



Making TV Personal

August, 2006

CONFIDENTIAL

POWERING IP TELEVISION™



Mission

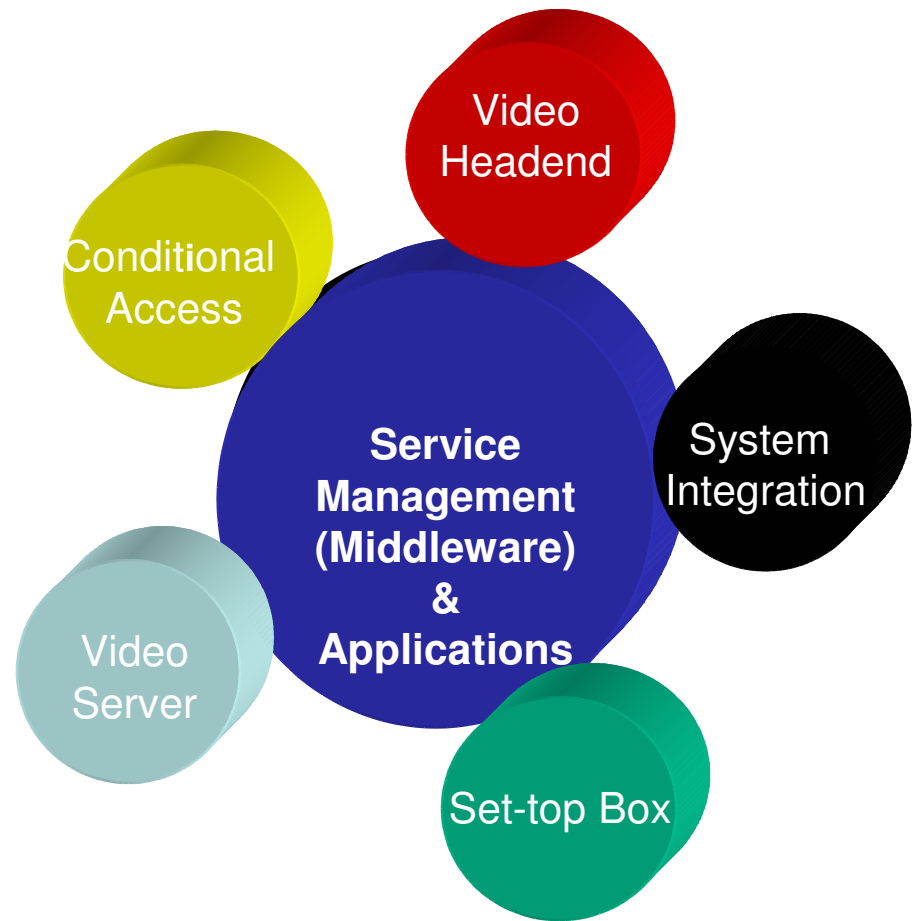
*To be the leading supplier of
“open system” applications and service management platforms
for IP Television*

Minerva Networks: Long History of Technology Leadership

- **Minerva *Compressionist*** **1995**
 - First “human-assisted” MPEG-2 Encoder platform
- **Minerva *Impression*** **1998**
 - First desktop DVD Authoring software (250,000 copies sold in first year)
- **Minerva *Video Network Platform (VNP)*** **1999**
 - First MPEG-2 IP video streaming appliance
- **Minerva *Video Concentrator (VC8000)*** **2002**
 - Highest density IP video encoding/gateway platform
- **Minerva *iTVManager (Apps & Service Management Platform)*** **2003**
 - Selected to power largest IPTV deployment in the United States
- **Minerva *iTVManager*** **2004**
 - Over 40 IPTV deployments worldwide
- **Minerva *iTVManager*** **2005**
 - First IP-based PVR and HDTV deployment

Minerva's IPTV Solution

- **IPTV Middleware & Applications**
 - *Minerva iTVManager*
- **Conditional Access**
 - Integrated with Irdeto and Widevine
 - OEM Agreement with Latens
- **Video Server**
 - Integrated with C-Cor, SeaChange, Entone Kasenna and Bitband
- **Video Headend**
 - Deployed with Tandberg, Harmonic, TUT, Skystream and Optibase
- **Set-top Box**
 - Integrated with Thomson, Amino, i3Micro, Entone and Others
- **System Integration**
 - Partnerships with Nortel, IBM, Italtel, ECI, TUT, Eagle Broadband and Others



Largest Installed Base of IPTV Deployments Worldwide!

Minerva iTVManager Overview

- **Proven**
 - Over 90 installations worldwide
 - Powers largest IPTV deployment in the US (Surewest)
- **Complete**
 - Broad set of basic and advanced services
 - Supports leading Video Servers, CA/DRMs and STBs
- **Customizable**
 - Full control over User Interface
- **Extensible**
 - Open platform with robust APIs
- **Carrier Grade**
 - High availability & scalability
 - Ease of integration with leading BSS/OSS systems

Proven

POWERING IP TELEVISION™



Select Customers (Out of 90+ Deployments)

Midwest Telnet (7 IOCs)	Wisconsin	ADSL
Ringgold Telephone (IOC)	Georgia	ADSL
Twin Valley Telephone (IOC)	Kansas	ADSL
Hargray Communication (IOC)	South Carolina	ADSL
Pembroke Telephone (IOC)	Georgia	ADSL
Matanuska Telephone (IOC)	Alaska	ADSL
Provo (Utility)	Utah	FTTH
Livingston Telephone (IOC)	Texas	ADSL
Surewest Communications (IOC)	California	ADSL/FTTH
Grant County (Utility)	Washington	FTTH
NTS (CLEC)	Texas	FTTH
Project Mutual Telephone (IOC)	Idaho	ADSL
MMPolska	Poland	ADSL/FTTH
Smart Telecom	Ireland	FTTH

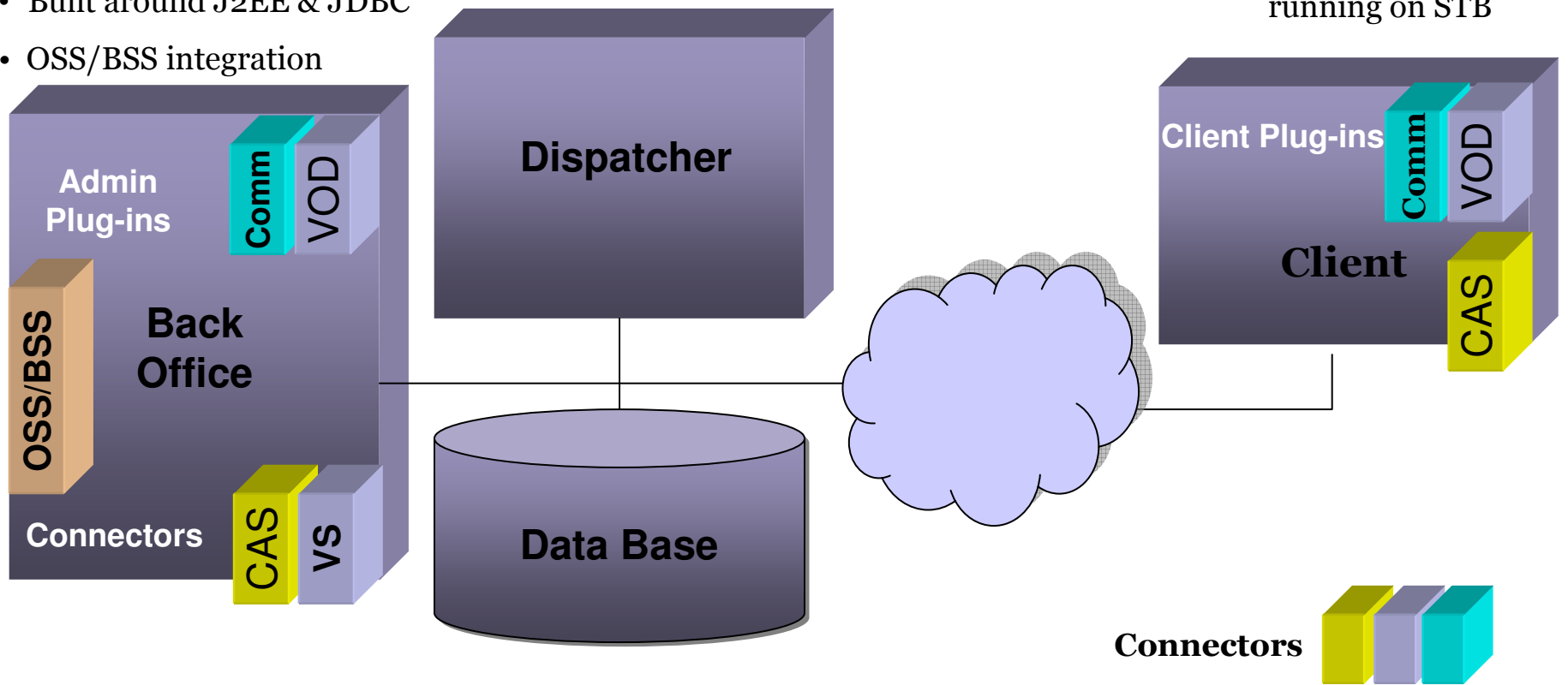
Complete

Architecture Overview

- Business logic execution and distribution of applications, content and meta-data from Back-office to Client

- Built around J2EE & JDBC
- OSS/BSS integration

- Unified user interface environment for native and third-party applications running on STB



Key Components

- **Client**

- Executes service specific applications based on provisioning and entitlement information received from the Back-office via the Dispatcher

- **Back-office**

- Responsible for services provisioning and administration
- Integrates with other components of the services delivery platform via a set of Connectors

- **Dispatcher**

- Responsible for the business logic execution and the communication between Back-office and Client

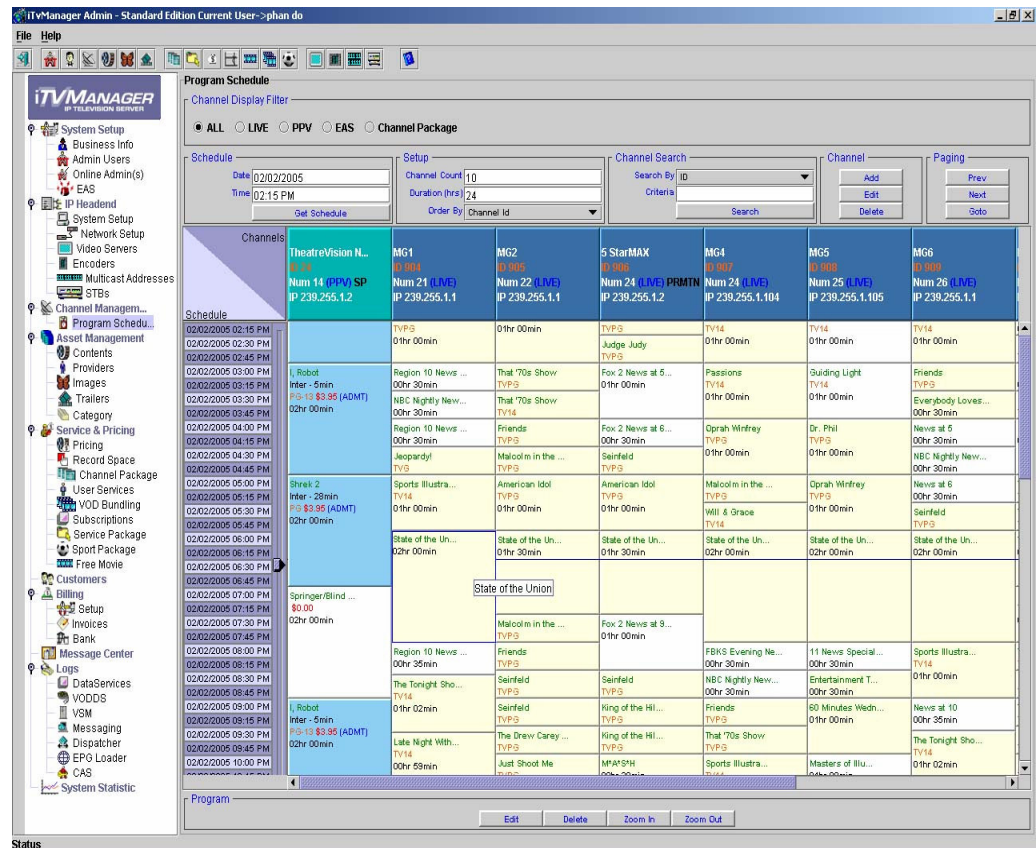
- **Data Base**

- Stores data needed to configure, maintain and operate services

Back-Office Module

• Management Tools:

- STB & subscriber management
- Content acquisition
- Asset management
- EPG creation and maintenance
- Pay-per-View management
- PPV scheduling
- SVOD bundling
- VOD server management
- T-commerce packages creation
- Service pricing
- Usage analysis and reporting
- Client messaging
- Caller ID management
- Emergency Alert System (EAS)
- More ...



EPG Creation Module

Minerva Client Applications

- **Key Features**

- Electronic Program Guide
- Live Pay-Per-View
- VOD and SVOD
- HDTV
- PVR (DVR)
- Caller ID
- On Screen Messaging
- Web Portal Access
- Web E-mail Access
- Bill Preview
- Channel blocking
- Parental Control
- EAS
- On screen keyboard
- Multiple user accounts
- Search
- More...



Customizable

Customization & Personalization

- Base set of UI templates
- User selectable themes
- Mosaic (thumbnail view of channels)

The screenshot displays a television guide interface. At the top, a program card for "First Love, Last Rites" is shown, featuring a thumbnail of vintage cars, the title, release year (1998), genre (Drama), and runtime (95 min, R). Below the title is a synopsis: "Over the course of a Louisiana summer, a young couple experiences their first relationship." The cast members "Natasha Gregson Wagner, Giovanni Ribisi" are listed. The start time is "7:20PM". Logos for "DOLBY DIGITAL", "SAP", and "Minerva Networks" are visible. Below the program card is a time slot selector for "Tue, June 1" with options for "7:00 PM", "7:30 PM", and "8:00 PM". The "7:00 PM" slot is highlighted. Underneath is a channel mosaic grid with five rows of channel options (101-105) and their corresponding program titles. The "105 HBO" row is highlighted, and the program "First Love, Last Rites" is listed in the adjacent cell.

Tue, June 1	7:00 PM	7:30 PM	8:00 PM
101 MTV	MTV Video Music Awards	Undressed	
102 MTV2	Radiohead in Concert	MTV2	
103 APLT	Crocodile Hun...	Crocodile Hun...	Crocodile Hun...
104 BRVO	The Hudsucker Proxy		
105 HBO	First Love, Last Rites		

Paycheck

7:00 pm - 9:30 pm, Drama, PG-13, (2003)

After learning that his memory has been erased, a technical wizard goes on the run to piece together clues from his his past.

Directed by John Woo.

Ben Affleck, Aaron Eckhart

7:20PM   SAP



My Faves

Tue, June 1

7:00 PM

7:30 PM

8:00 PM

101 MTV

◀ MTV Video Music Awards

Cribs ▶

102 MTV

Radiohead in Concert

Hip-Hop

103 APL

◀ Master and... ▶

104 BRV

The Hudsucker Proxy

105 HBO

Paycheck



Paycheck

7:00 pm - 9:30 pm, Drama, PG-13, (2003)

After learning that his memory has been erased, a technical wizard goes on the run to piece together clues from his his past.

Directed by John Woo.

Ben Affleck, Aaron Eckhart

7:20PM



SAP



All Channels

Tue, June 1

7:00 PM

7:30 PM

8:00 PM

101 MTV ▶

MTV Video Music Awards

Cribs

102 MTV

Radiohead in Concert

⚽ Hip-Hop

103 APL

◀ Master and... ▶

104 BRV

◀ The Hudsucker Proxy ▶ ⌚

105 HBO

Paycheck



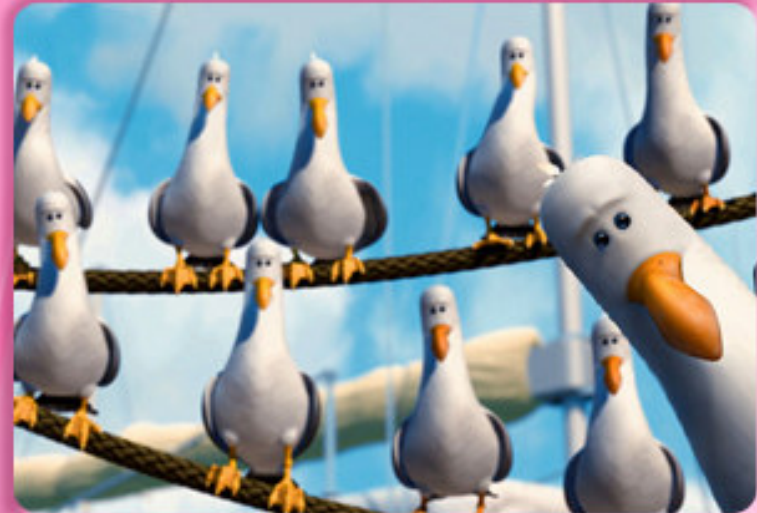
Paycheck

7:00 pm - 9:30 pm, Drama, PG-13, (2003)

After learning that his memory has been erased, a technical wizard goes on the run to piece together clues from his his past.
Directed by John Woo.

Ben Affleck, Aaron Eckhart

7:20PM **SAP**



My Faves

Tue, June 1

7:00 PM

7:30 PM

8:00 PM

101 MTV

◀ MTV Video Music Awards

Cribs

102 MTV

Radiohead in Concert

Hip-Hop

103 APL

◀ Master and...

104 BRV

The Hudsucker Proxy

105 HBO

Paycheck





Time remaining in preview: 4 min



**SEL
122**

Dancer in the Dark (★★★★)

Price: \$4.99

PPV

Selma is a Czech immigrant, a single mother working in 1960s rural America.

(2001: Drama, 162 min, NC-17)



Time remaining in preview: 4 min



WGN
23

Paycheck

7:00 pm - 9:30 pm, Drama, PG-13, (2003)

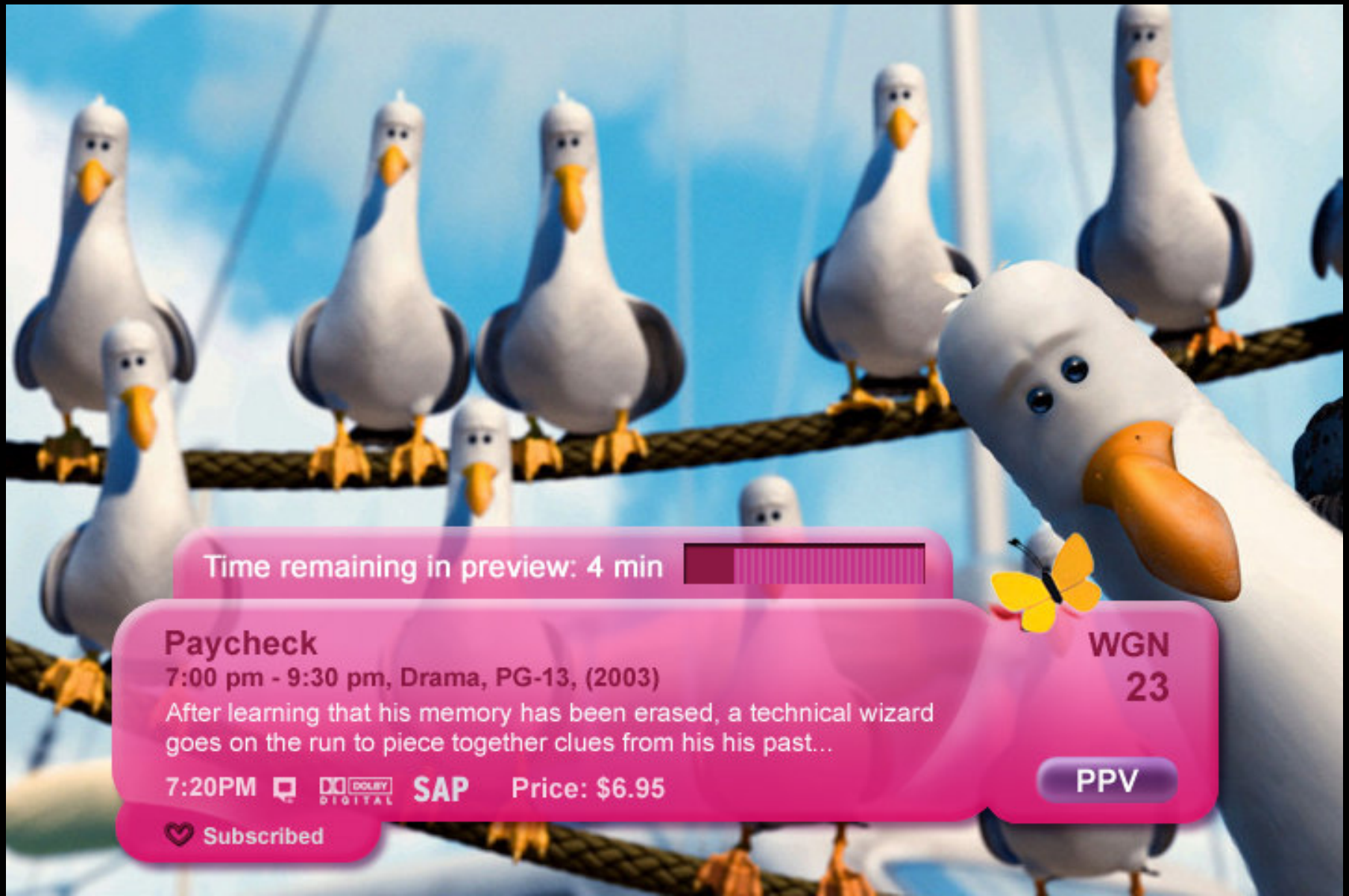
After learning that his memory has been erased, a technical wizard goes on the run to piece together clues from his his past. Directed by John Woo.

7:20PM



PPV





Time remaining in preview: 4 min



Paycheck

7:00 pm - 9:30 pm, Drama, PG-13, (2003)

After learning that his memory has been erased, a technical wizard goes on the run to piece together clues from his his past...

7:20PM **SAP** Price: \$6.95

Subscribed



WGN
23

PPV



Parental Controls



Guide



Rentals



Vault



Specials



POWERING IP TELEVISION™





12/23/2005
12:05PM
User Name

Guide

PVR

Rentals

Vault

Video Packages

Parental Controls

Specials

Settings

Favorites





12/23/2005 | 12:05PM
User Name

Guide

PVR

Rentals

Vault

Video Packages

Parental Controls

Specials

Settings

Favorites

text & Talk



Sponsored Co-Branding



The image shows a television screen displaying a scene from the anime 'Sword of the Stranger'. Three characters are visible: a woman in a black mask and suit on the left, a woman in a brown high-collared dress in the center, and a woman in a school uniform on the right. A semi-transparent grey menu overlay is positioned on the left side of the screen. The menu features the Minerva Networks logo at the top, followed by a list of green buttons with white text: GUIDE, PVR, RENTALS, VAULT, VIDEO PACKAGES, PARENTAL CONTROLS OFF, SPECIALS, SETTINGS, and FAVORITES. At the bottom of the menu, the text '12/23/05 | 12:05 PM | User Name' is displayed.

Minerva Networks

GUIDE

PVR

RENTALS

VAULT

VIDEO PACKAGES

PARENTAL CONTROLS OFF

SPECIALS

SETTINGS

FAVORITES

12/23/05 | 12:05 PM | User Name



Mosaic View

- Single stream of blended channels
- Live video in each thumbnail
- Highlighting thumbnail tunes to audio on that channel
- Selecting thumbnail tunes to channel



Picture In Picture (H2 2006)

- Available with multi-stream capable STBs (next generation system-on-a-chip design)
- Surf and preview channels while watching another channel
- EPG or info bar surfing
- Supports video from VOD library

Paycheck
5:00 pm - 7:30 pm, Drama, PG-13, (2003)
After learning that his memory has been erased, a technical wizard goes on the run to piece together clues from his his past.
Starring Ben Affleck, Aaron Eckhart - Directed by John Woo
7:20PM **SAP**

Minerva Networks

Subscribed

Tue, June 1

	7:00 PM	7:30 PM	8:00 PM
101 MTV	MTV Video Music Awards	Cribs	
102 MTV	Radiohead in Concert	Hip-Hop	
103 APL	Master and Commander	The Sea...	
104 BRV	The Hudsuc...	Queer Eye...	Hairspray
105 HBO	Paycheck	Six feet Under	

105 | HBO Subscribed

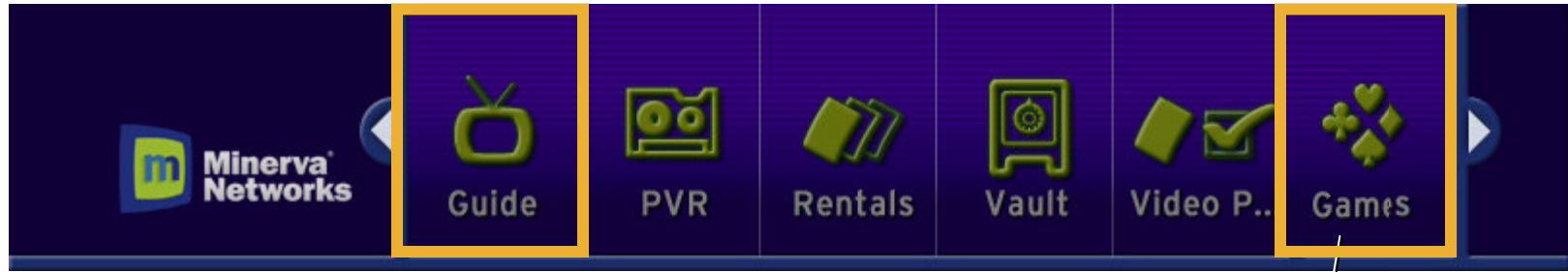
The Geisha ★★★ 7:20PM
7:00 pm - 9:30 pm, Drama, PG-13, (2003)
In the years before World War II, a Japanese child is torn from her penniless family to work as a geisha house.
Price \$4.55 **PPV**

Extensible

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Third-Party Web Applications



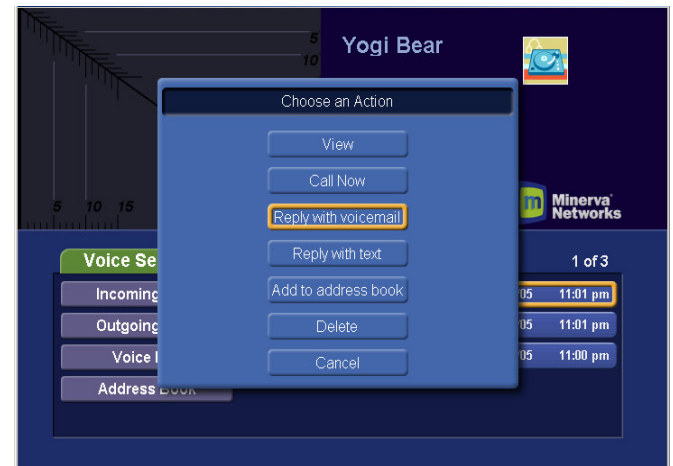
New Button in Menu bar to switch to application



Game images from arkadium

Voice And Text Communications

- Voice services (Call back, call to voice mail)
- Messaging services (Text messaging, IM)
- Personal address book



Advertising/Marketing Module

- On demand advertising (e.g. Yellow pages)
- T-commerce (e.g. Branded storefront)
- Transaction profiling (e.g. View/click tracking)

Bozo's Best Parties 555-1212
 Everything you need for kid, office, theme and student parties. Come in for all your party planning needs.
 Visit our website at www.bozosbest.com

Desperate Housewives

Yellow Pages All (1 of 8)

Party Supplies	Bozo's Best Parties
Pets	Halls and Marks Cards
Pharmacy	Minnie's Mints & Muffins
Pizza	Party Pooper's Poppers
Plumbers	Yo, Great Party Dude

Book Store All (1 of 1500)

All	Harry Potter, Half Blood Prince
Drama	Angels & Demons
Romance	The Kite Runner
Suspense	1776
Mystery	Freakonomics, A Rogue Econ...

Harry Potter, Half Blood Prince \$16.99
 The war against Voldemort is not going well; even Muggle governments are noticing. Ron scans the obituary pages of the Daily Prophet, looking for familiar names. Dumbledore is absent from Hogwarts for long stretches of time, and the Order of the Phoenix has already suffered losses. And yet . . .

Interactive Applications

- **Application Examples**

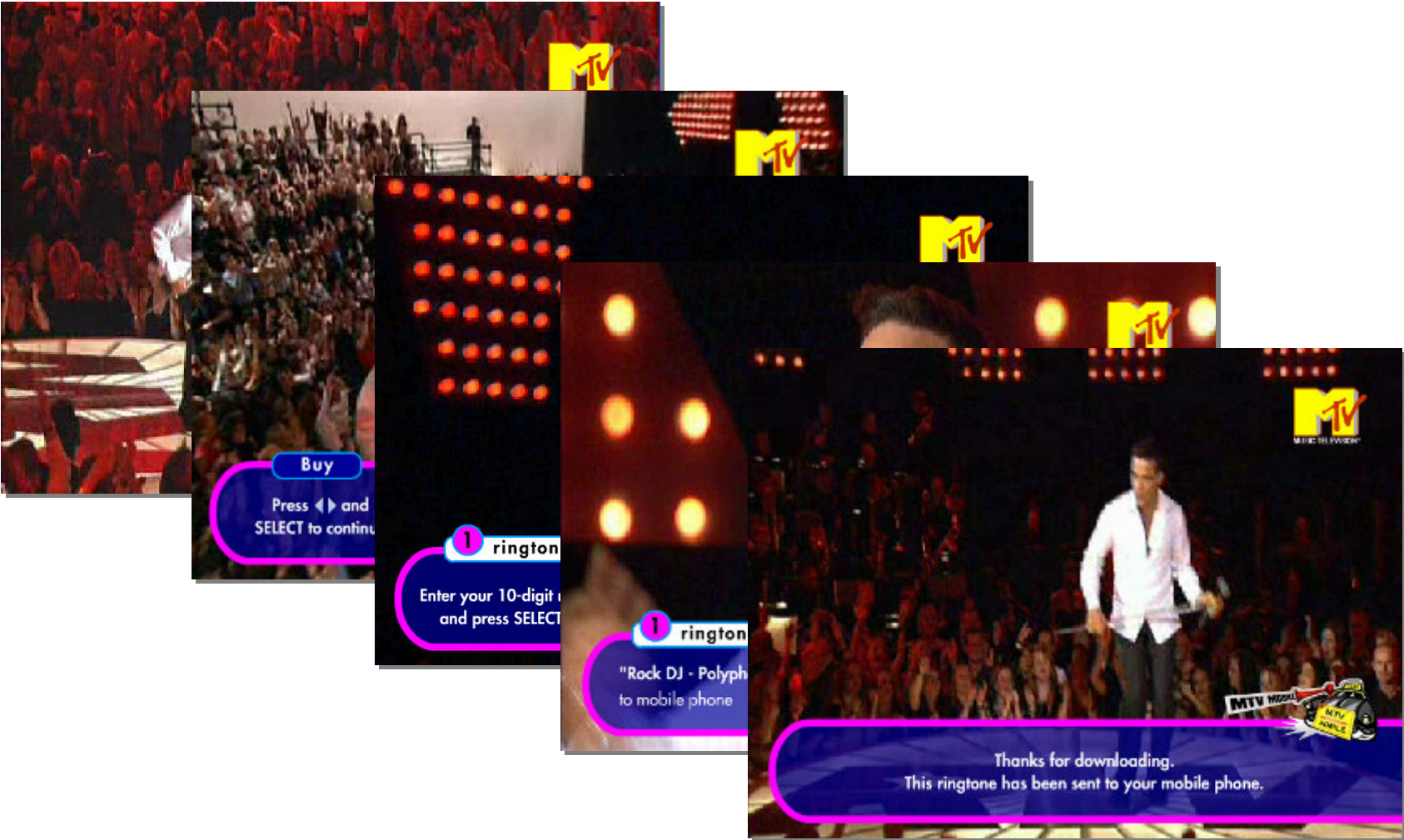
- Telescopic advertising
- Remote learning
- Polls
- Guided viewing
- T-commerce
- Recommendations

- **Process Flow**

- STB calls Server after trigger event
- Server controls STB UI
- STB takes action (e.g., Play VOD) and reports selection to Server



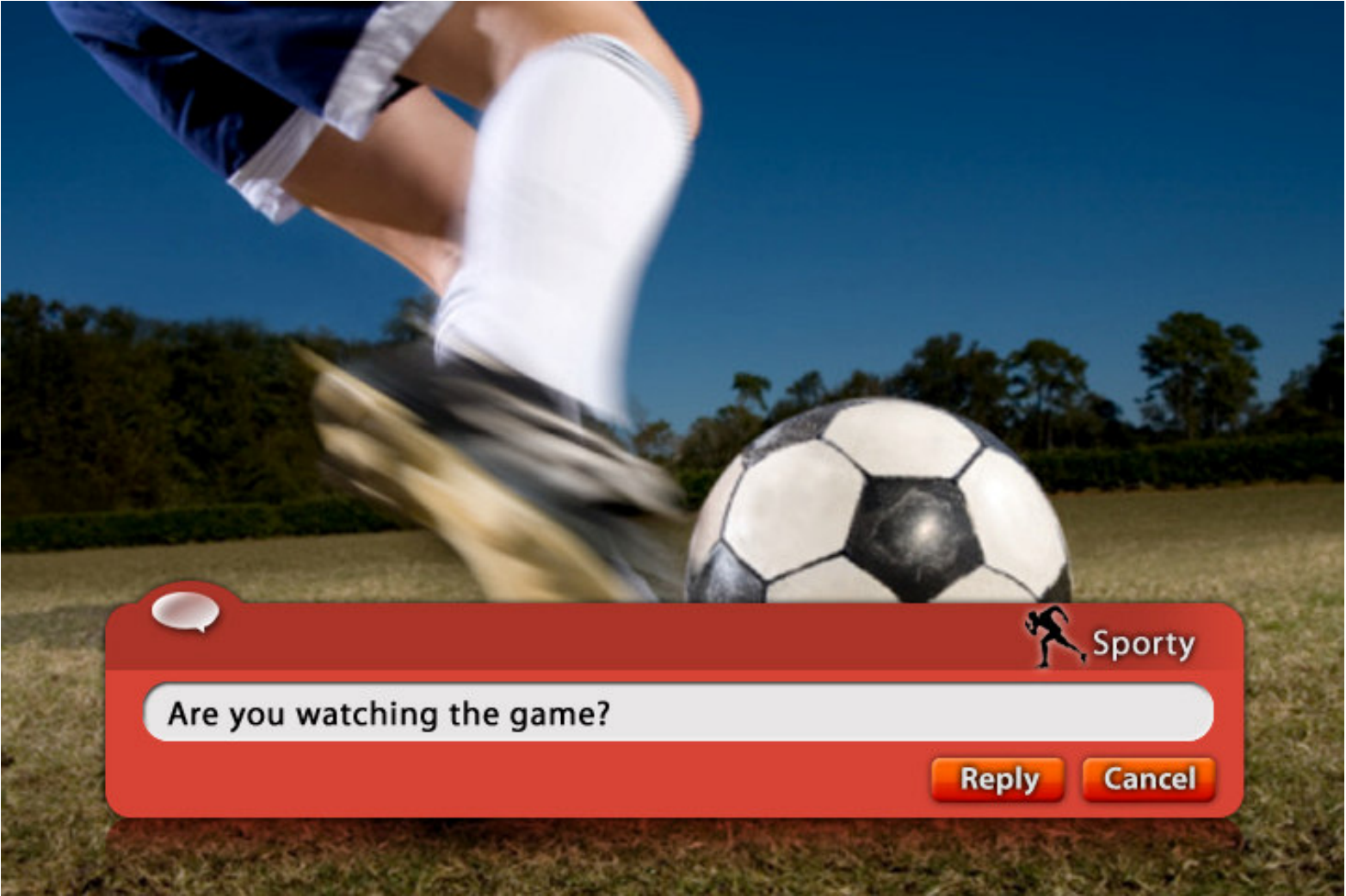
Interactive Applications: Itaas



Open: Interactive Viewing API's



Open: Interactive Viewing API's



Open: Advertisement Insertion API's



IPTV Services Platform APIs

- **Published APIs**

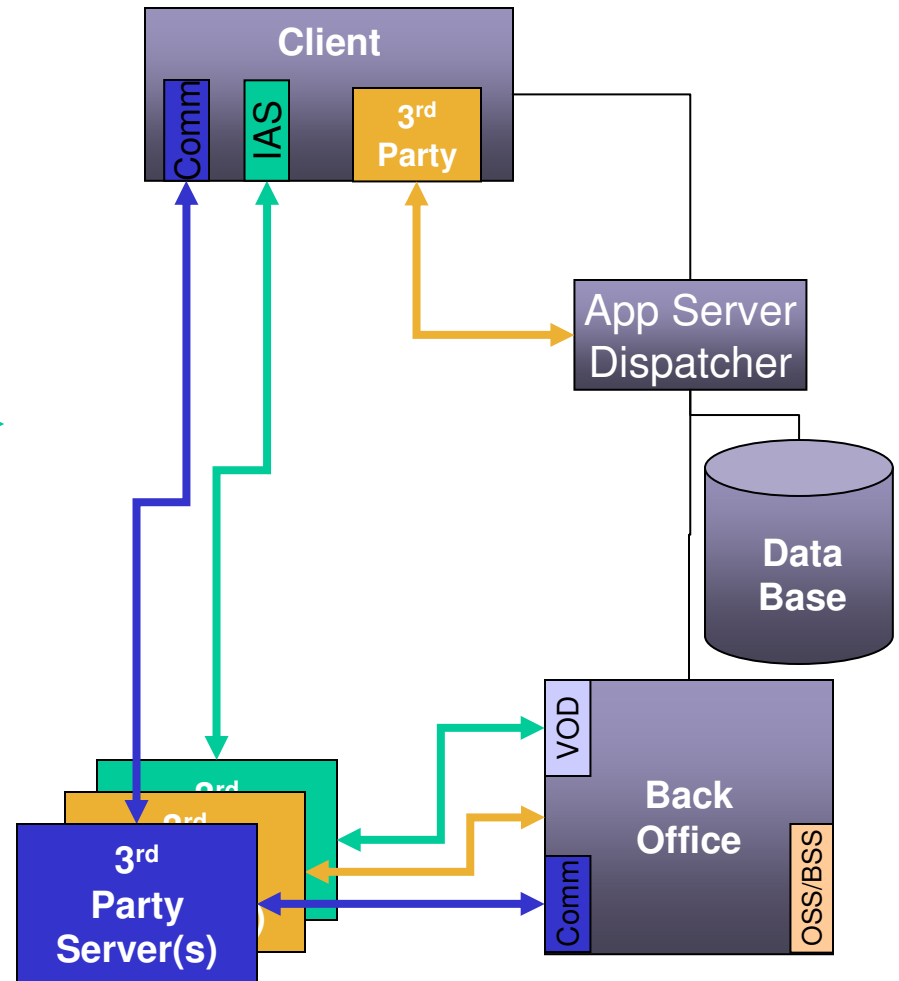
- OSS/BSS+
- VOD+
- CA+
- STB Application porting layer+
- QoS API+

- **Draft APIs**

- App Server Query* ↔
- Communications Services* ↔
- Interactive Application Services* ↔
- Client Data Services**
(integrated client applications)
- Application Context Switching
(standalone client applications)

- **Future**

- Javascript

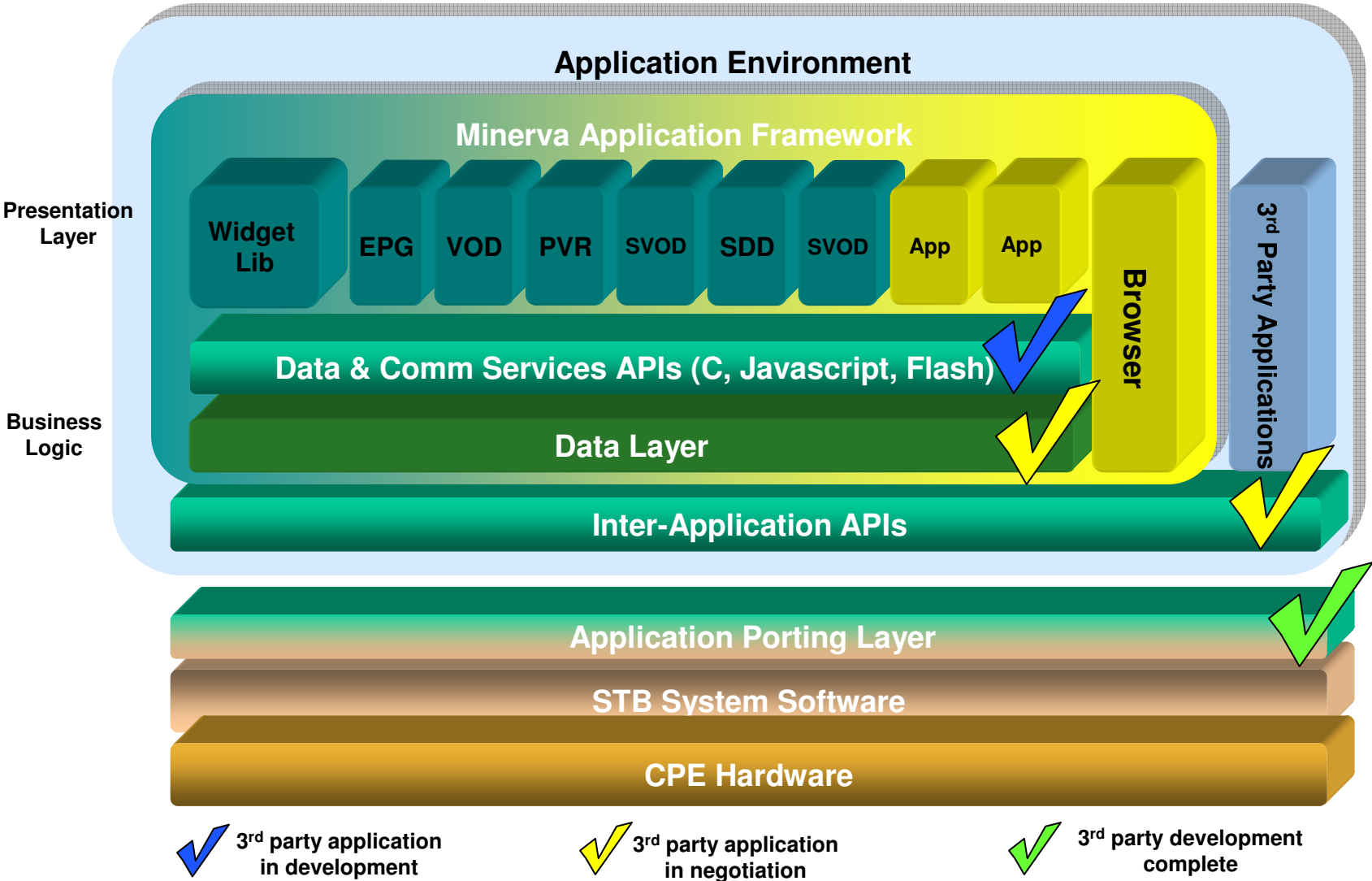


+ Third party development complete & in production

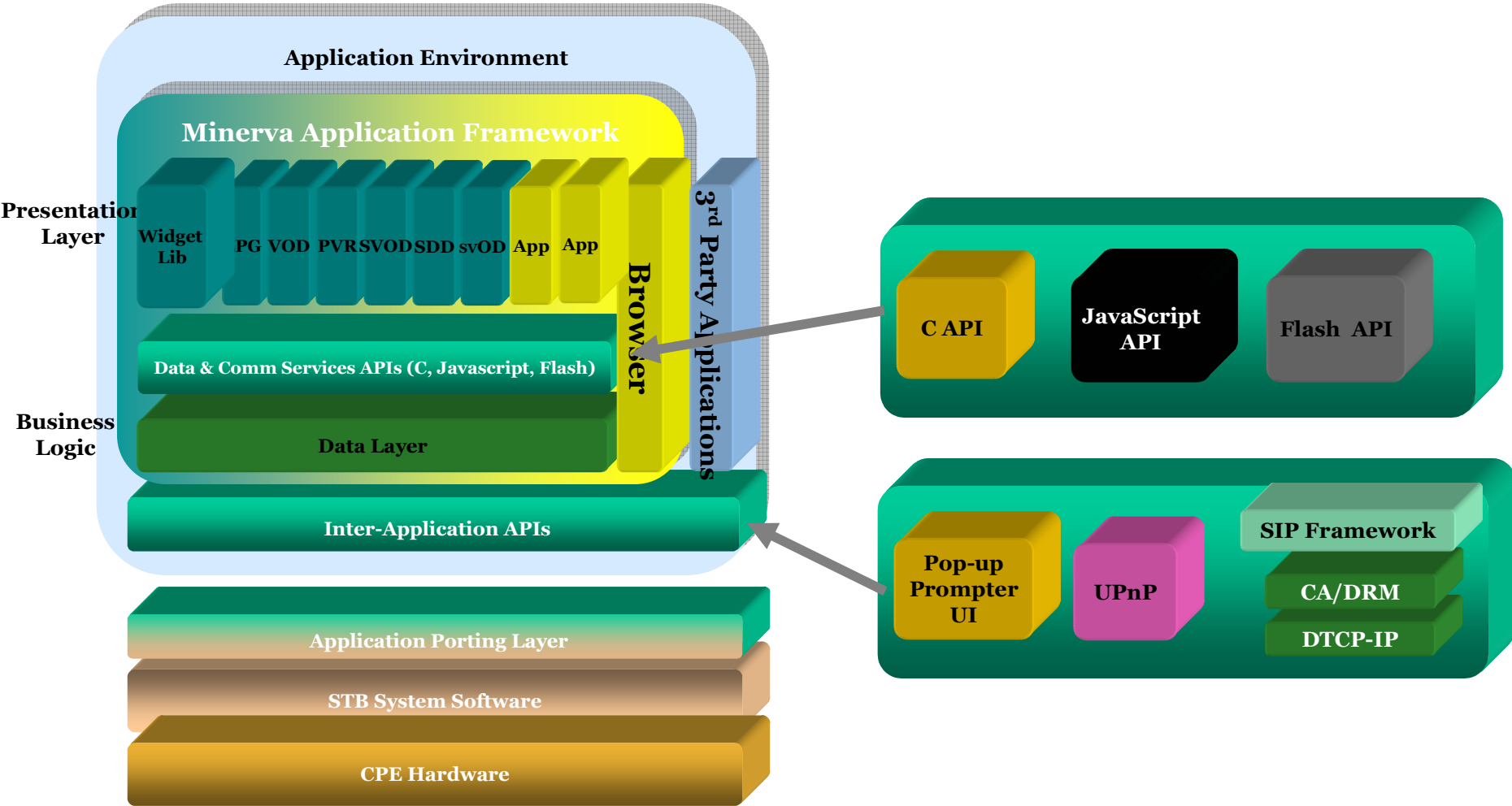
* Third party application under development

** Third party negotiations in progress

Client Software Architecture



Client Software Architecture (Cont)



Carrier Grade

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Administration and Management Platform

- **Complete set of APIs for integration with OSS/BSS**
- **STB management tools**
 - OS and application upgrade monitoring
 - STB status reports (offline/online)
 - HD and multi-stream control
- **Messaging tools**
 - Single or broadcast messaging
 - System alerts
 - Billing reminders
- **Streamlined Local EPG and VOD metadata input**
- **Multi-channel, multi-region support**
- **Database maintenance suite**

Auto Provisioning

- **Simple STB Deployment Process**

- Set up customer account
- Define maximum number of STBs for the account
 - Install STB at user location
 - Upon boot-up, STB prompts user for account code
 - STB is activated and assigned to the account
- No need to pre-assign STB prior to actual installation

- **High Security**

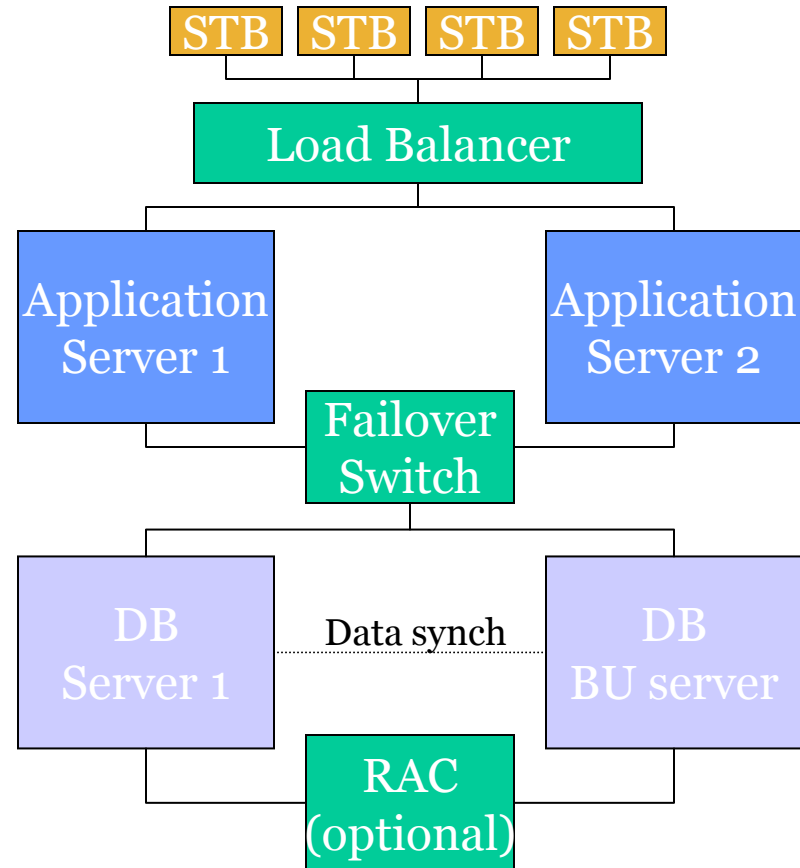
- Max limit prevents unauthorized STBs from being assigned to an account
- Max limit prevents authorized STB from being assigned to the wrong account

- **Device Database Maintenance**

- STBs taken out of service must be removed from DB before a new or replacement unit is activated

High Availability

- Load balancing
- Data backup & recovery
- System failover (RAC)
- Disaster recovery



High Scalability

- **Services**

- Modular Architecture
- Optimized (CPU & Memory) graphics primitives
- Optimized “Widgets” suited to TV experience
- Rich set of Inter-application APIs
- “Data Windowing” functionality for dynamic and flexible data caching

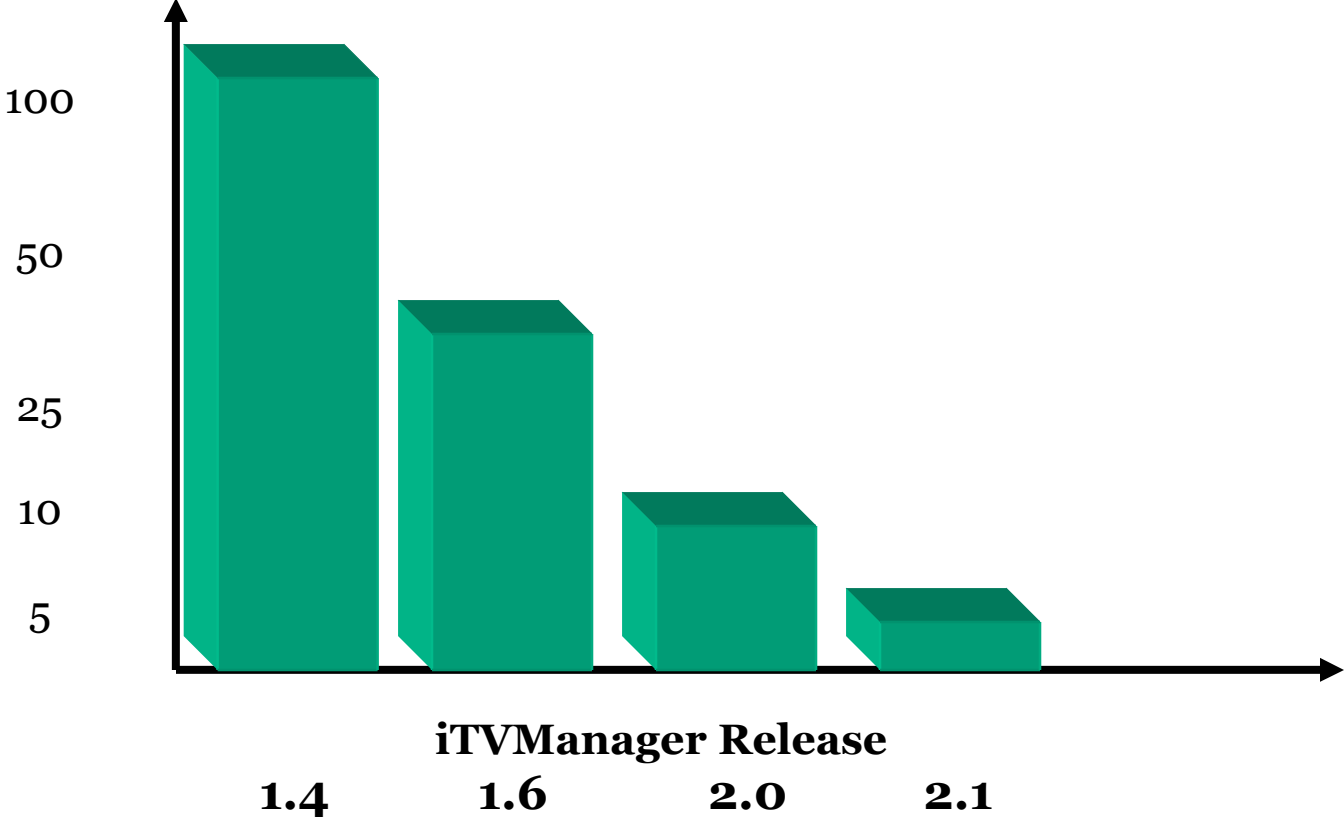
- **Subscribers**

- Error resilient STB client module
- Robust Back-office driven multicast messaging
- Data compression
- Caching in STB of vital service and entitlement information
- Service specific data caching for high responsiveness

Scalability Test Results

Normalized
Back-office
Load per
Subscriber

Continuous improvement of subscriber
service load performance



iTVManager 3.x Overview

iTVmanager 3.x Key Features

- Region and channel mgmt
 - Multi-region support
 - Multi-channel lineup
 - A la carte channel structure
 - URL channels
- Client software enhancements
 - User selectable UI
 - Video in browser
 - Improved customizability
 - Viewer statistics
 - UI customization kit
- Administration
 - HD and PVR management
 - Consolidated boot stream for all STBs
 - Expanded APIs
- High availability ready
- Platform upgrade (Red Hat, Oracle, Java)

System Set-up

Bookend Channel Manager

Encoder



Edit Multicast Stream Set

Multicast Stream Set

ID: 1

Name: Primary Dispatcher

Type: Primary

Description:

Run Time Stream: 239.192.55.10

Run Time Stream Port: 4545

Run Time Stream Bit Rate (Kbit/s): 3000

Service Message Stream: 239.192.55.11

Service Message Stream Port: 4545

Service Message Stream Bit Rate (Kbit/s): 128

HA Timeout for Primary and Redundants (seconds): 15

HA Timeout until Alternatives (minutes): 15

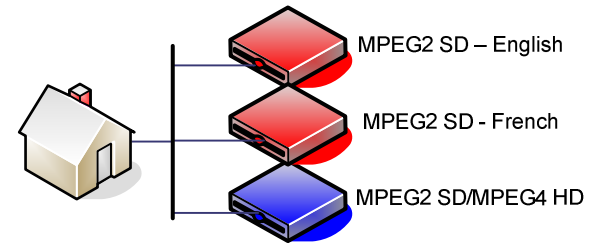
STB Boot Stream

ID	Stream Multicast_Ip	Stream Port	Transfer Rate(Kb/s)	Skin	STB Name	Language
1	239.192....	4545	3000	EN	Thomson;Amino;Other;...	Eng...
2	239.192....	4545	3000	FR	Amino;Amino120;Amin...	Fre...

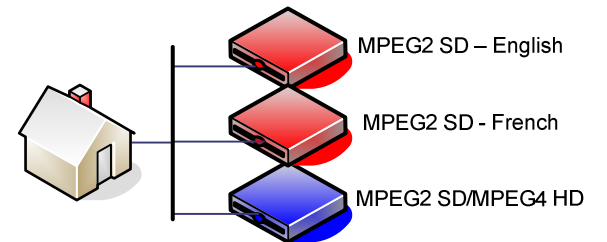
Buttons: Add, Delete, Up, Down, Submit, Cancel

Java Applet Window

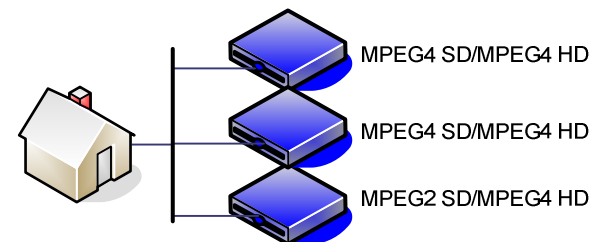
Region #1: English - Lineup #1 MPEG2SD/MPEG4HD



Region #2: French - Lineup #1 MPEG2SD/MPEG4HD



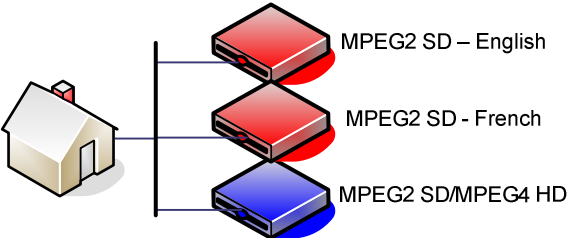
Region #3: English - Lineup #2 Only MPEG4



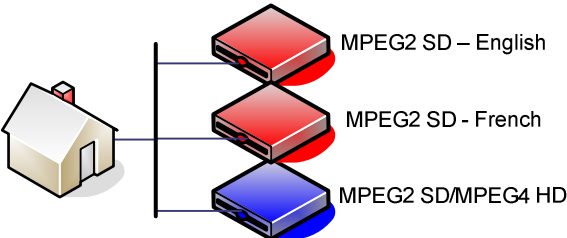
System Set-up cont.

Add Regions

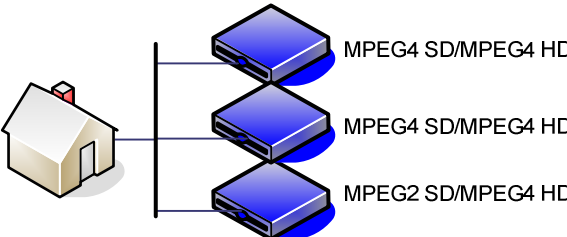
Region #1: English - Lineup #1 MPEG2SD/MPEG4HD



Region #2: French - Lineup #1 MPEG2SD/MPEG4HD



Region #3: English - Lineup #2 Only MPEG4



Encoders



Channels



Edit Localization
✕

Localization

ID	1
Name	Default
Description	
Country Code	US
Currency Symbol	\$
Decimal Style	9999.99
Date Style	MM/dd/yyyy
Time Style	HH:mm
Timezone	Canada/Pacific
Channel Lineup	MINH LINEUP
Boot Stream(s)	239.192.55.13 FR; FR (2) 239.192.55.12 EN; EN (2)

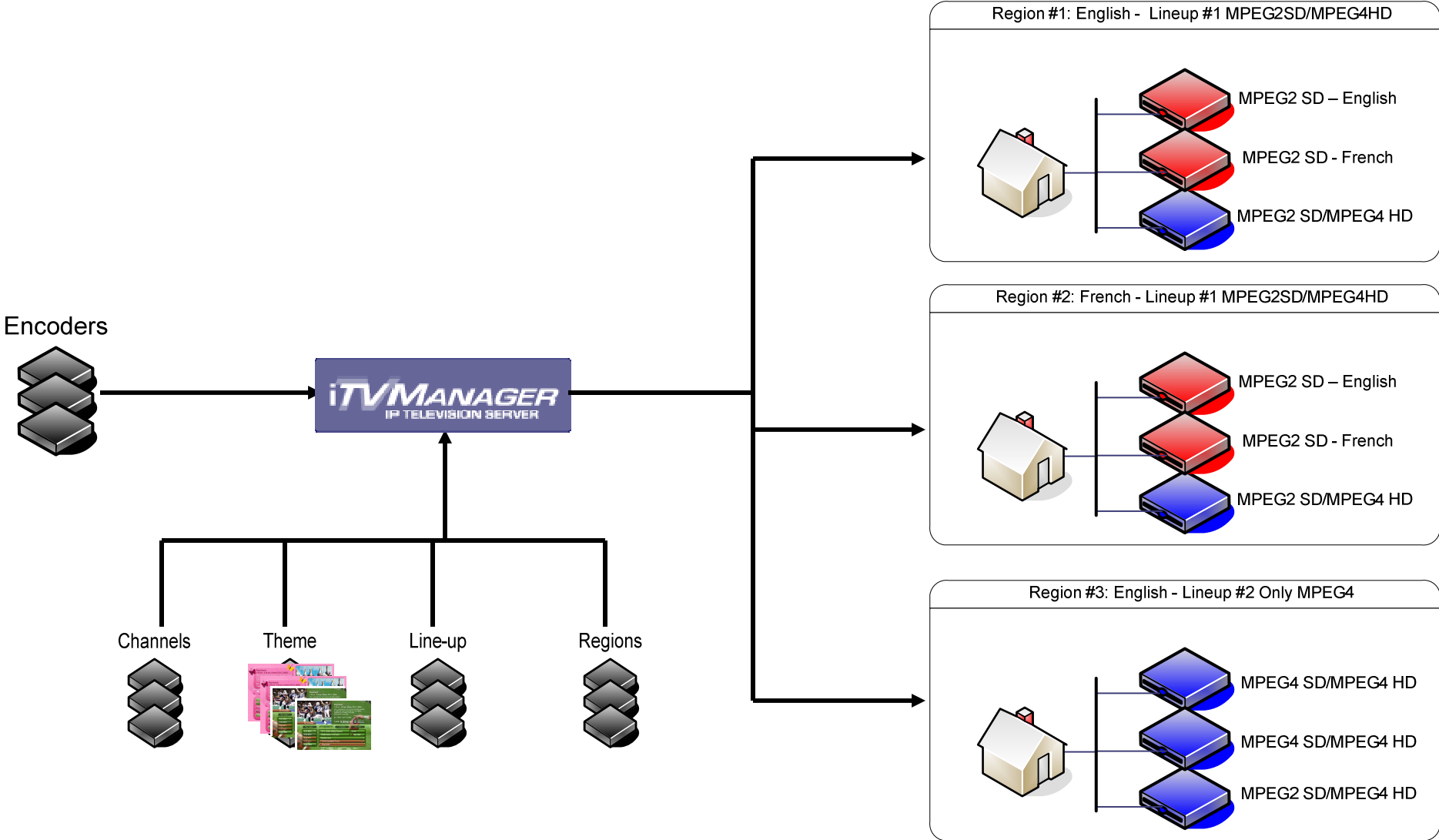
Update Boot Stream(s)

Submit
Cancel

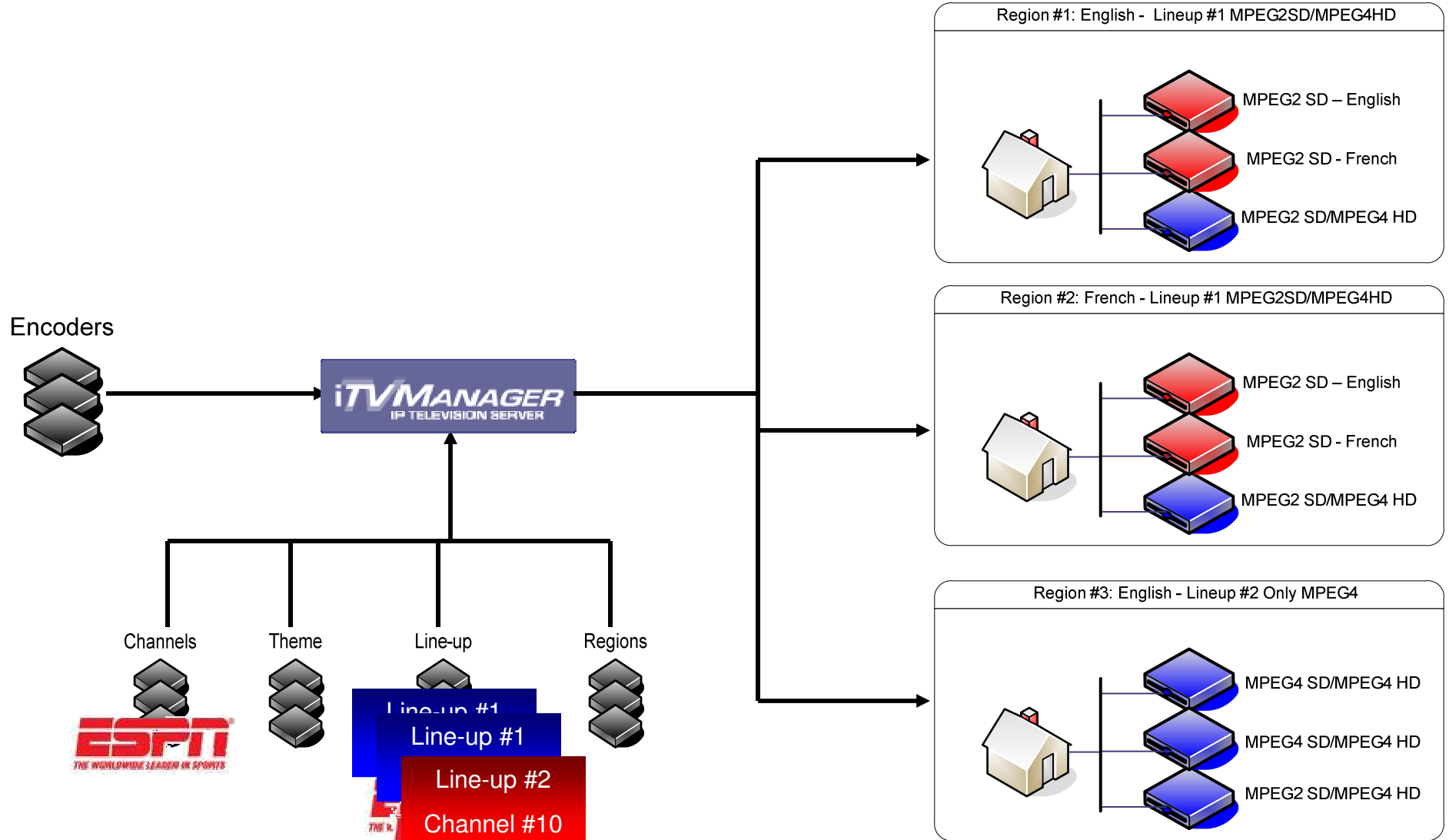
Regions



Theme Control



Channels



Roadmap: iTVmanager 3.0

	Q1	Q2	Q3
3.0	3.0 (Limited release) SA Widevine Seachange SDK driven Key features: User selectable UI Multi region Multi Line ups HD mgmt Hi-avail ready URL channels Video in browser HD PVR	3.0.x (new systems) Admin ADB 3800/5800 Entone VOD Widevine Latens Bug fixes	3.1 (upgrade from 2.1) 2.1-3.x Migration Amino 110, 120, 500 ADB PVR SA PVR Latens Key features: Multiple UI presets (e.g., Smoke w/o posters) Transaction profiling Static mosaic Interactive applications Series record (PVR) nPVR UI Customization kit
Platform	Dell 1950 (upgraded 1850s for 2.1 to 3.0 upgrades)		
	Red Hat 4.4		
	Oracle App Server 10g		
	Oracle DB Server 10g		

SP = service patch (bug fixes, minor features)

HP = hot patch, service critical

IR = integration release (third party updates: STB, VOD, CA)



www.minervanetworks.com