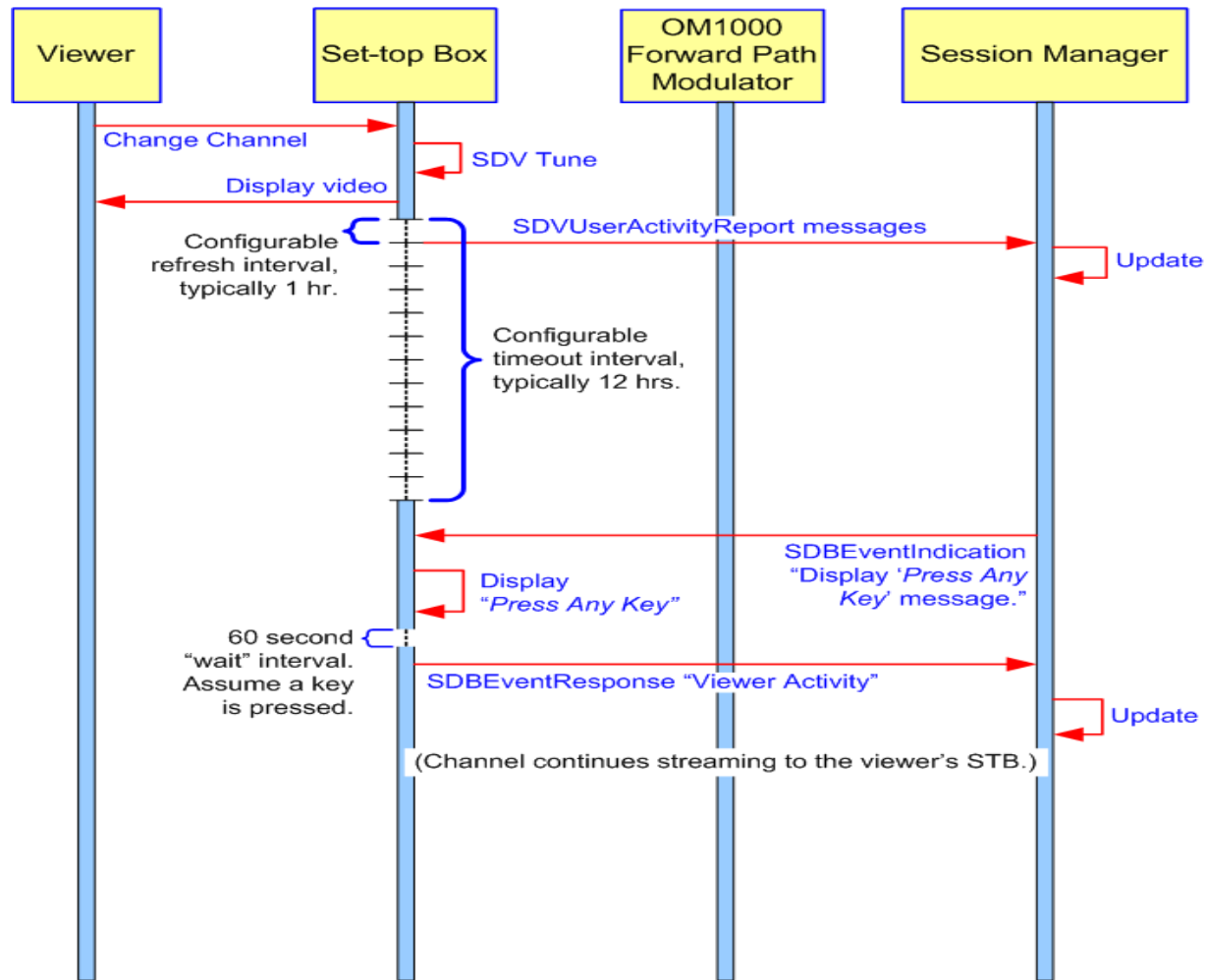
Client Inactivity (NO Response)



Forced to Safe Channel



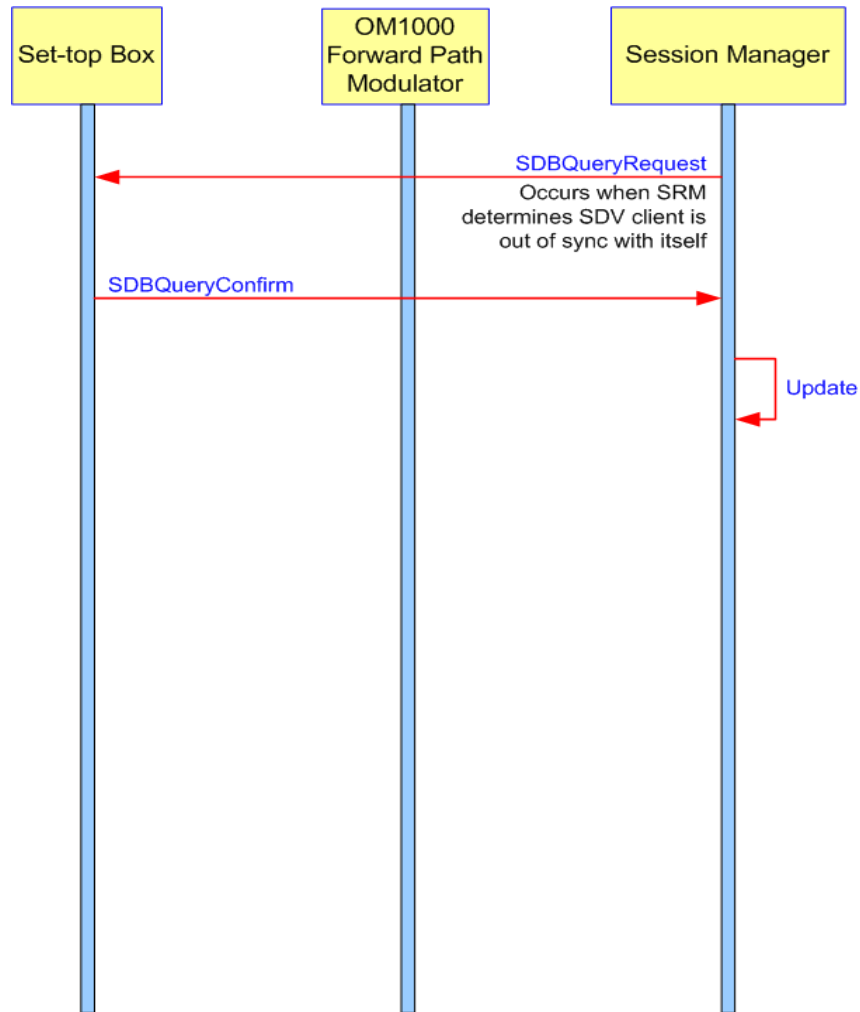
Check Viewer Presence (Confirmed)



User Activity Prompt

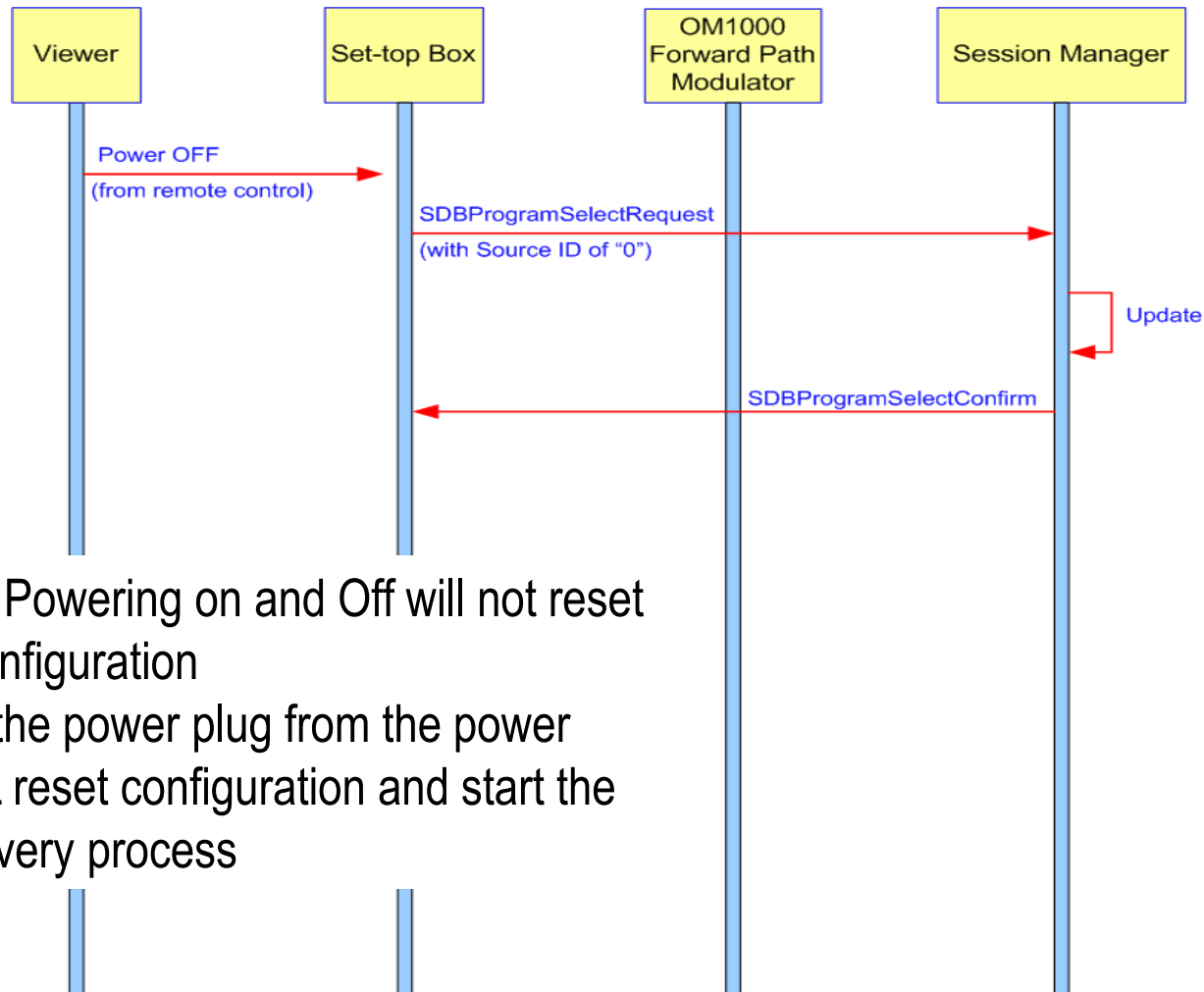


Session Manager Client Query



When the SM Server and SDV Client have become out of sync

STB Power Off



- Subscriber Powering on and Off will not reset the STB configuration
- Removing the power plug from the power outlet WILL reset configuration and start the Auto Discovery process

**Questions?
Thanks!**