

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

## Introductions

**Cliff Aaby**

Principle System Architect, On Demand

Arris Group

**Cliff.Aaby@arrisi.com**

**503-690-6332**

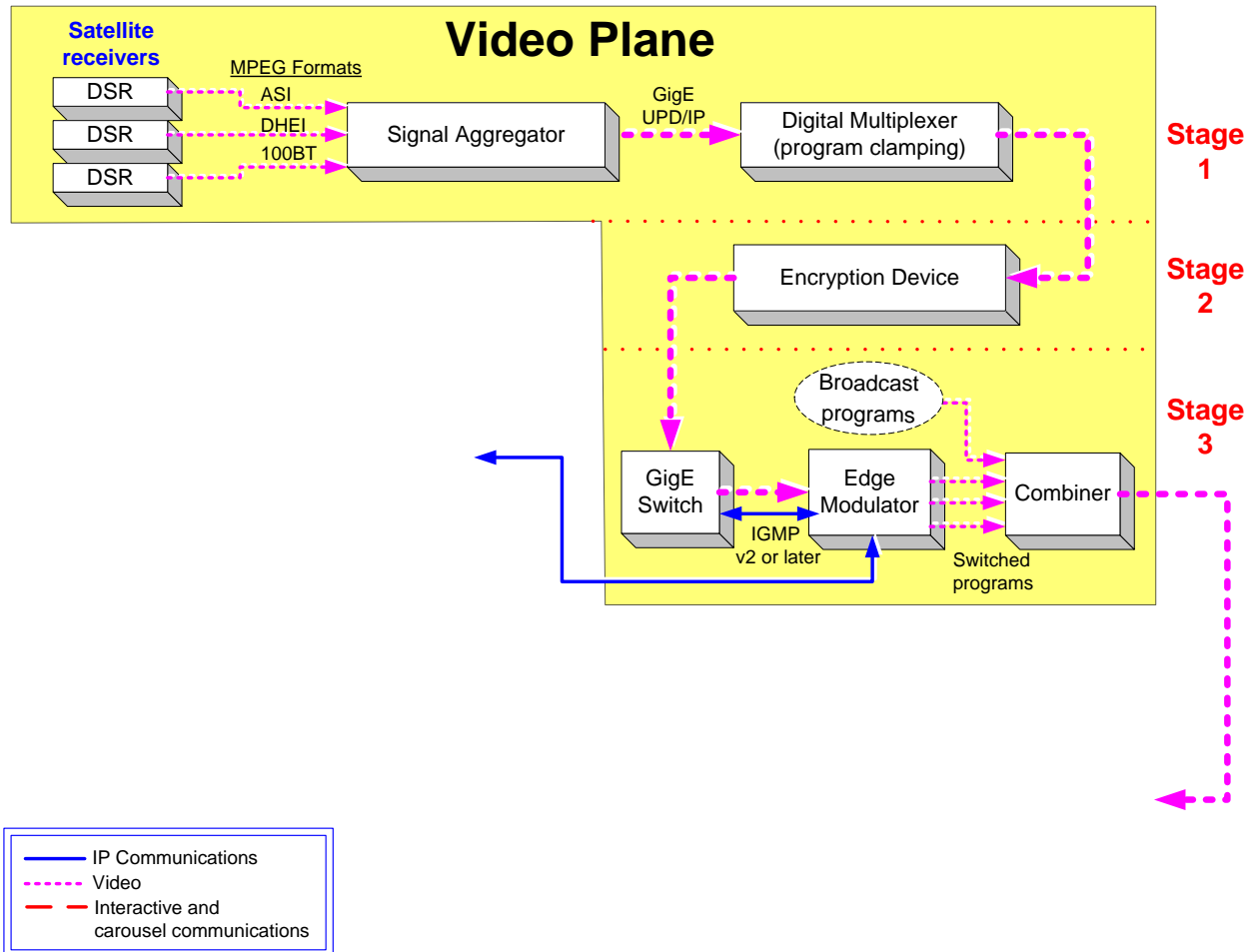
## Course Contents:

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

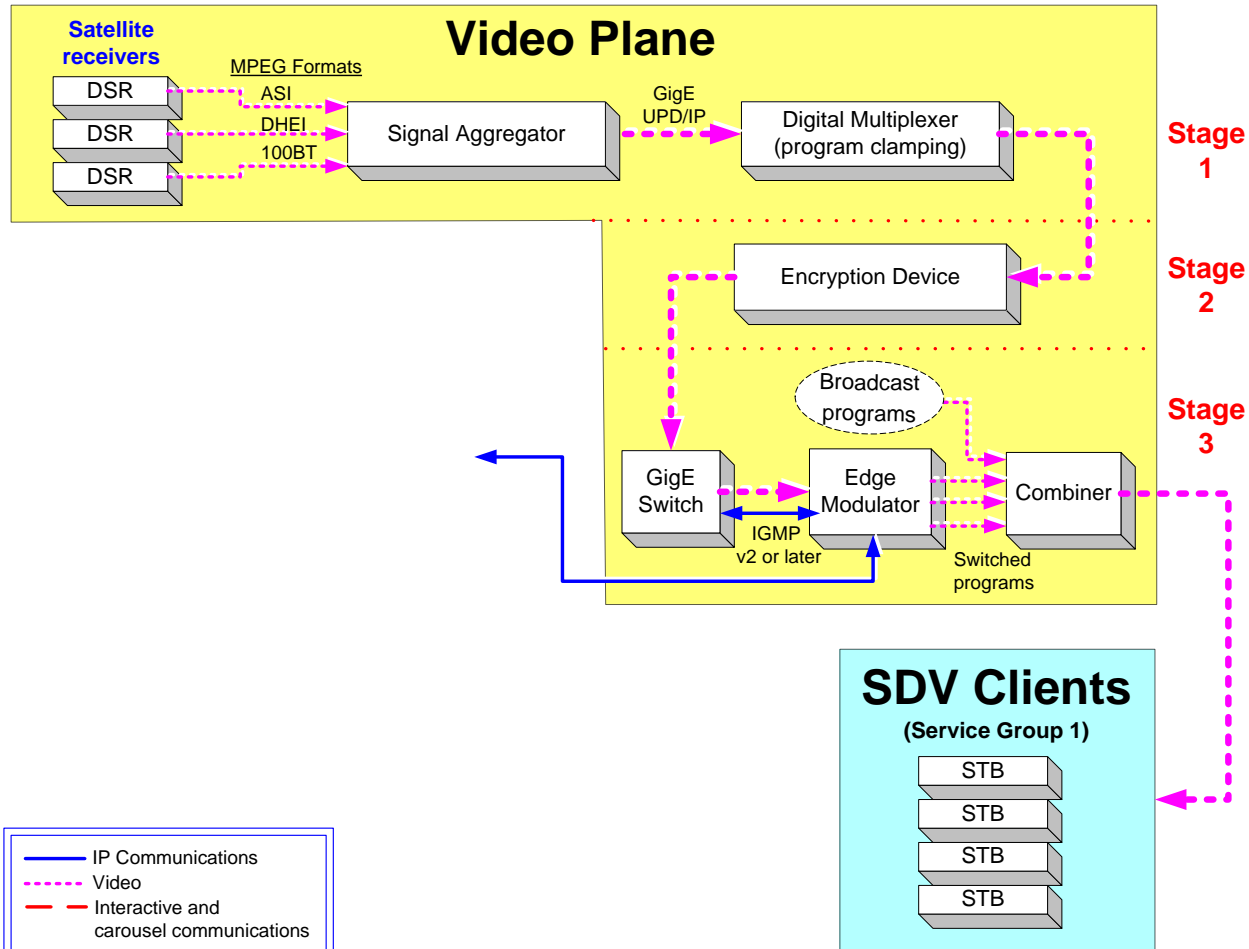
## Motorola STB Requirements

- **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

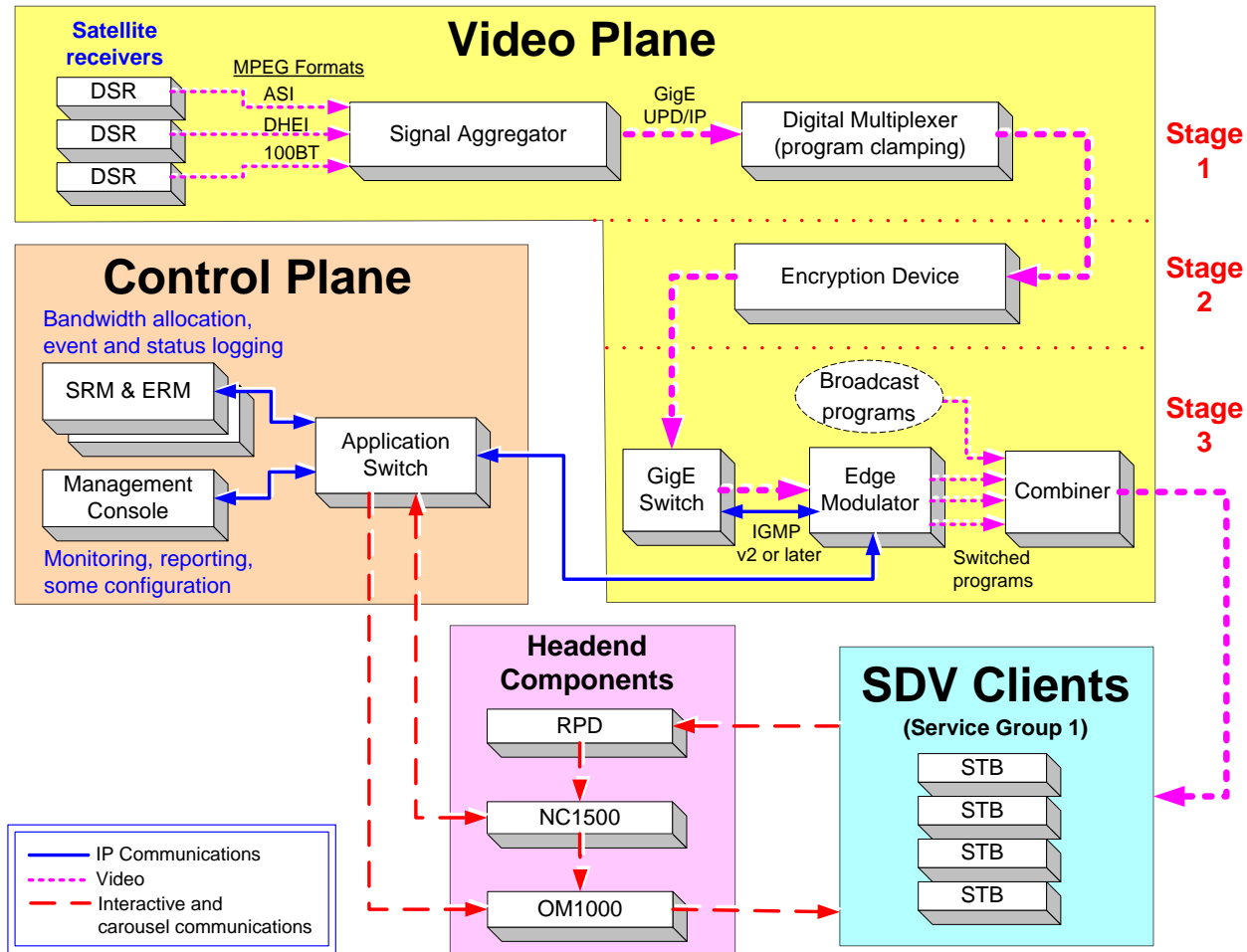
# Detailed SDV System Architecture



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

Source Name	Virtual Channel Number (VCN)	Source ID	Frequency (EIA No.)	Program Number
Slapstick	54	542	131	18
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A&E	19	389	118	5

- 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**

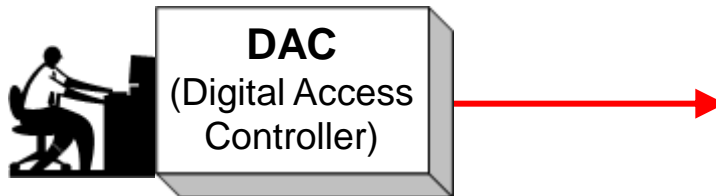
(Forward Path Out-Of-Band Modulator)

**Input socket:**

**10.10.10.1:8857**

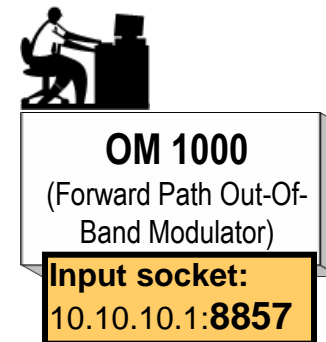
## Creating/Configuring Mini-car Background Service

- 2 Create a background service named "mini\_car".



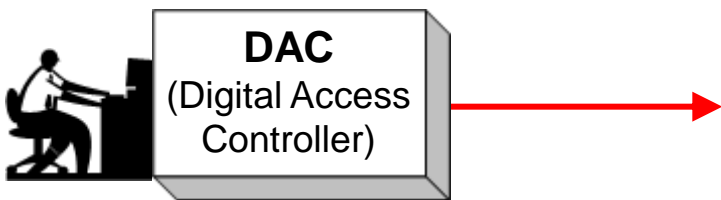
- 3 Assign "mini\_car" service to each OM1000 to be used. This generates a Program ID (PID) for each OM1000.

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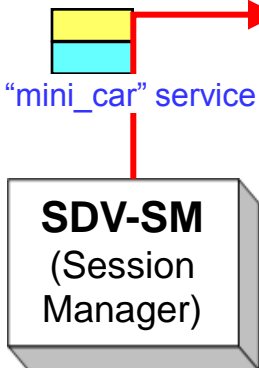


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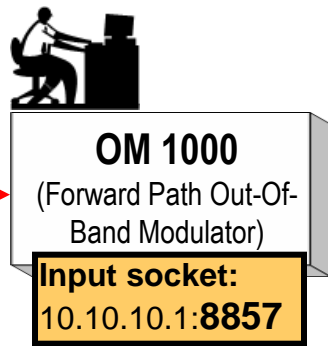
**4** On MC, configure SDV-SM to stream mini-carousel to OM1000's. For each OM1000 to be used, specify:

- 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



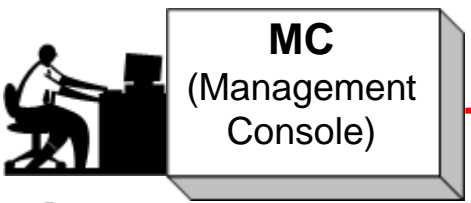
**5** Mini-carousel streams to each OM1000 for which SDV-SM was configured in step 4.

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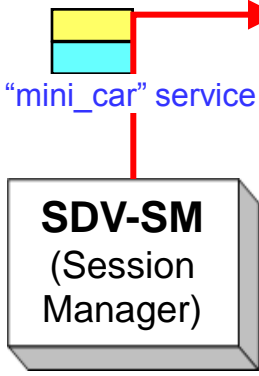


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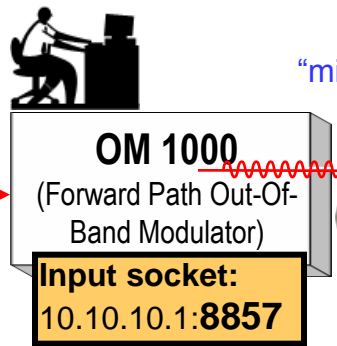
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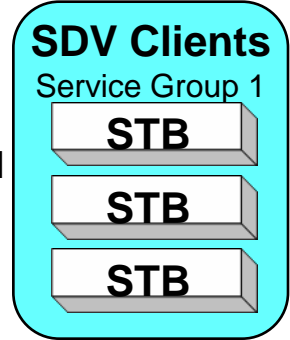


**5** Mini-carousel streams to each OM1000 for which SDV-SM was configured in step 4.

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**

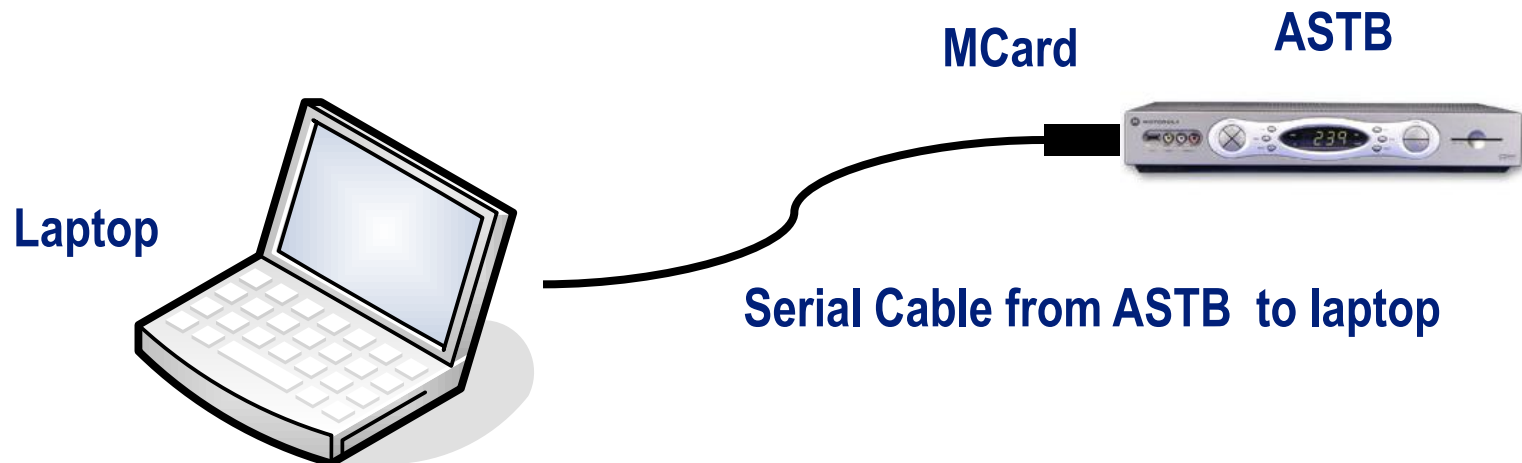
- Open source software terminal emulator
- Emulates multiple types of terminals
- Supports telnet, SSH 1 & 2, and serial port connections
- Built in scripting language

## **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

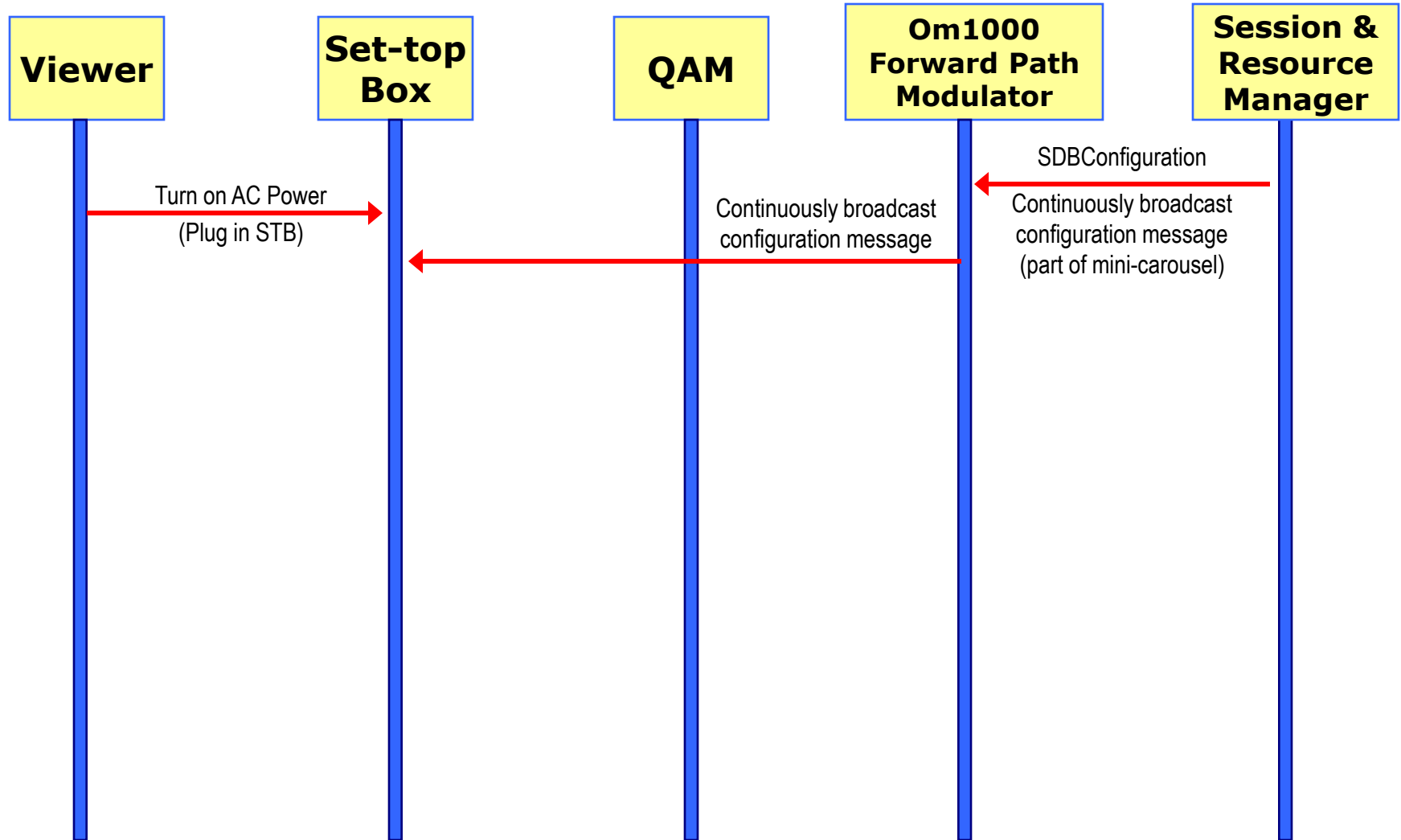
- **Auto Discovery** (Determines the service group and region to which subscriber belongs)
- **Channel Change** requests for both broadcast and switched video programming
- **Mini-car** carries “**active map**” message so **SDV client** can determine if switched program exists in service group or not
- **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”)

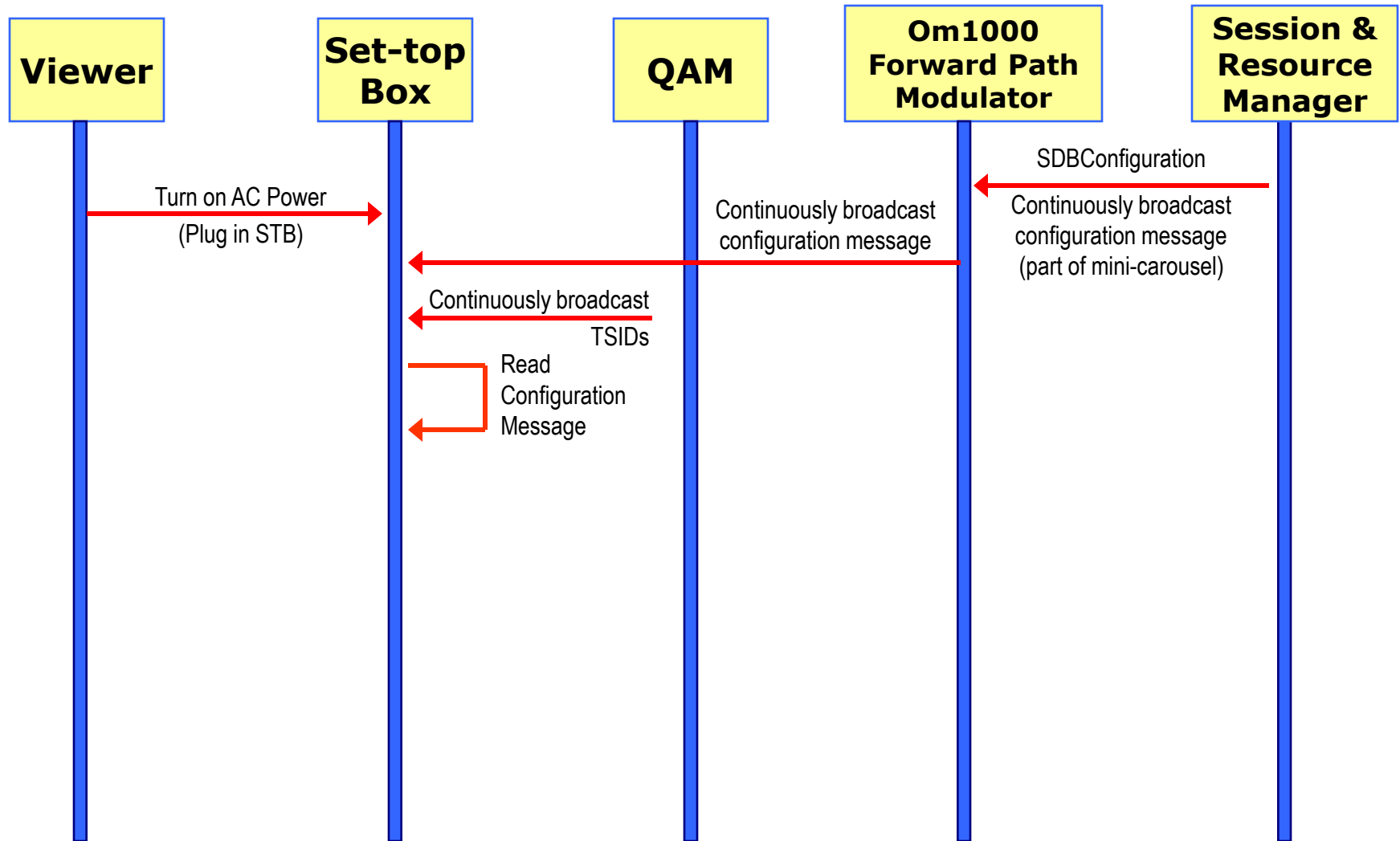
# **Auto Discovery**

## **Animated Flow Diagram**

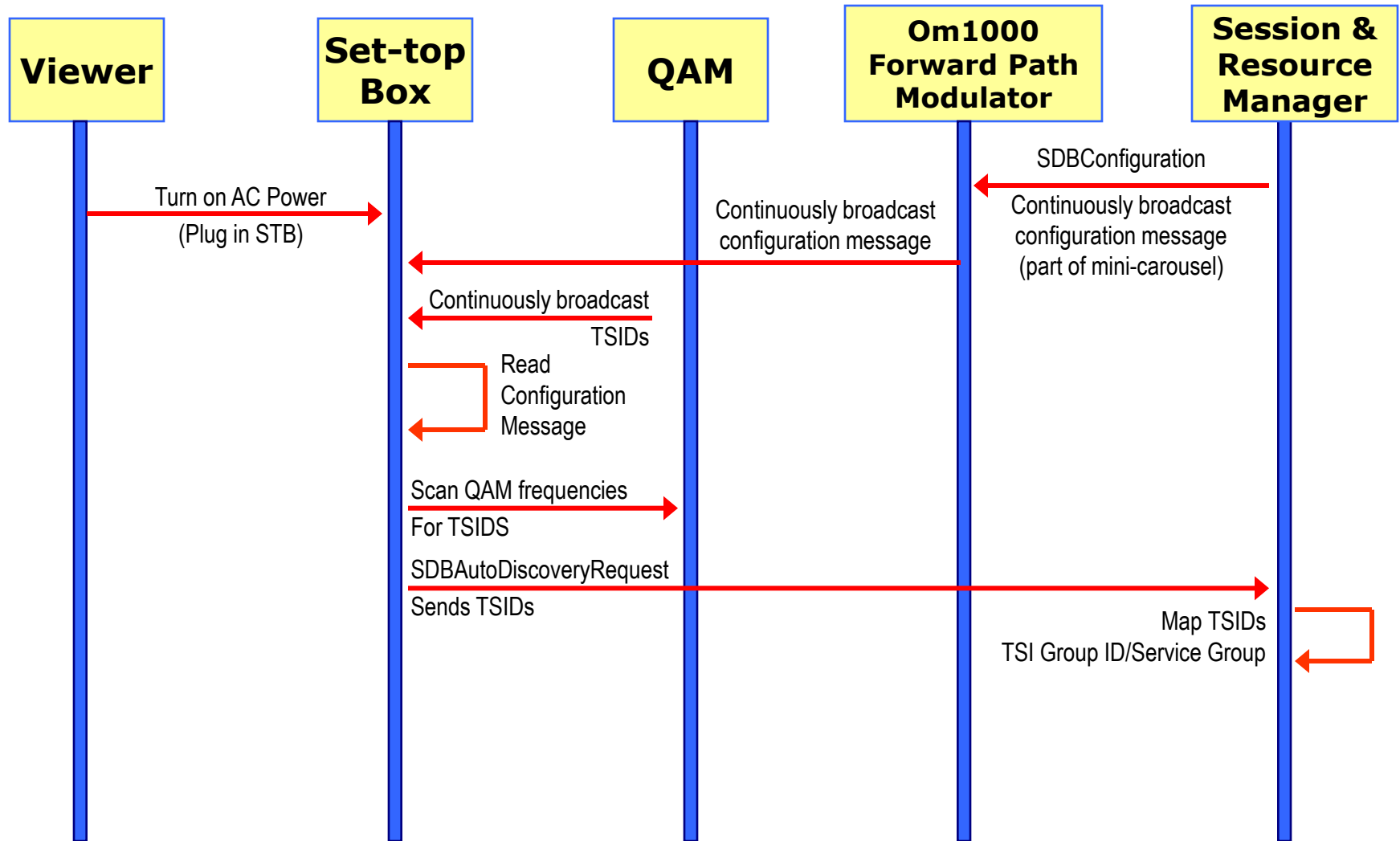
# Auto Discovery



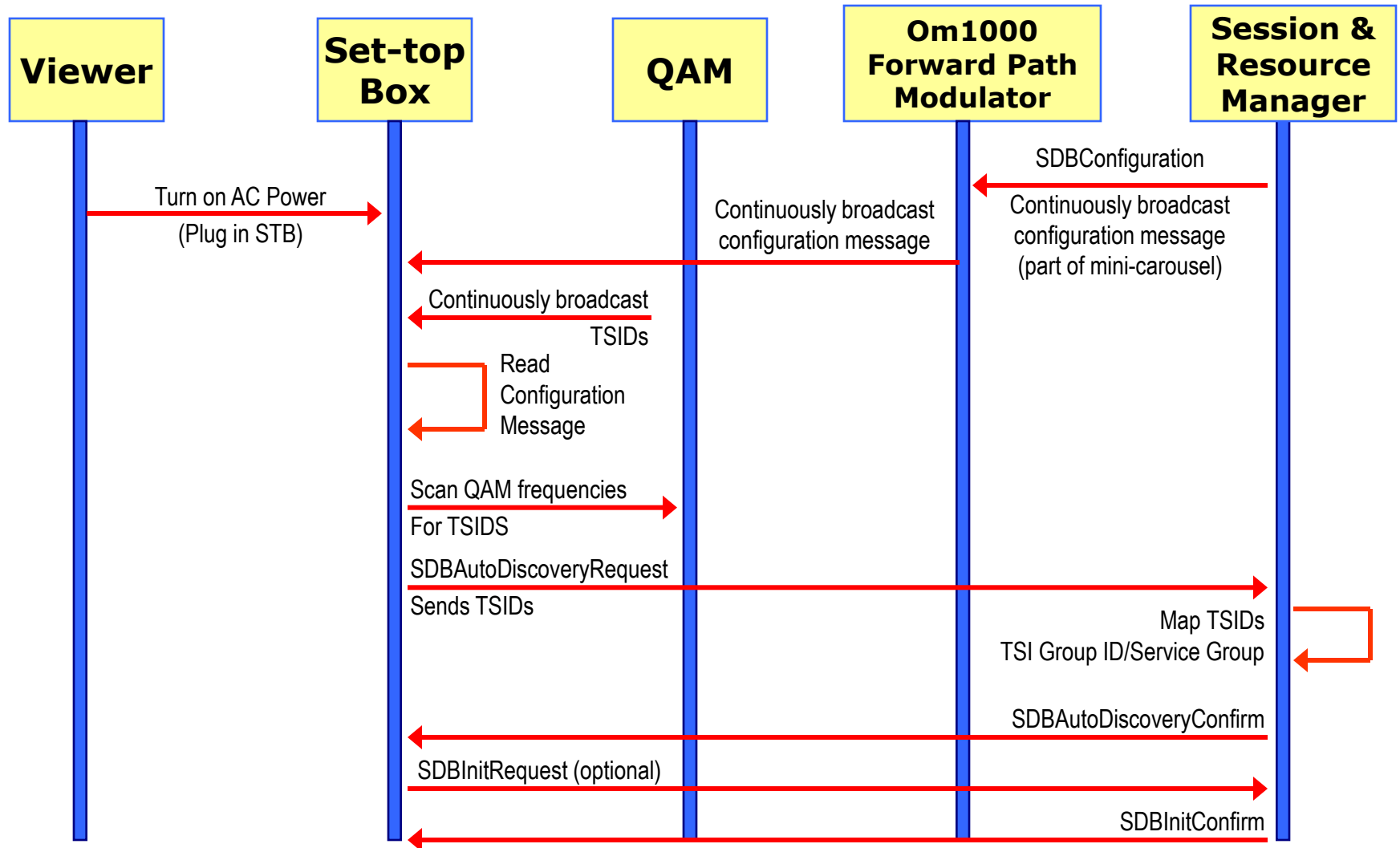
# Auto Discovery



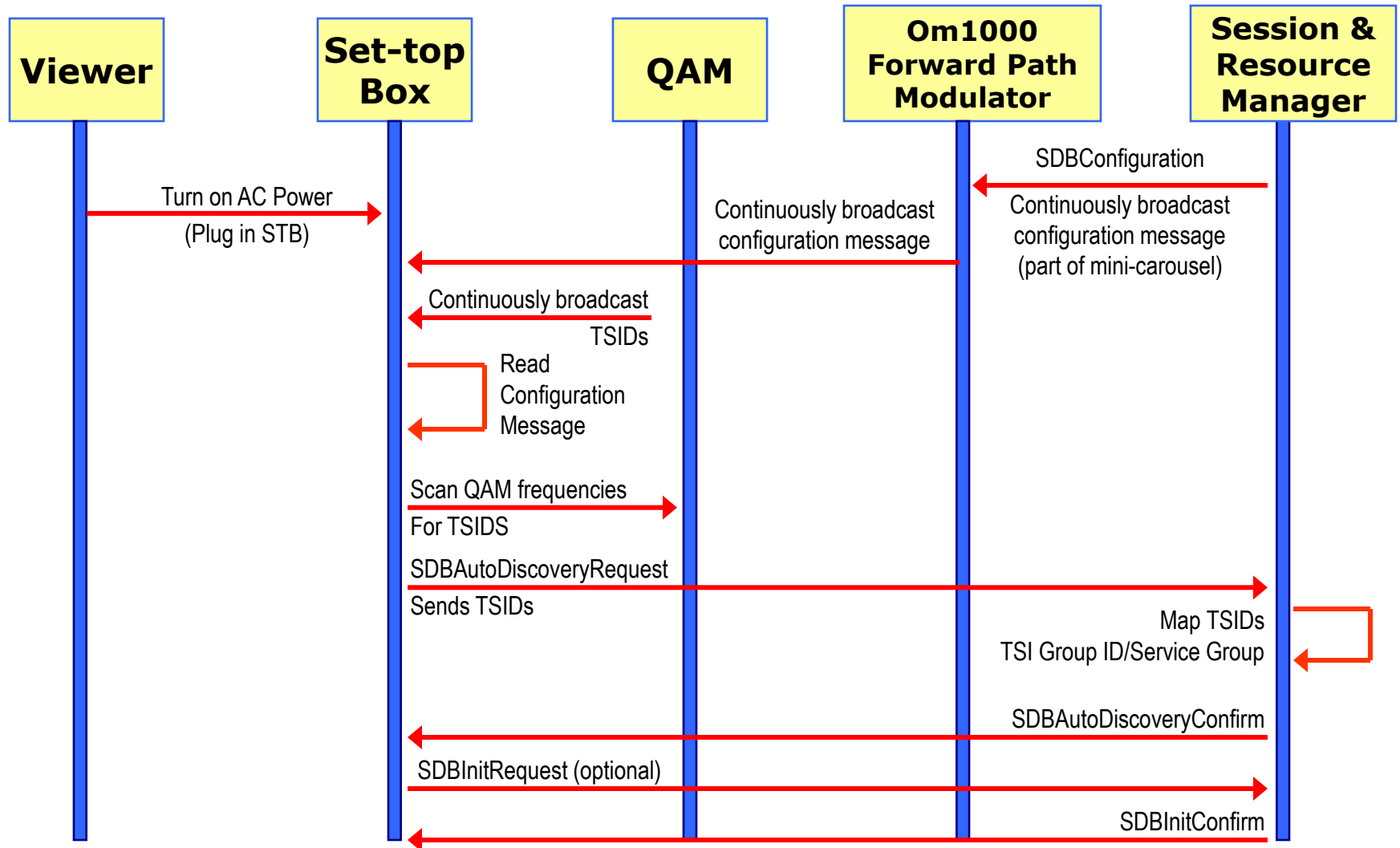
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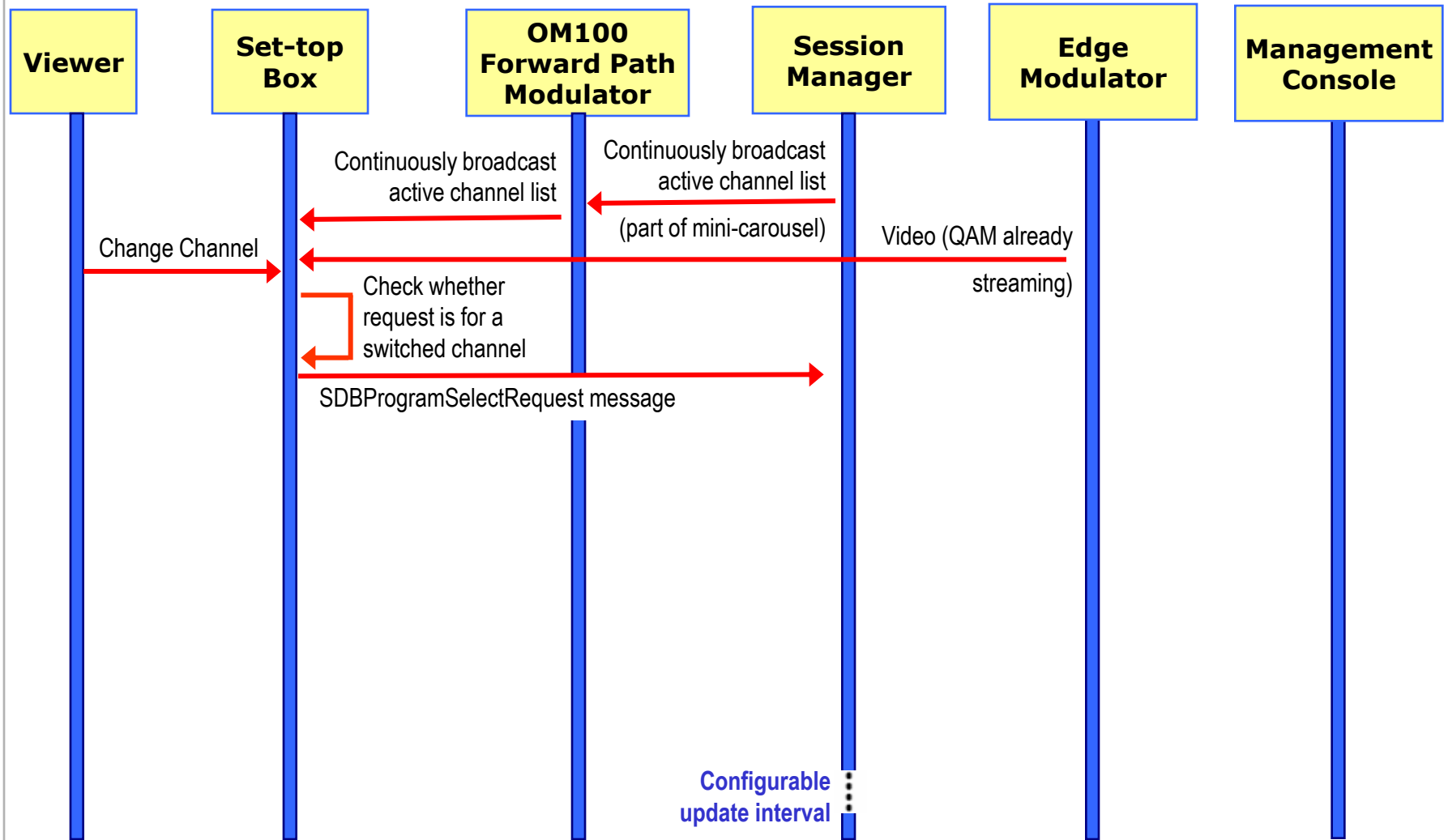
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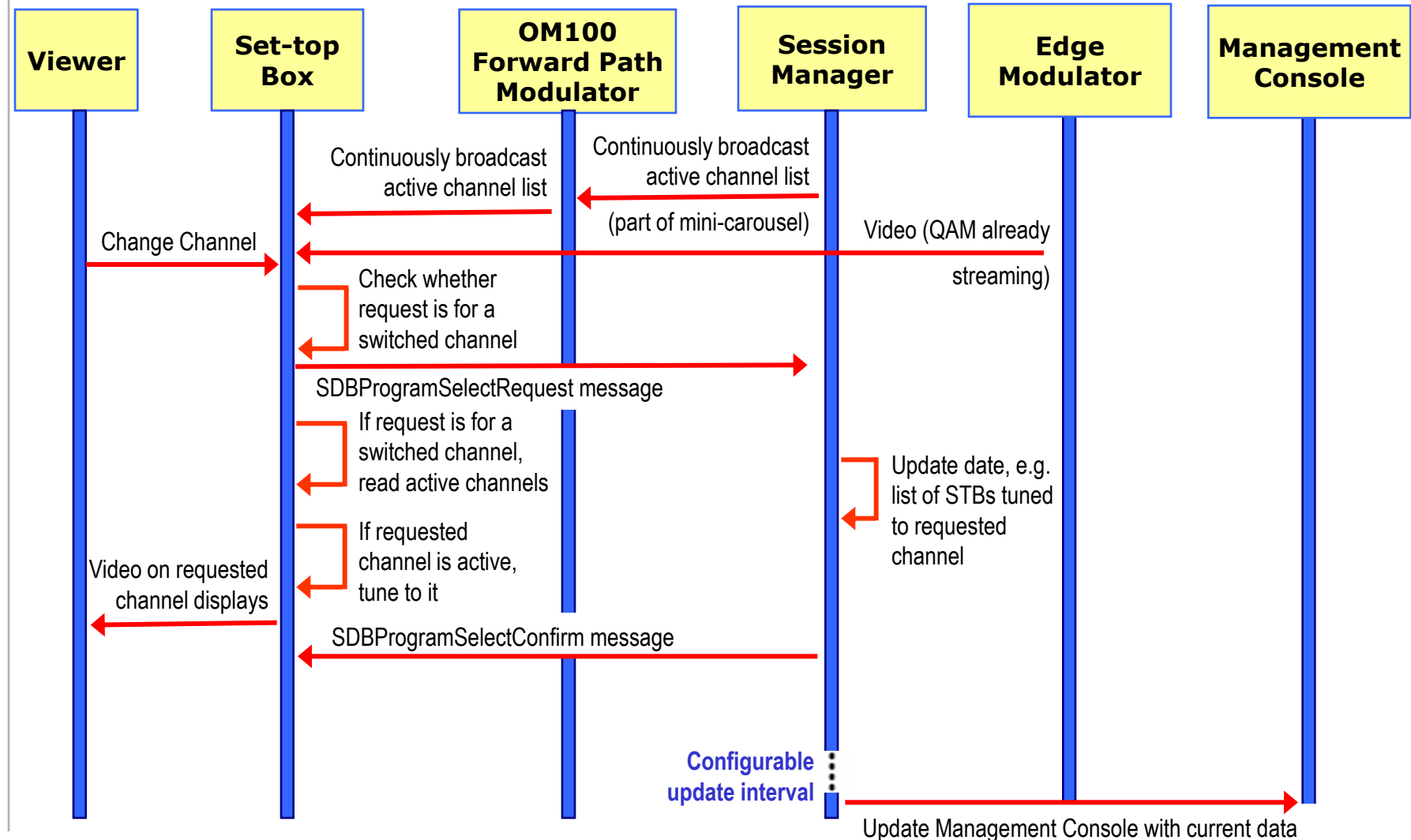
# Channel Change with *Active* Channel in Carousel

## Animated Flow Diagram

# Channel Change with Active Channel in Carousel



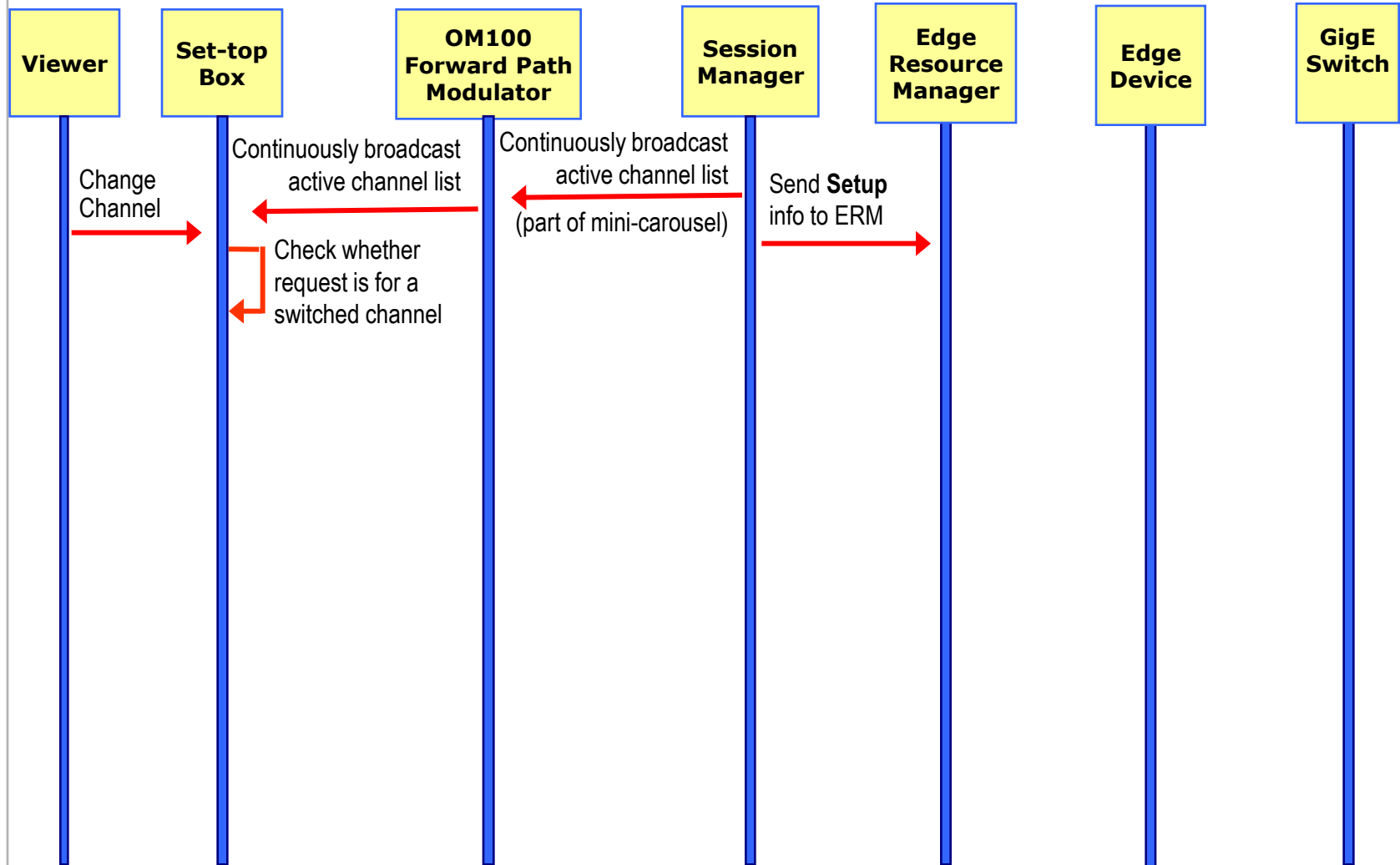
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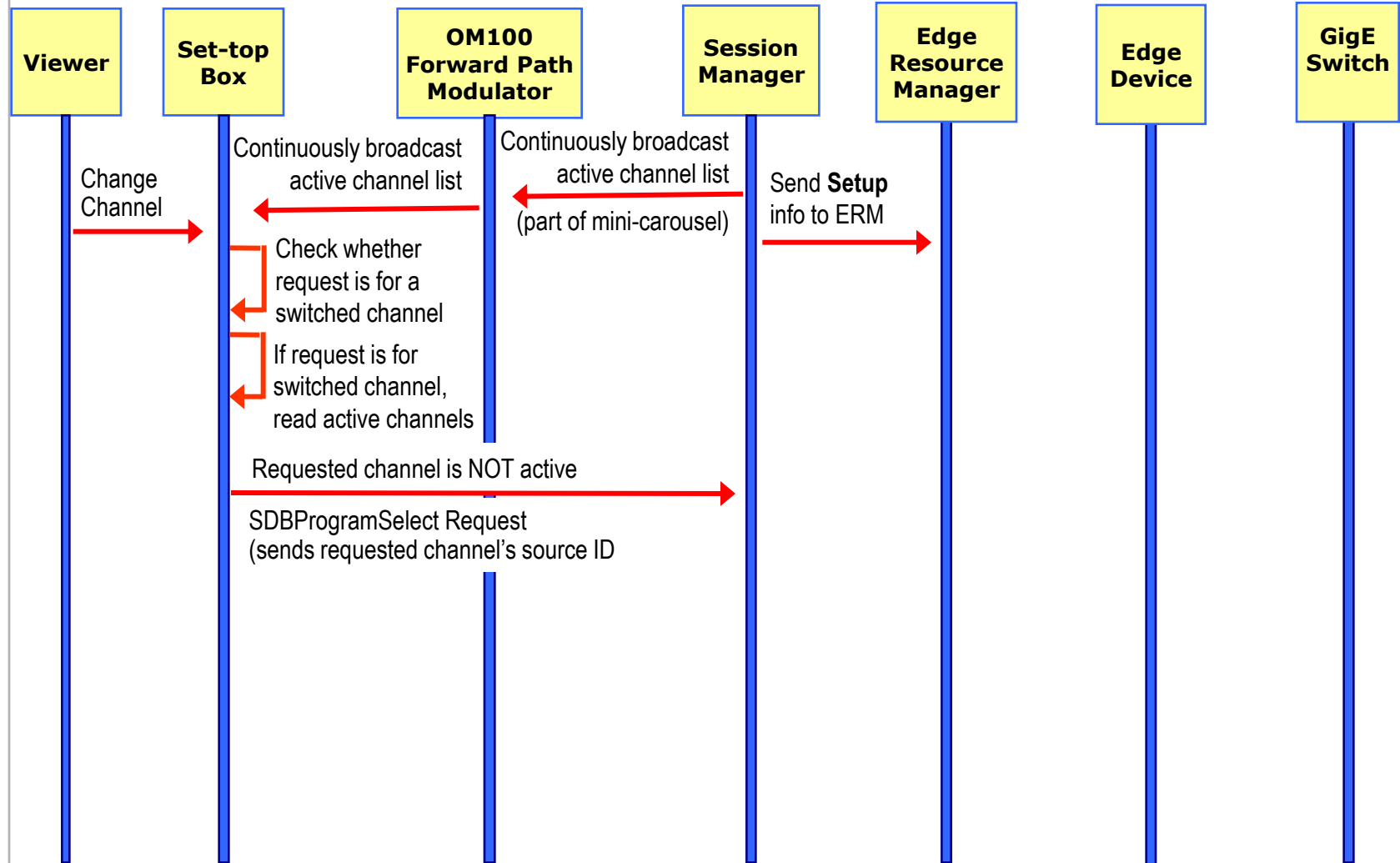
# Channel Change with *Non-Active* Channel in Carousel

## Animated Flow Diagram

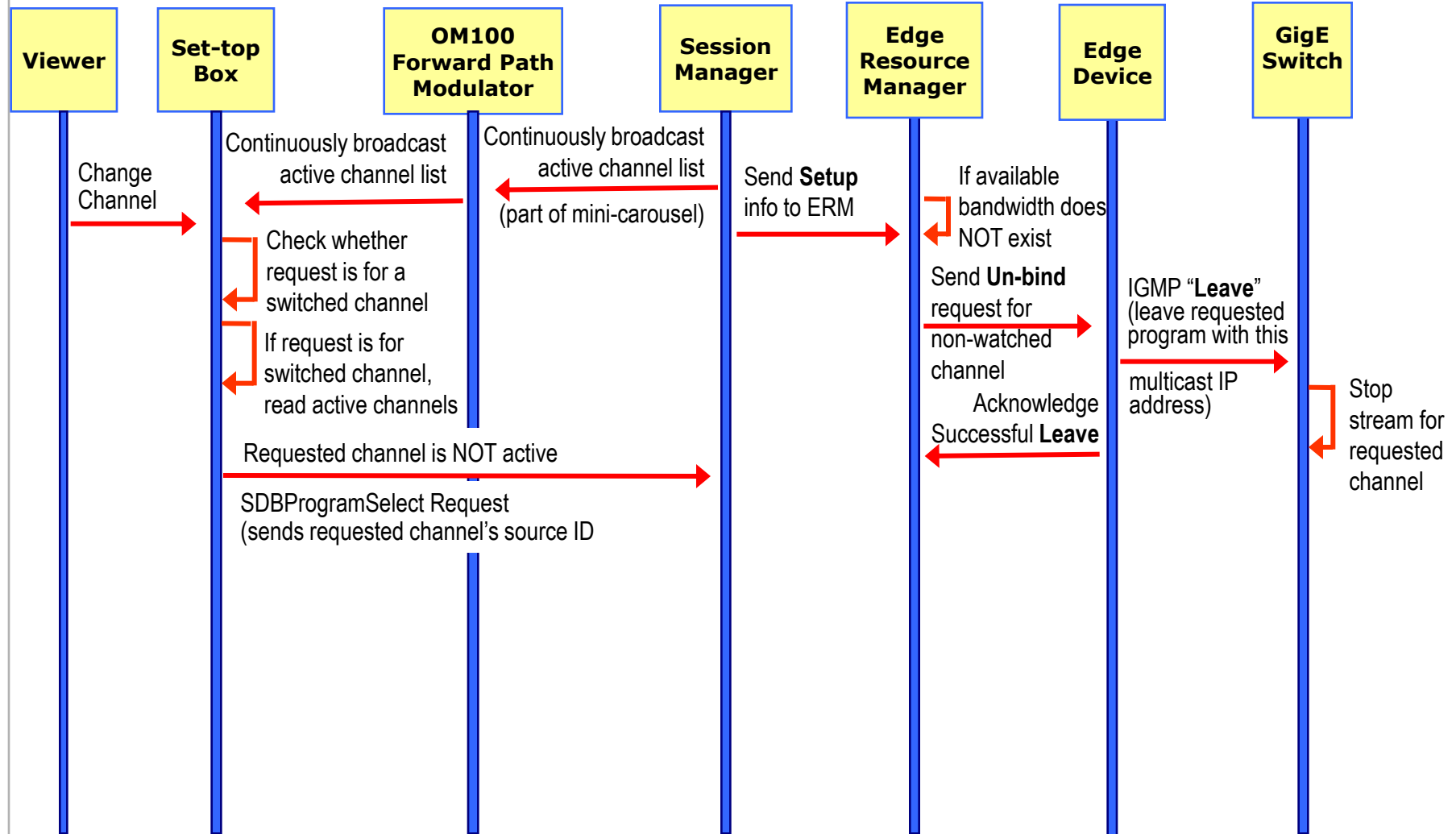
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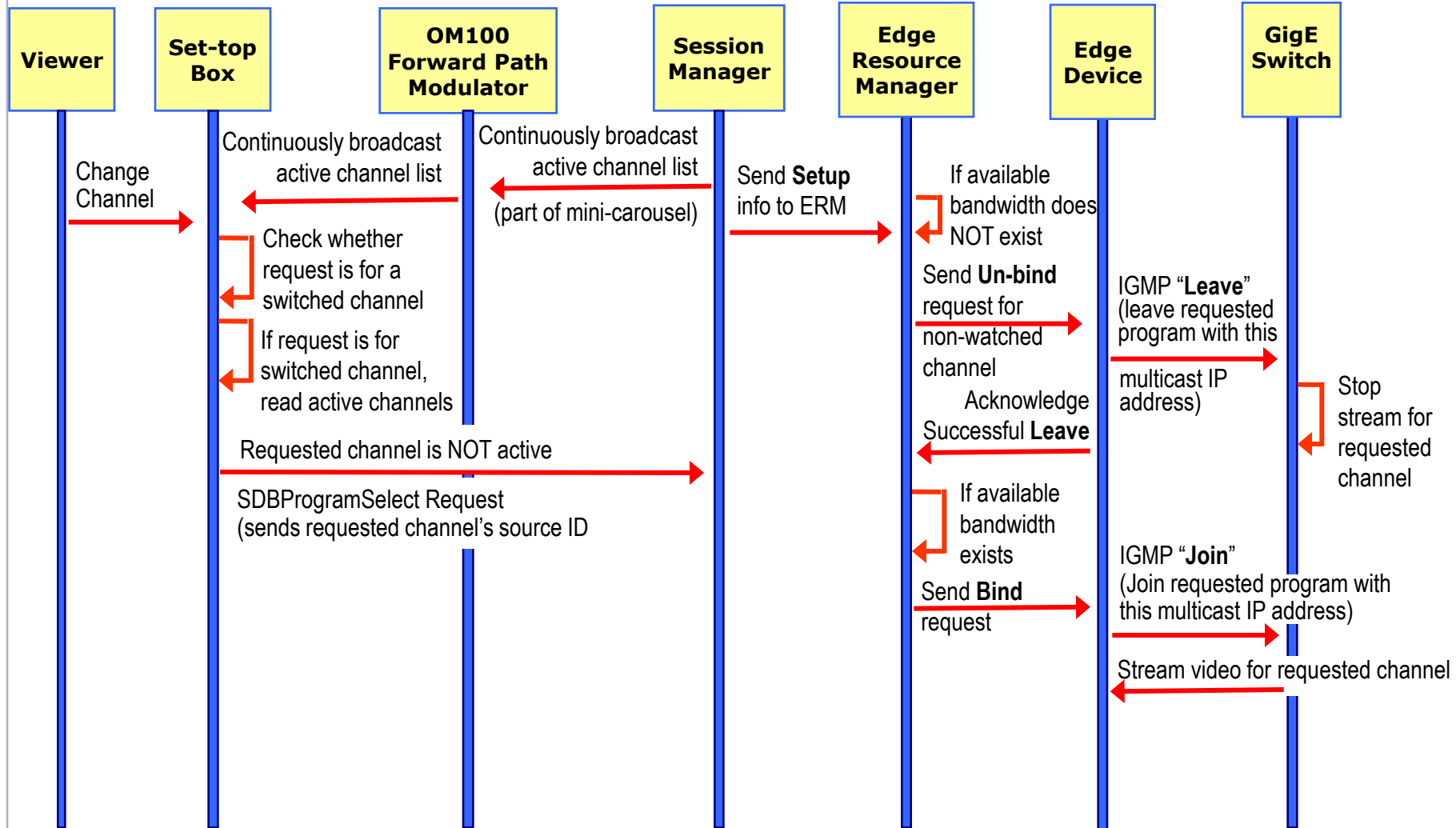
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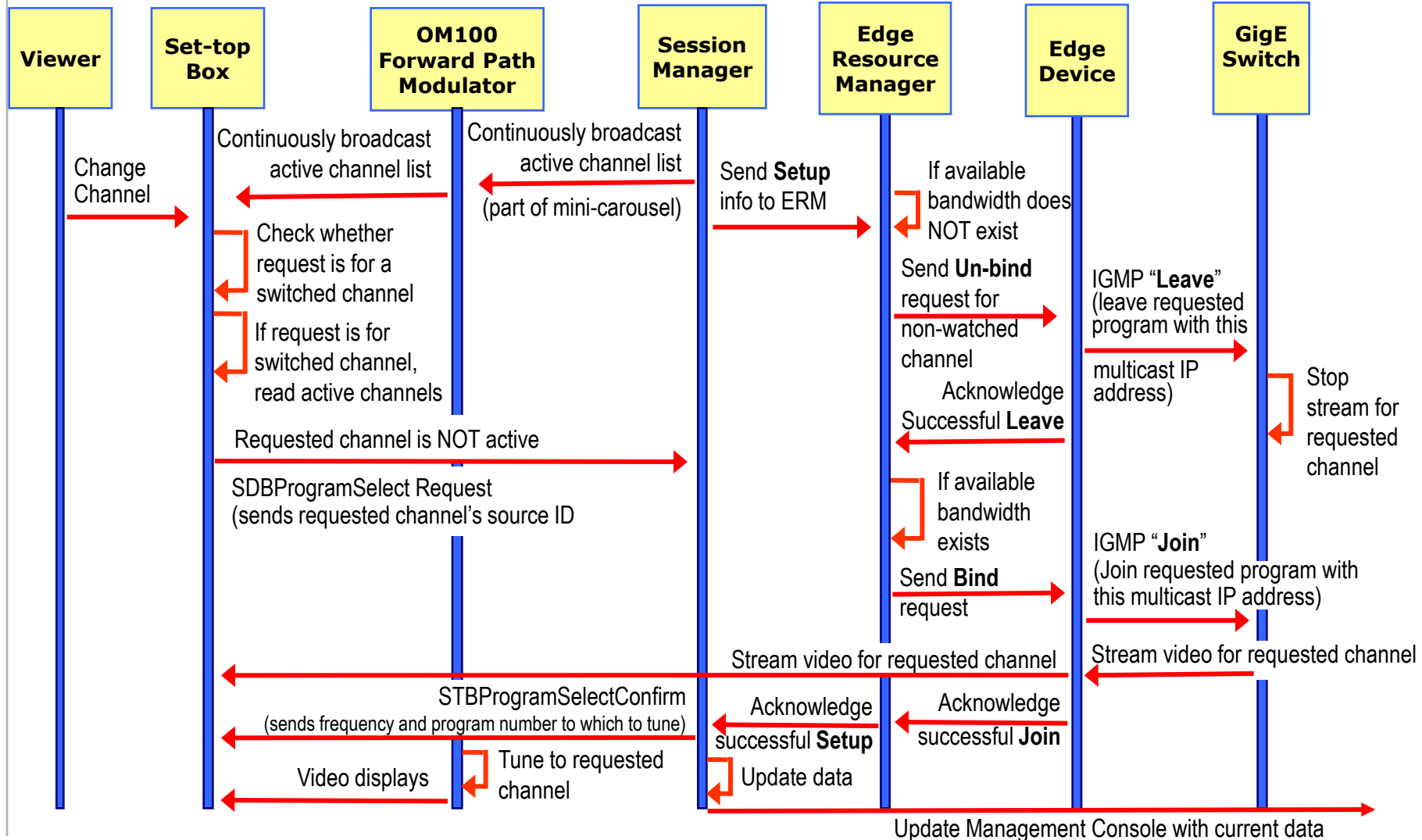
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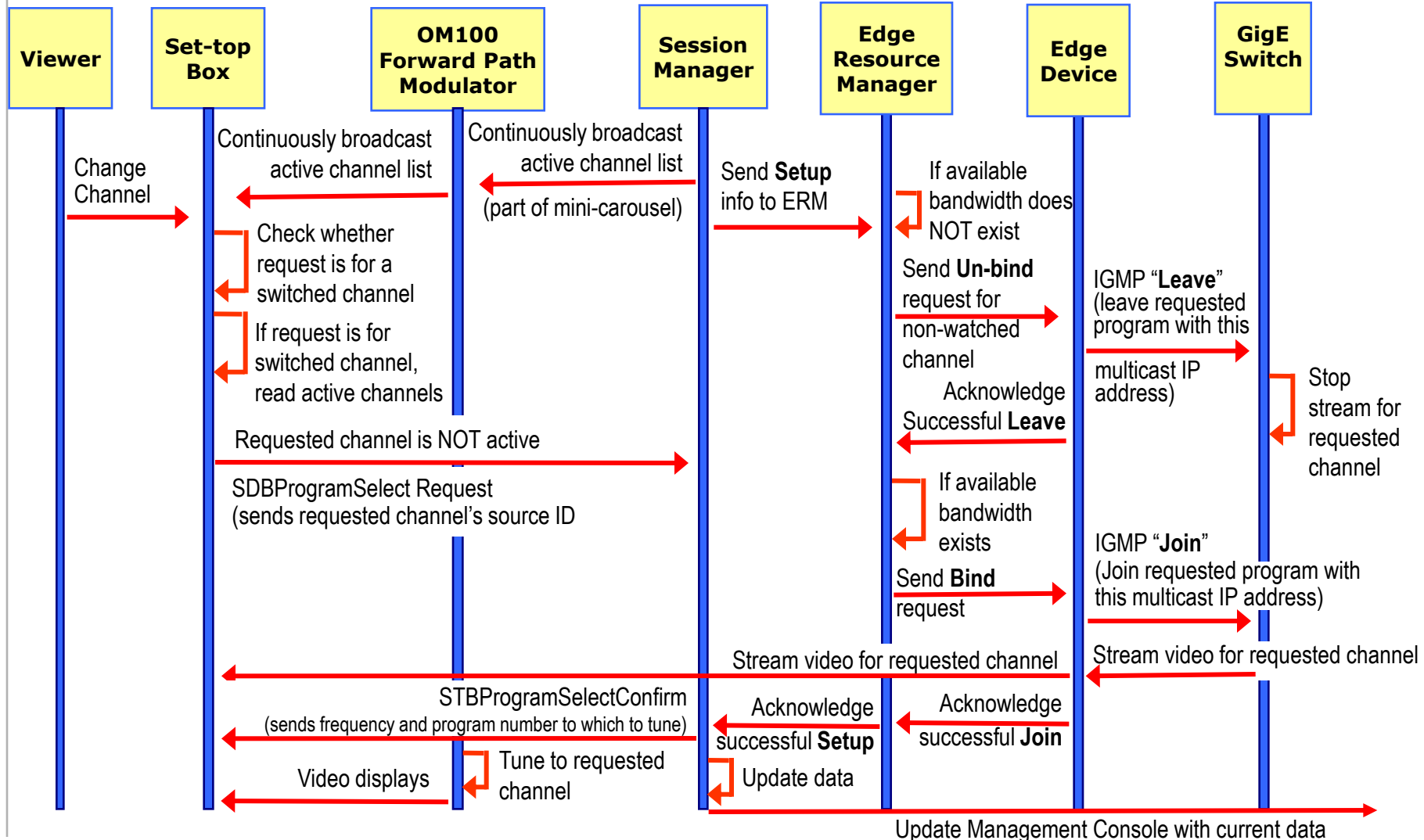
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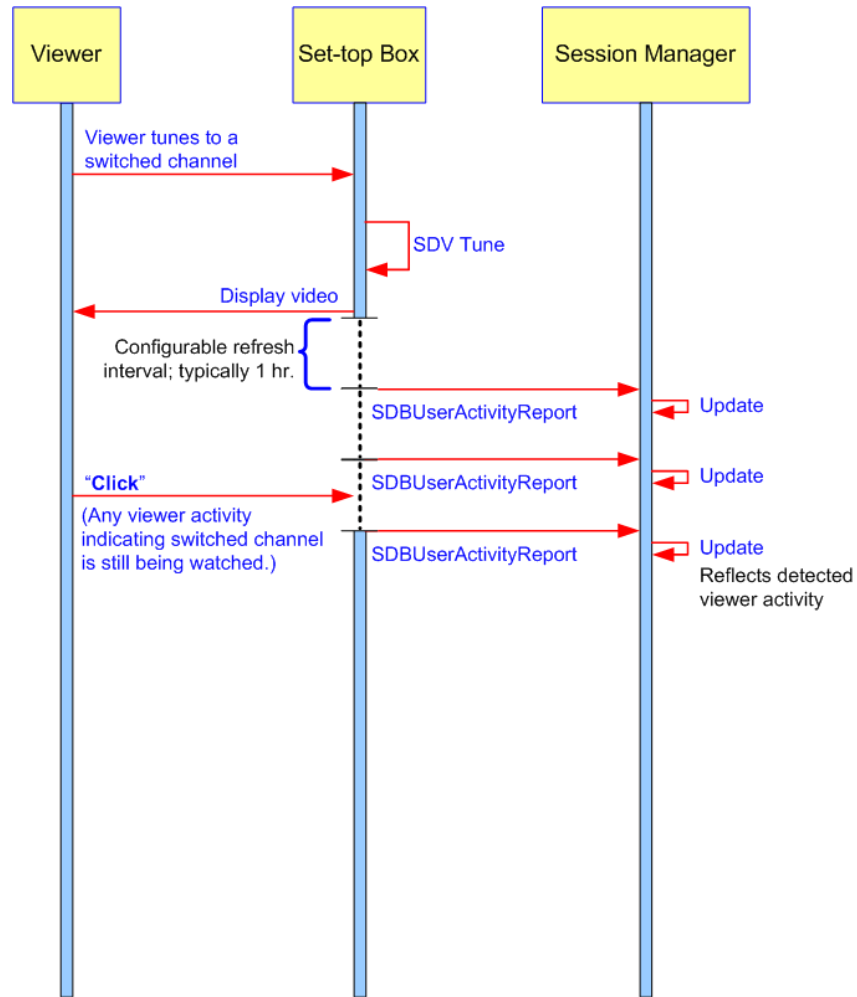
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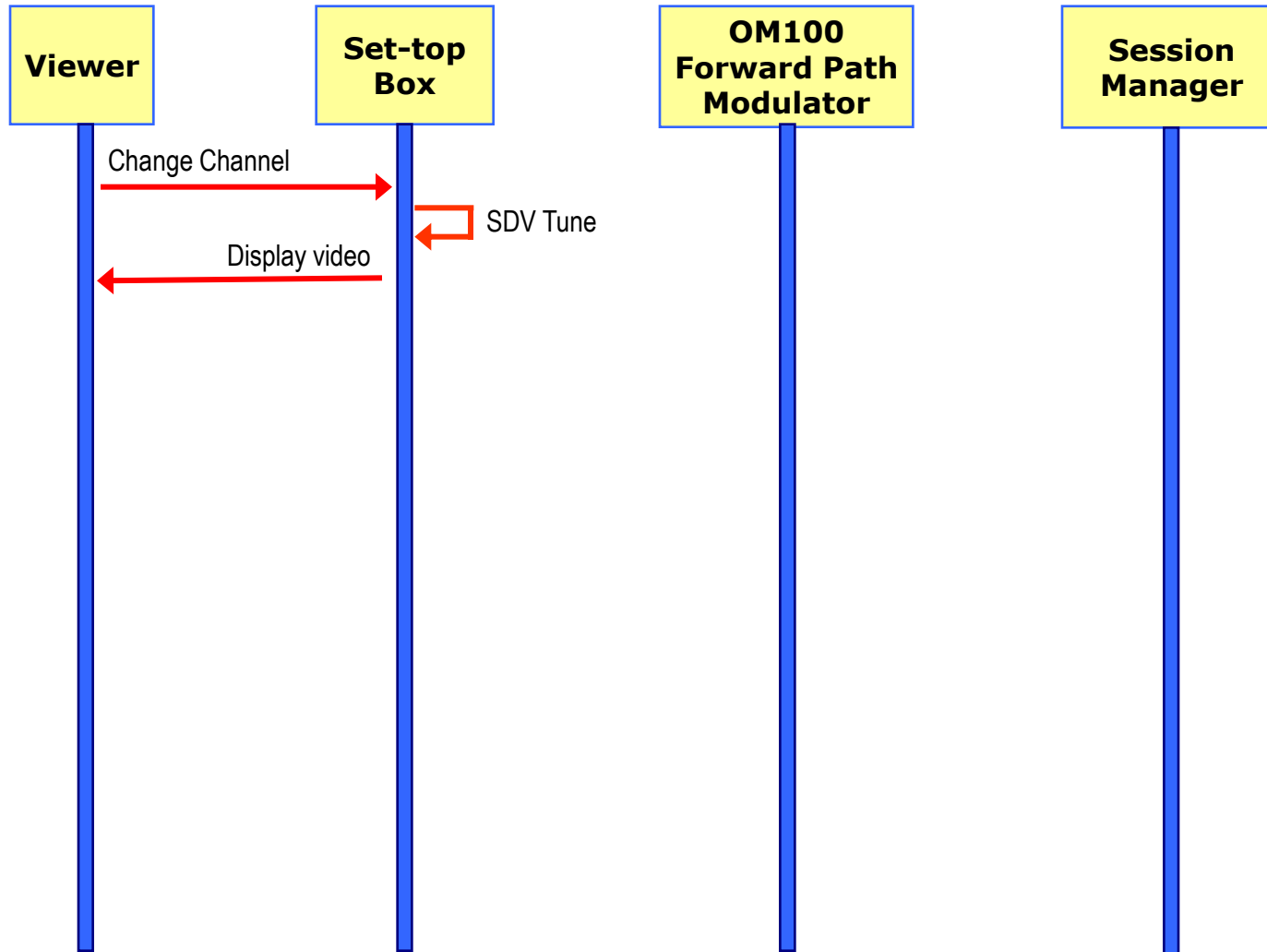
# User Activity Reports



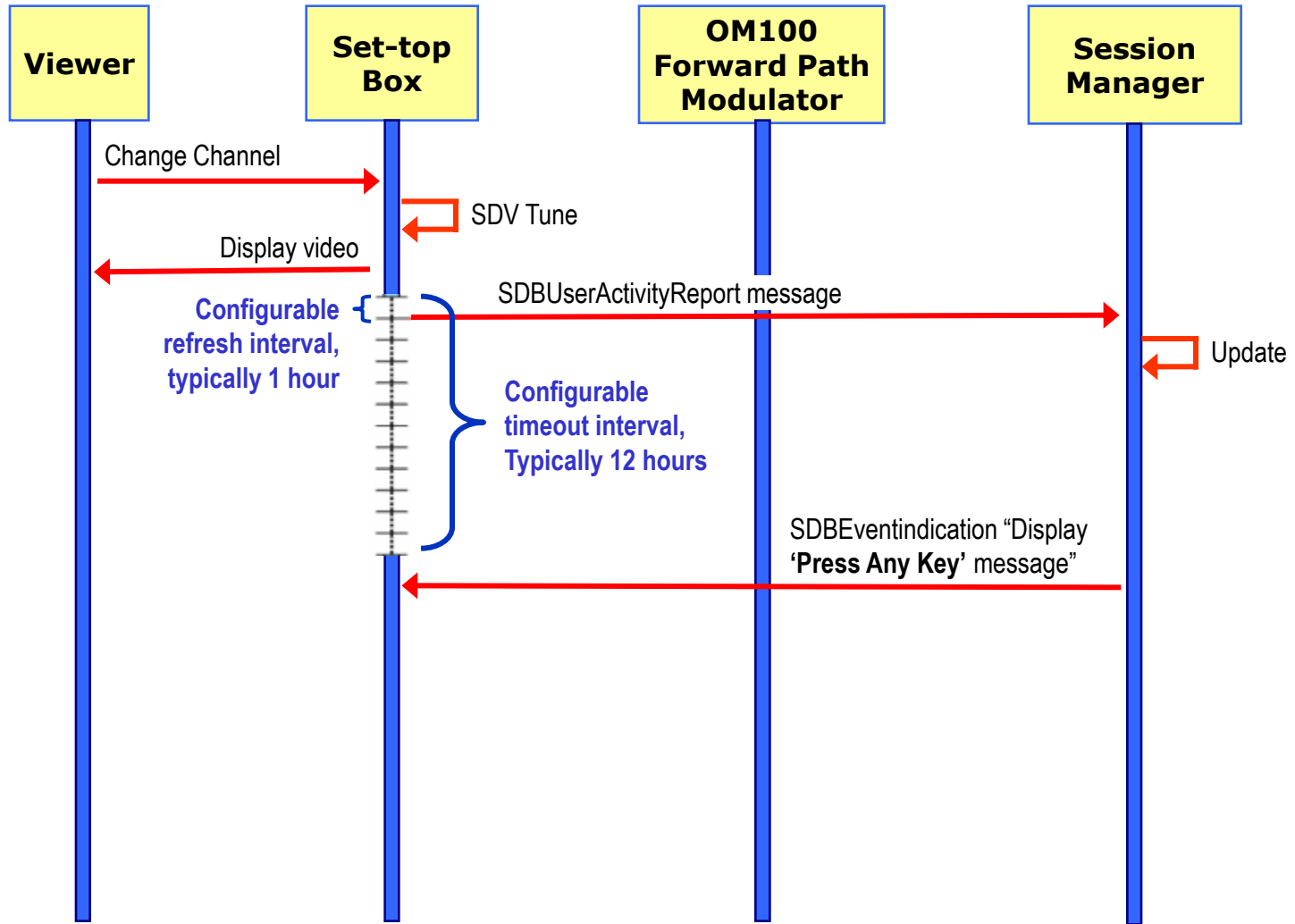
# Client Inactivity (No Response)

## Animated Flow Diagram

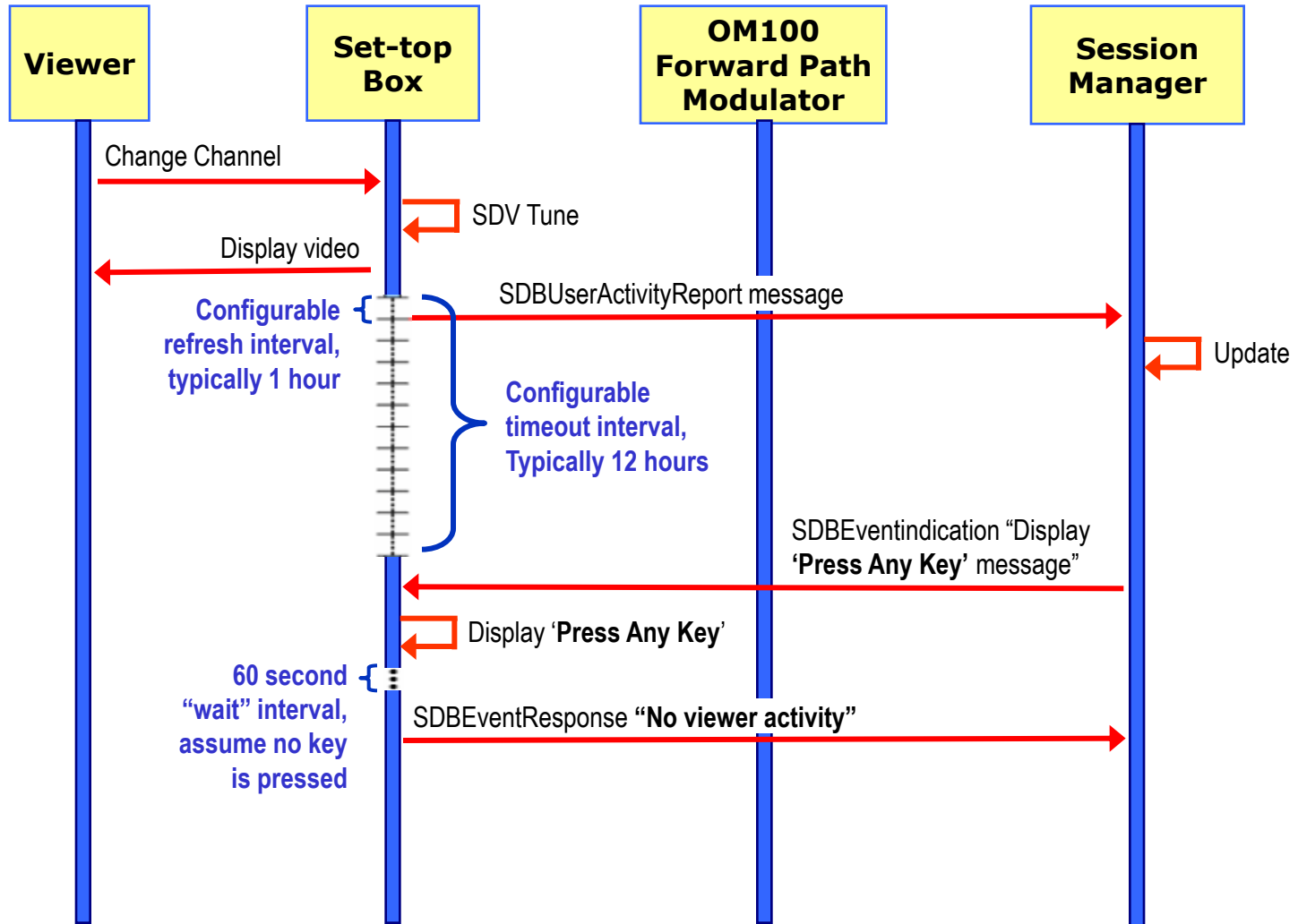
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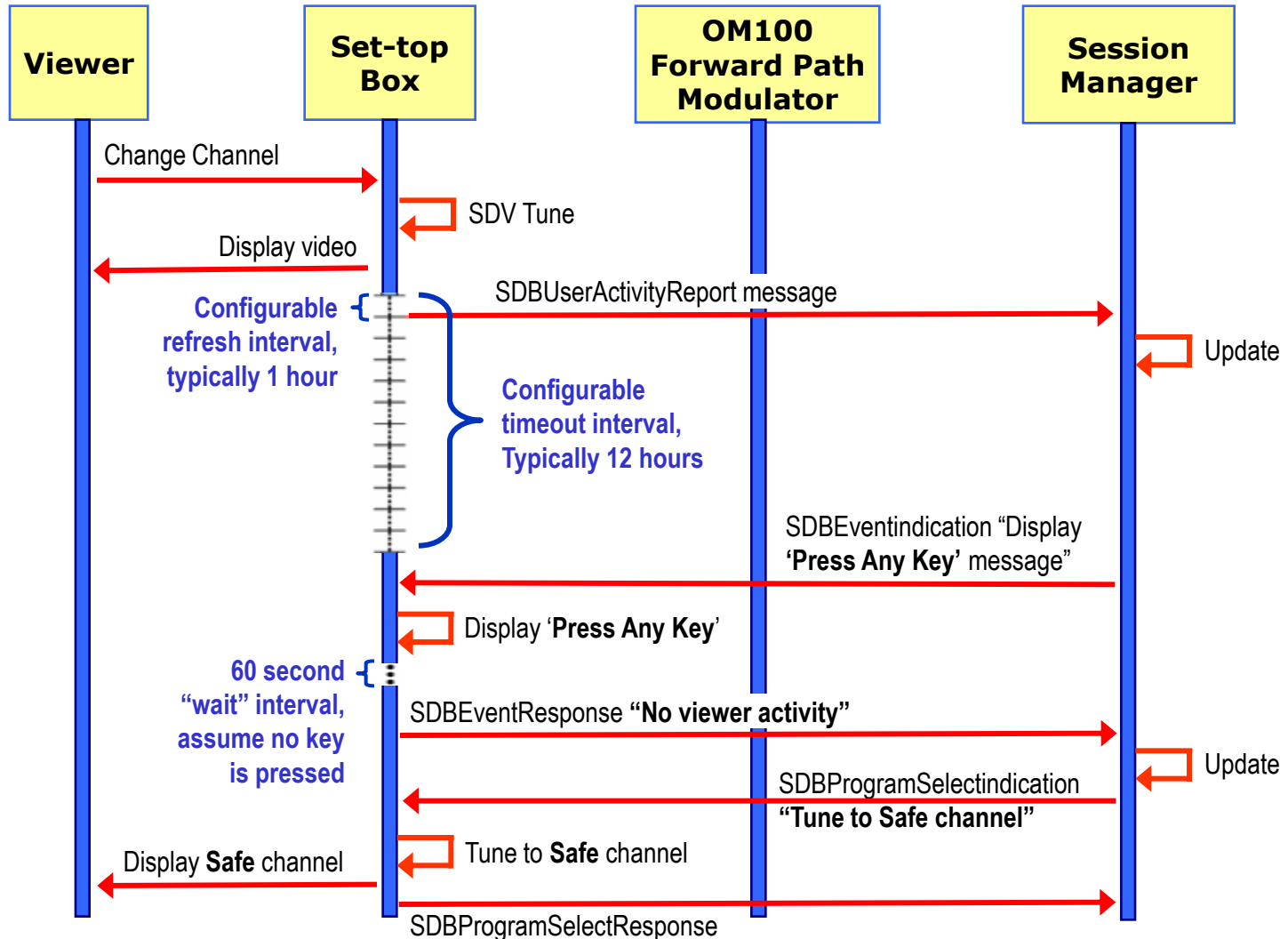
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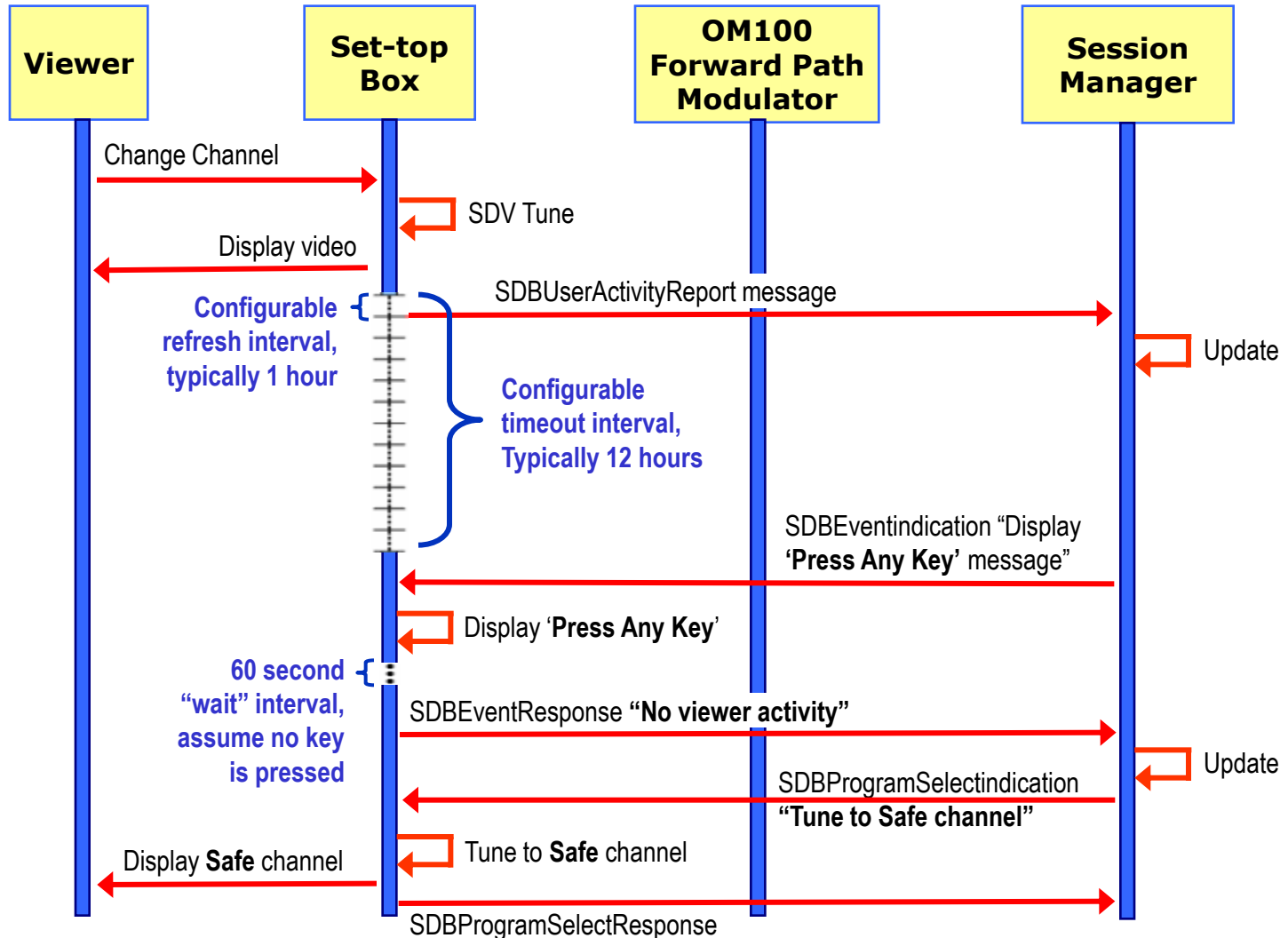
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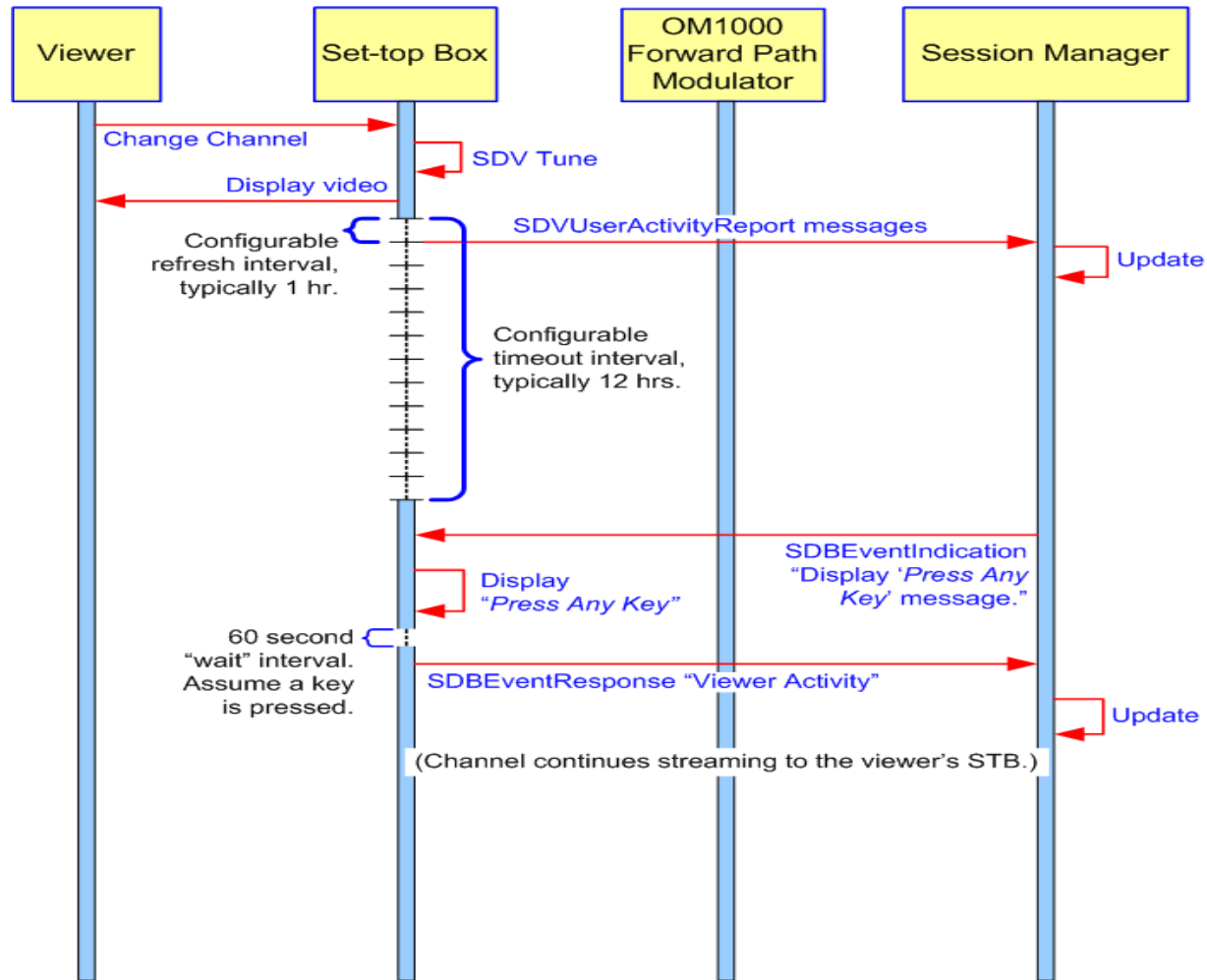
# Client Inactivity (NO Response)



## Forced to Safe Channel



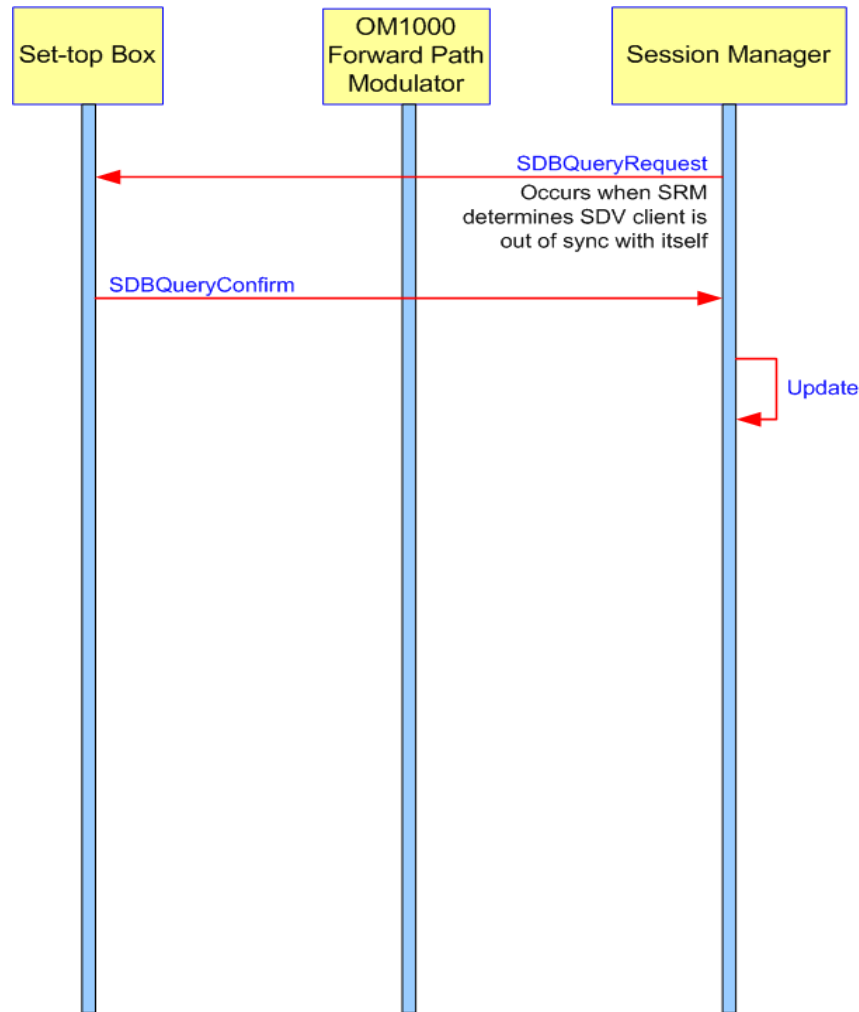
# Check Viewer Presence (Confirmed)



## User Activity Prompt

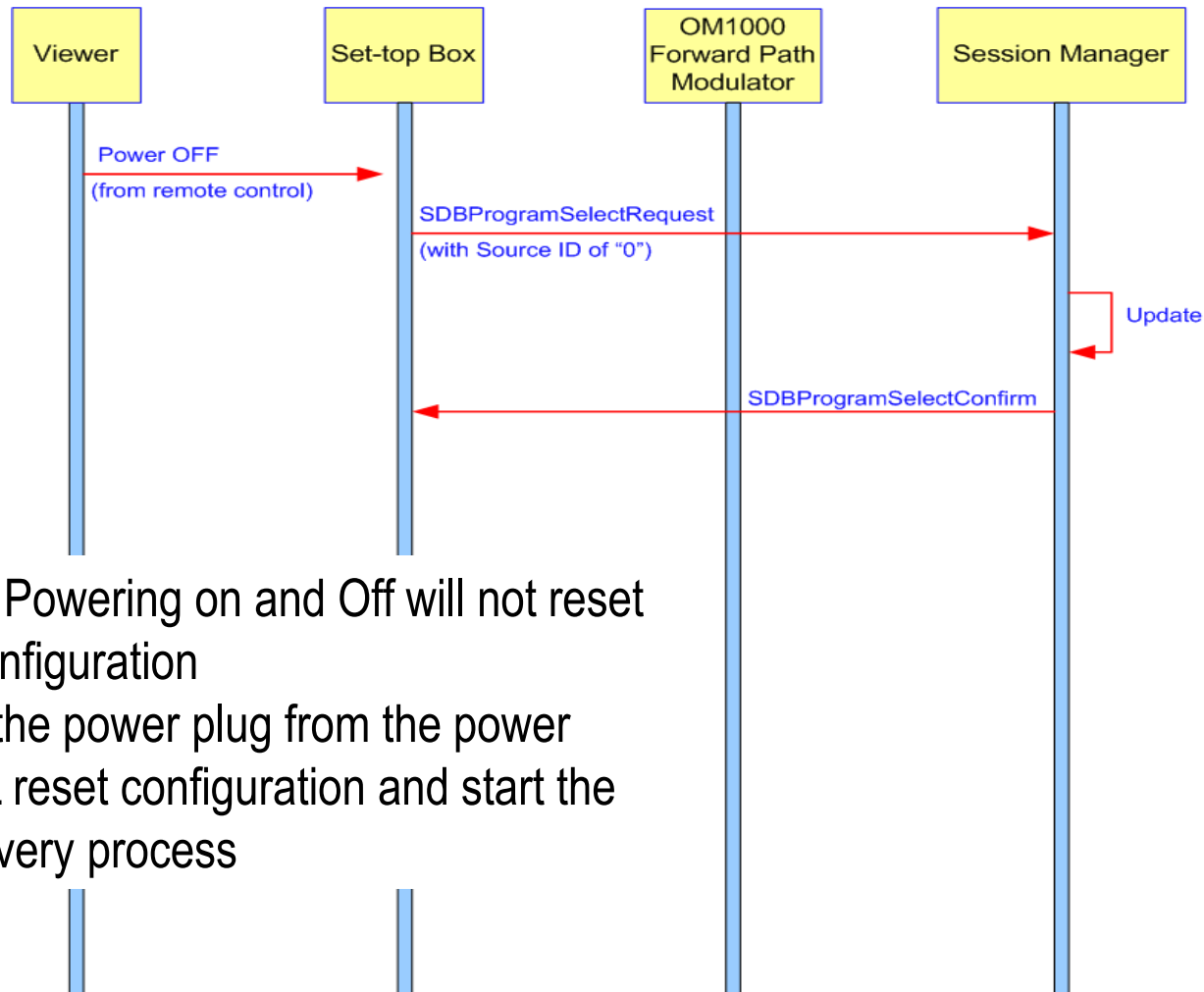


# Session Manager Client Query



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!**