



OCAP Roadmap and Future Services

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TS-5931



OCAP Opportunities for Developers

A view to the future of Cable TV

Peer into the future of interactive services
on Cable TV

OCAP Specs

Core specifications

- OCAP 1.0-based on PersonalJava™ platform variant
 - Supports typical TV apps—EPG, VOD, etc
 - Supports ‘bound’ associated with TV programming
- OCAP 1.1-based on PBP 1.1
 - Adds metrics
 - Diagnostics
 - ‘multi-function’ capability
 - Digital Program Insertion (DPI)

OCAP Specs

Possible future extension specifications

- SIP/IMS support
- HW accelerated graphics
- Cable-PC
- Mobile

OCAP Services

Possible future services

- Nationally distributed interactive content
 - Access to cable network services, like VOD, transactions
- New advertising scenarios
 - Interactive—telescoping to VOD, Request for Information (RFI), etc
 - Addressability—insertion in broadcast, VOD, DVR
- User generated applications
- What are your ideas?



OCAP Future Interactive Services on Cable TV

Mark Jensen

Manager, Interactive Television Platforms

Cox Communications
<http://www.cox.com>

TS-5931

Java™ Platform Interactivity in Cable

Today, tomorrow, and beyond

Eliminating the barriers of **developing**
and **delivering** exciting based Java
Applications to a Cable Television Device

Agenda

Cable TV's Java Platform Middleware

Tools and Process

Device Types

Network Capabilities

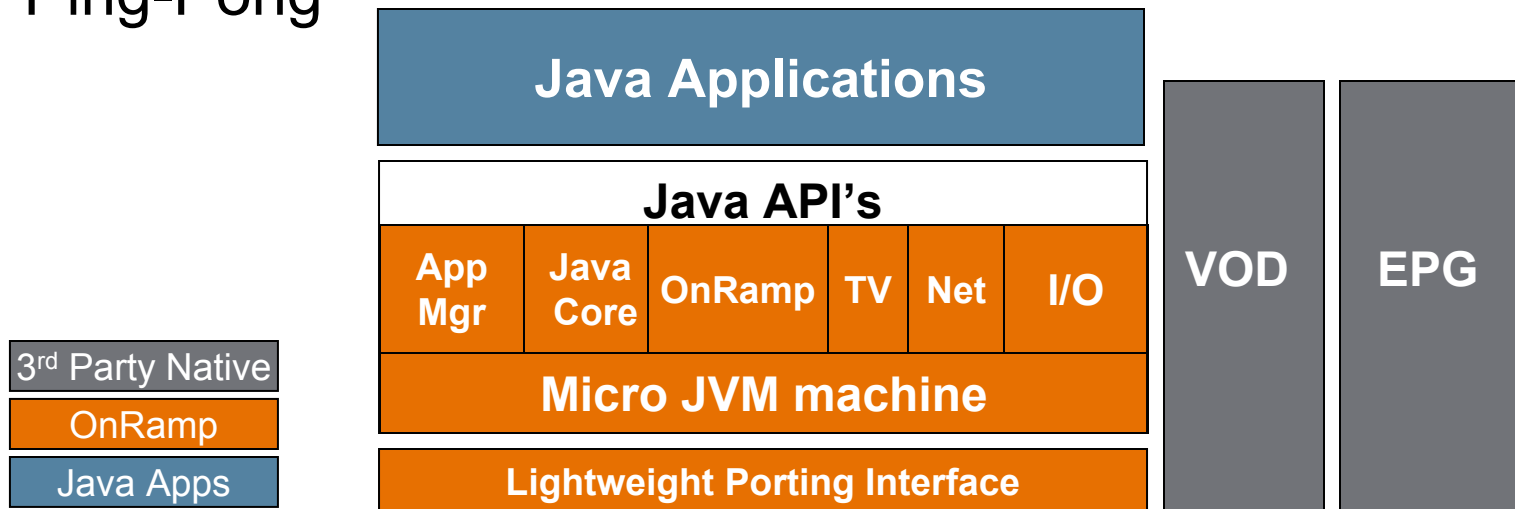
Today's Java Applications

Tomorrow's Java Applications

Cable TV's Java Platform Middleware

OnRamp

- Pre OnRamp
 - Micro Java Virtual Machine (JVM™ machine)
 - Ping-Pong

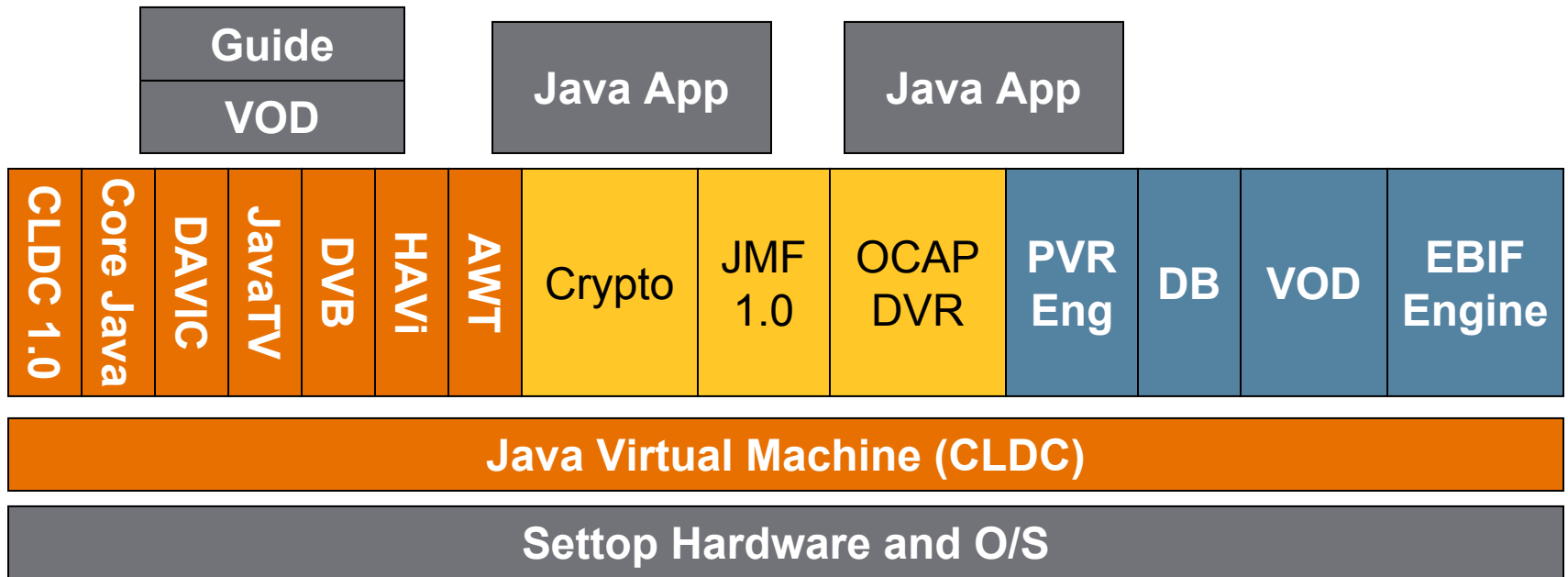
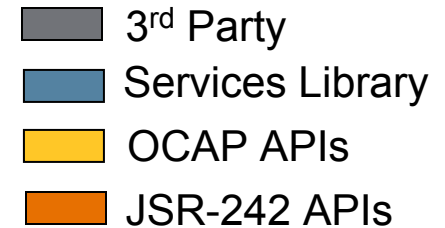


The terms "Java Virtual Machine" and "JVM" mean a Virtual Machine for the Java™ platform.

Cable TV's Java Platform Middleware

OnRamp

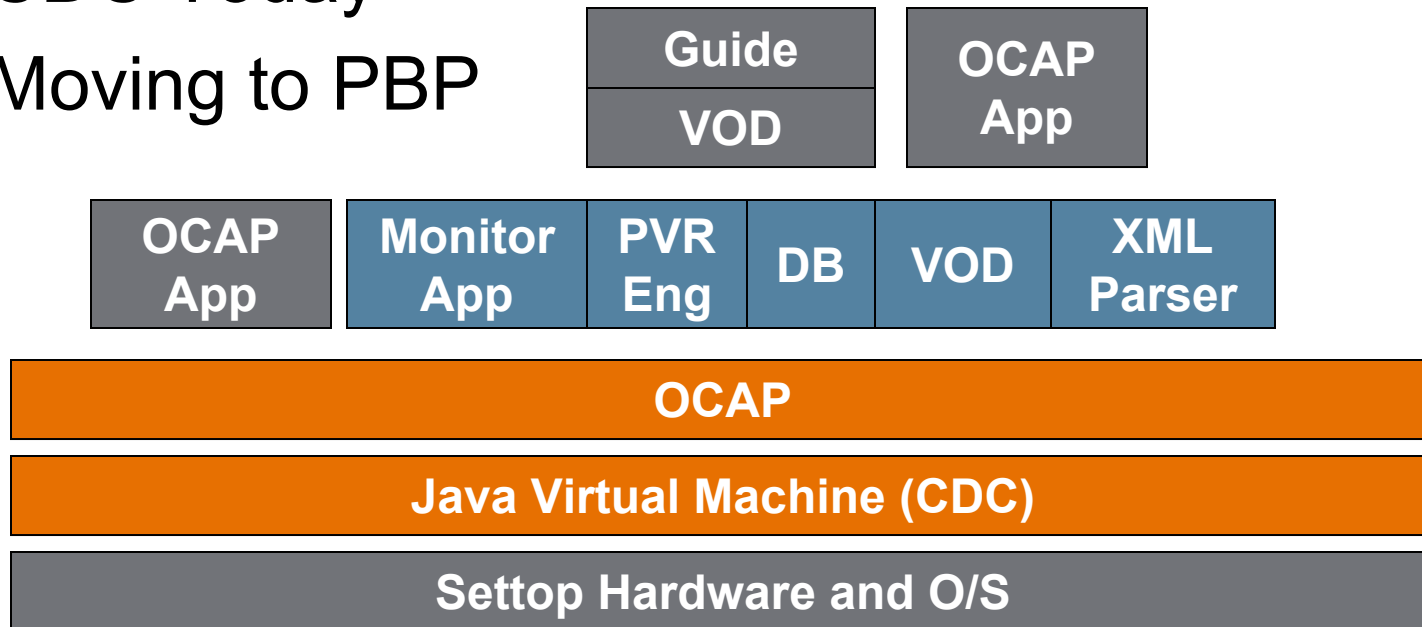
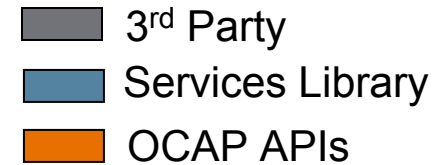
- JCPSM Services—JSR 242
- Subset of OCAP



Cable TV's Java Platform Middleware

OCAP

- Based on GEM
- CDC Today
- Moving to PBP



Agenda

Cable TV's Java Platform Middleware

Tools and Process

Device Types

Network Capabilities

Today's Java Applications

Tomorrow's Java Applications

Process

Steps to Success

- Develop in a Java Environment
 - Standard IDE Tools
- Simulate with an
 - OCAP Simulator
 - Cable TV Network Simulation
- Participate in OCAP Interops
- Work with an OCAP Device Manufacture
- Contact an MSO

Tools

How to get started

- OCAP Emulators Development Tools
 - VisionWorkbench, MHDK
- Network Simulators and Production Tools
 - Ensequence, eMUSE, Tandberg/GoldPocket
- Video and Data Synchronization Tools
 - Object Carousel with RF Modulator to Set-top
- Set-top serial output of a debug device

Agenda

Cable TV's Java Platform Middleware
Tools and Process

Device Types

Network Capabilities

Today's Java Applications

Tomorrow's Java Applications

Device Types

- Constrained set-top device (CLDC)
 - OnRamp
 - Limited Network Capability (Legacy OOB)
- Advanced set-top devices (CDC)
 - OCAP
 - DOCSIS Cable Modem built right in
- Advanced CableCARD Televisions (CDC)
 - OCAP
 - DOCSIS Cable Modem built right in
- Advanced DCAS Televisions and set-tops (CDC)
 - OCAP
 - DOCSIS Cable Modem built right in

Agenda

Cable TV's Java Platform Middleware

Tools and Process

Device Types

Network Capabilities

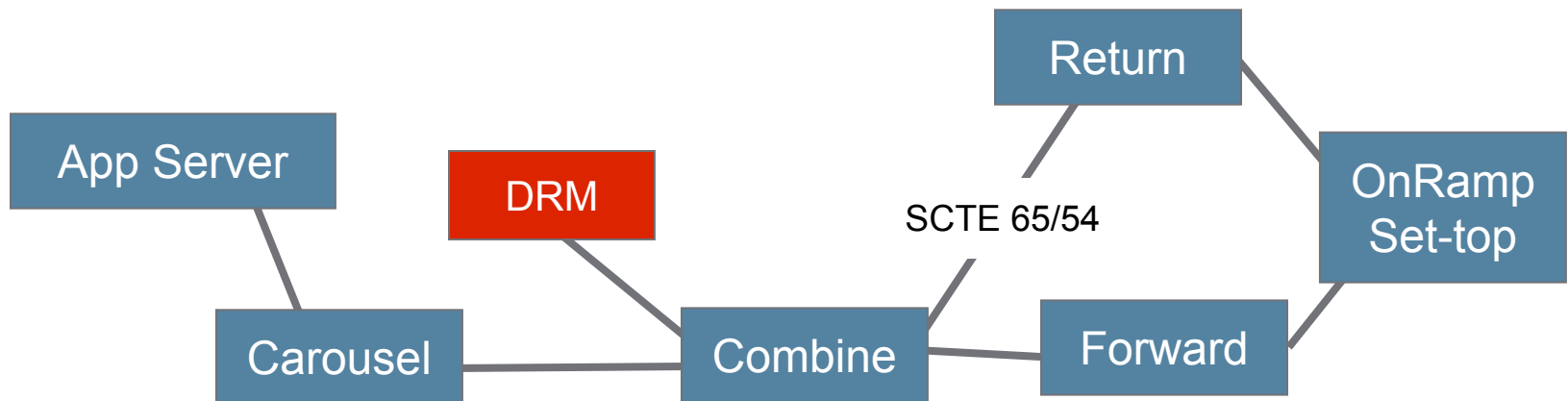
Today's Java Applications

Tomorrow's Java Applications

Cables Transport Network

Limited Capability

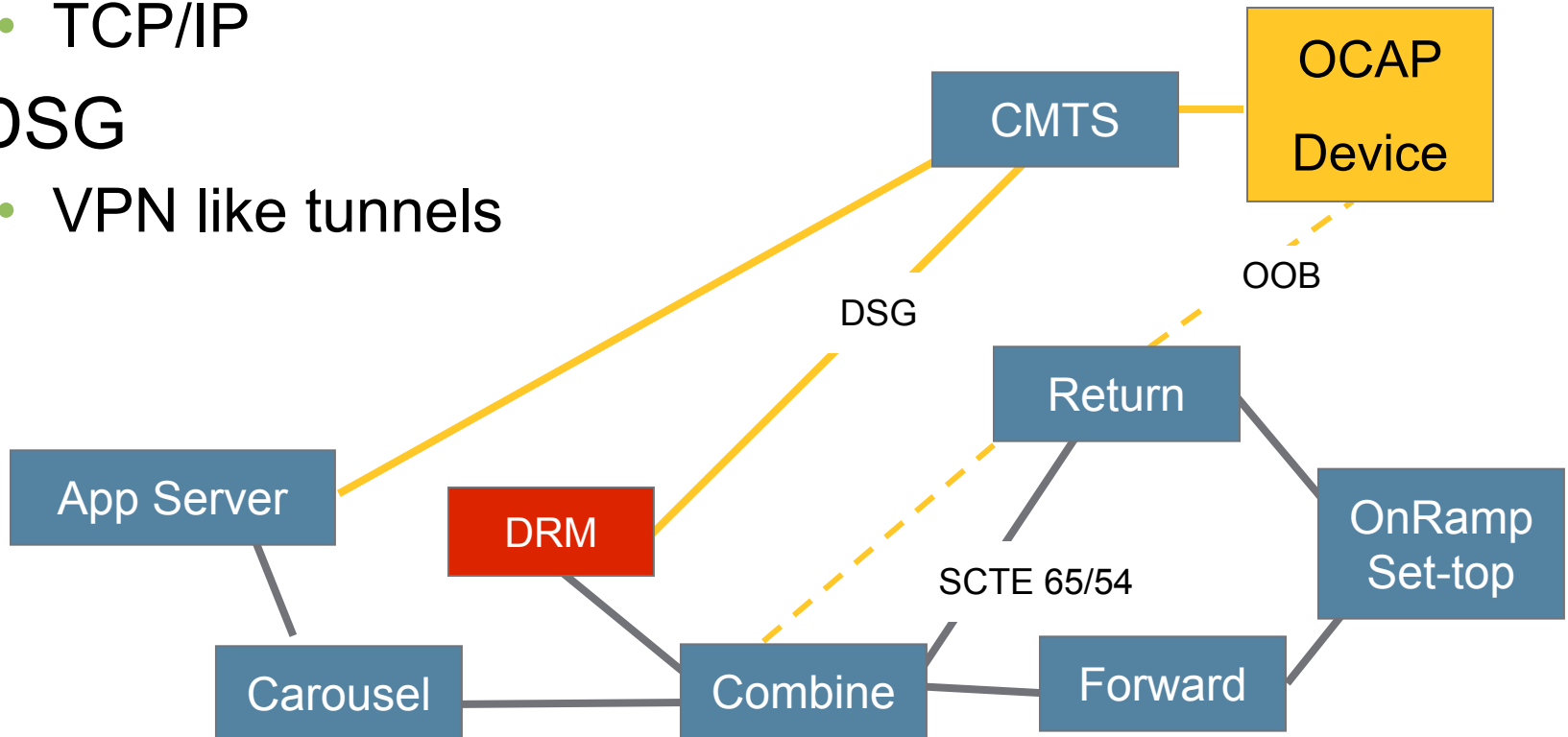
- OOB Application and Data Delivery
 - SCTE 65 and 54
 - UDP/IP with limited Bandwidth
- IB Application Delivery
 - Constrained



Cables Transport Network

DOCSIS & DSG

- DOCSIS
 - TCP/IP
- DSG
 - VPN like tunnels



Agenda

Cable TV's Java Platform Middleware

Tools and Process

Device Types

Network Capabilities

Today's Java Applications

Tomorrow's Java Applications

Today's Java Applications

- News and Information
 - Weather
 - News
 - On TV
 - At the Movies
 - Horoscopes
- Advertising
 - Cox Media Advertisers
 - Cox Products and Services

News and Information



The screenshots show a TV interface with the following elements:

- Header:** COX Digital Cable logo, channel 071 HGTV, date 12/23, time 10:07am, and a photo of a man in a hammock with an "EXIT TO TV" button.
- Left Menu:** Main Menu, News & Info, Weather (highlighted), Gulf Coast 4 Day, Regional 4 Day, Weather Maps, Surf and Tides, Top U.S. Cities.
- Weather Section:** "Currently" with four location cards: P'COLA (Sunny, 100), N'VILLE (Showers, 8), FWB (Sunny), and C'VIEW (Sunny). Includes a "MORE" button.
- Bottom Left:** SHOWTIME ON DEMAND logo with the text "A whole new way to watch TV." and a "MORE" button.
- Right Menu (Screenshot 2):** Main Menu, News & Info, On TV, TV News, Best Bets, Soap Scoop, What's on PPV (highlighted).
- Right Menu (Screenshot 3):** Main Menu, News & Info, Horoscopes (highlighted).
- Right Menu (Screenshot 4):** What's on PPV section listing: Spider-Man 2 (PG-13), Shrek 2 (PG), and Around the World in 80 Days (PG).
- Horoscope Section (Screenshot 4):** Taurus (April 20 - May 20), Lucky number: 867, Financial outlook: risky. A scrollable list of horoscopes: aurus, Gemini, Cancer, Leo.

Advertising

COX Digital Cable

071 HGTV
12/23
10:07 am

Main Menu
News & Info
Horoscopes

Taurus
April 20 - May 20
Lucky number: 867
Financial outlook: risky

HOROSCOPES
aurus
Gemini
Cancer
Leo

VOLVO for life
MORE

EXIT TO TV

COX Digital Cable

071 HGTV
12/23
10:07 am

VOLVO S80 2.5T AWD
Luxury Sedan

Inspiring performance.
Empowering comfort.
Reassuring care.
The Volvo S80. An unusually
invigorating experience.

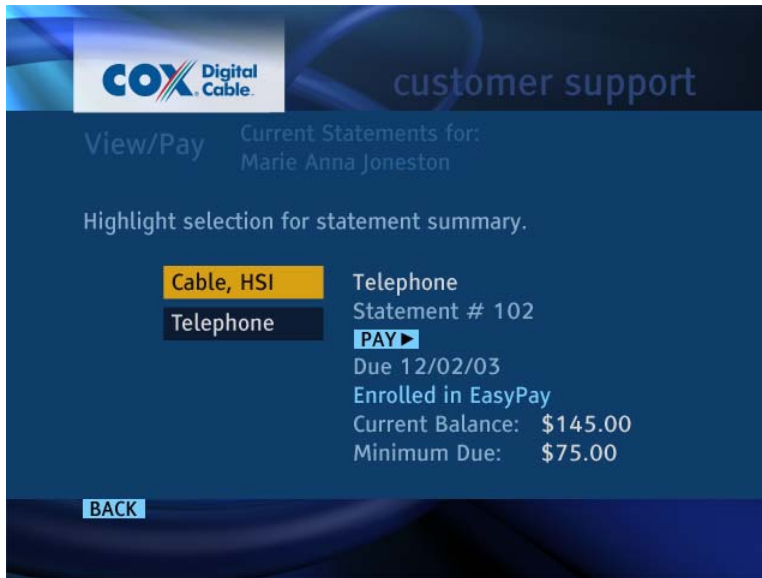
For your local dealer visit
www.volvocars.us/

BACK

Today's Java Applications

- Customer Care
 - View and Pay Bill
 - Sign up for EasyPay
 - Product FAQ
- Order Services
 - Premium Channels
 - Cox Products and Services
- E-Mail Viewer (Integrated with High Speed Data)
 - Read and Delete E-Mail

Customer Care



Order Services



COX Digital Cable

071 HGTV
12/23
10:07am

EXIT TO TV

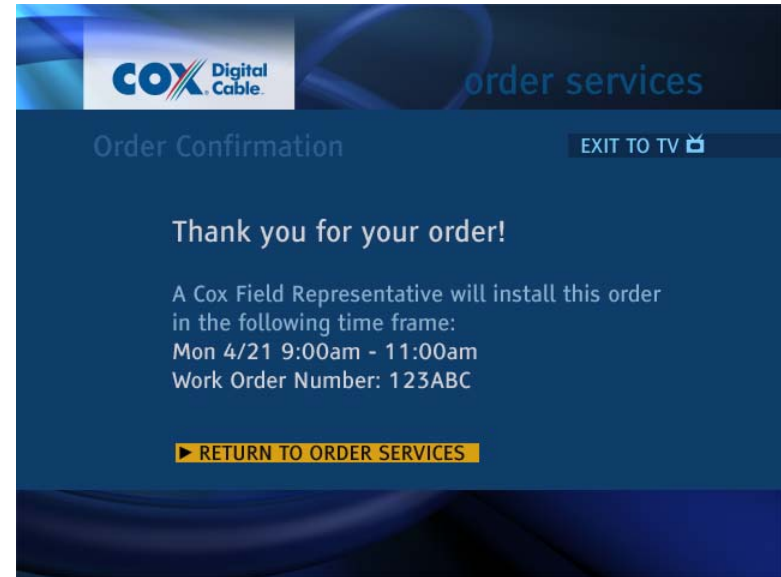
Main Menu
Order Services
 Special Offers
 Open Tickets
 Contact Us

EasyPay
 AUTOMATIC
 SECURE
 EFFORTLESS
 MORE

Cox
 Products & Services

Learn about all the great products that Cox has to offer. You can even order some of them right here through your TV!

- Cox High-Speed Internet
- Cox Digital Video Recorder
- HBO / Sho / Starz!



COX Digital Cable

order services

Order Confirmation

EXIT TO TV

Thank you for your order!

A Cox Field Representative will install this order in the following time frame:
 Mon 4/21 9:00am - 11:00am
 Work Order Number: 123ABC

▶ RETURN TO ORDER SERVICES

E-Mail Viewer

COX Digital Cable

071 HGTV
12/23
10:07am

Main Menu
Email Viewer
PIN Set Up

Log In

User Name:

Cox TV PIN:

LOG IN ►

Set PIN or edit existing PIN
Select this button if you are a first time user or have forgotten your PIN.

EXIT TO TV

COX Digital Cable

071 HGTV
12/23
10:07am

Main Menu
Email Viewer
In Box
PIN Set Up

◀ ▶ 1-5 of 25 **DELETE SELECTED ✓**

John Smith	latest news	2/15/04	<input type="checkbox"/>
Amazon Sales	what's up	2/14/04	<input type="checkbox"/>
Orbitx	order has shipped	2/10/04	<input type="checkbox"/>
Lisa Jones	get back to me	2/09/04	<input type="checkbox"/>
Doug Jones	this weekend	2/09/04	<input type="checkbox"/>

EXIT TO TV

COX Digital Cable

071 HGTV
12/23
10:07am

Main Menu
Email:
In Box
PIN Set Up

◀ ▶ 1 of 25 **DELETE**

From: John Smith <jsmith1232@aol.com>
Subject: Reunion Info for the class of 1980 Weekend.
Date: 2/15/04

The reunion weekend is coming up and I wanted everyone to have all the details. I'll be sending out another email a few weeks before the event . . .

This email contains HTML and is best viewed on a computer.

EXIT TO TV

Tivo and OnRamp




COX

11:08 am
Martha
"Actress Isabella Rossellini" (2007) Actress Isabella Rossellini makes a simple supper from the "Joy of Cooking" cookbook. (CC)

Fri 12/29	11:00 am (11:08 am)	11:30 am	12:00 pm	▶▶
300 TDCNTRY	Today's Country >			
301 CLSCNT...	Classic Country >			
302 CLSRCK	Classic Rock >			
500 STARZHD	< Terminator 2: Judgement Day HD	Slingbla... >		
502 SHOWHD	< Lost in Yonkers HD	All We Are Saying HD		>
740 ESPNHD	< College Football: Music City Bowl HD >			
2 KTVUDT	Judge Hatchett	Martha	KTVU Channel 2... >	

A Programs (all) C Channels (all) Enter More Options



COX

College Football
5:15 pm - 9:00 pm No Rating 5:33 pm 2 KTVUDT

"Tostitos BCS Fiesta Bowl: Oklahoma vs. Boise State" From Glendale, Ariz. The Oklahoma Sooners take on the Boise State Broncos. (HDTV, CC)

Program Options

- Swap Tuners
- Closed Captions
- Audio
- Parental Controls

Tip: Press RECORD to record this program



On DEMAND
3:18 pm

Betty Boop in Poor Cinderella
\$1.00 Betty is Cinderella in this Technicolor cartoon from the Thirties. Betty's only color featurette!

- Movies
- Kids
- Family Movies
- Music
- TV Entertainment
- Classics
- Sports & Fitness
- Free Movies
- Adults Only
- Premium On DEMAND

- Alladin's Magic Lamp FREE
- Betty Boop In Poor Cinderella**
- Customers Wanted FREE
- Hawaiian Love Birds FREE
- Housecleaning Blues FREE
- Little Swee' Pea
- Swing Cleaning FREE
- The Scared Crows
- Two for the Zoo FREE

Source: Tivo

Tivo and OnRamp

Search

NFL Football
 "Atlanta Falcons at Philadelphia Eagles" (2006) The Falcons (7-8) travel to Philadelphia to take on Any Reid's 9-6 Eagles. (HDTV, CC)

PHI_	Philadelphia	ON
A B C D E	Philadelphia Story, The	ON
F G H I J	Phillies @ Cubs	
K L M N O	Dr. Phil	
P Q R S T	< NFL Football	HD >
U V W X Y	Create a WishList search	
Z CLR SPC DEL 123		

Programs (Live TV & On DEMAND)

Season Pass Options
 Desperate Housewives

Get a Season Pass with these options

Show types:	Repeats & first run
Keep at most:	5 episodes
Keep until:	Space needed
Get in HD, if possible? <	Yes >
Start recording:	On time
Stop recording:	On time

Don't auto-record matching programs

Find Programs

Categories	About TiVo Suggestions
Search	Suggestions Settings
WishList Search	Seinfeld
TiVo Suggestions	<< 24 >>
Time & Channel	Frasier
	Sex and the City
	60 Minutes
	Great Performances
	Will & Grace

Source: Tivo

Tivo and OnRamp

Tivo Recordings

Desperate Housewives	Sun 2/12
60 Minutes (2)	Sun 2/12
HD (3)	Sat 2/12
Saturday Night Live	Sat 2/11
KIDMAN, NICOLE (6)	Sat 2/11
Unwrapped	Sat 2/11
POKER (2)	Sat 2/11
Monk	Fri 2/10
Tivo Suggestions	

Groups (on) Sort (by date)

Create WishList Search

Done creating this WishList search

Keyword: -
 Person: [DEPP, JOHNNY]
 Category: [Movies/Action Adventure]
 Auto-record? Yes

Cancel creating this WishList search

Press Info for help

Season Pass Manager

Below is a list of your Season Pass recordings and auto-recording WishList searches, in order of priority. To make changes to a Season Pass or WishList search, press SELECT. To move it up or down in the priority list, press RIGHT.

- Desperate Housew... *7 KGODT
- HANKS, TOM &... *any channel
- SpongeBob Squ... 67 NIK
- CSI: Crime Scen... 5 KPIXDT
- 30 Rock 3 KNTVDT

* Get in HD, if possible.

Source: Tivo

Agenda With Section Highlights

Cable TV's Java Platform Middleware

Tools and Process

Device Types

Network Capabilities

Today's Java Applications

Tomorrow's Java Applications

Today's Java Applications

- Targeted Advertising
 - Basic Profile Services
- Enhanced Telephony Integration
 - Caller ID
 - Call Disposition
 - Call Forwarding
- E-Mail Viewer (Integrated with High Speed Data)
 - Read and Delete E-Mail

Targeted Advertising



Enhanced Telephone Integration

Incoming Call with Caller ID



Enhanced Telephone Integration

Disposition Banner



Enhanced Telephone Integration

Most Recent Calls and Call Routing Configuration



COX Digital Cable

071 HGTV
12/23
10:07am

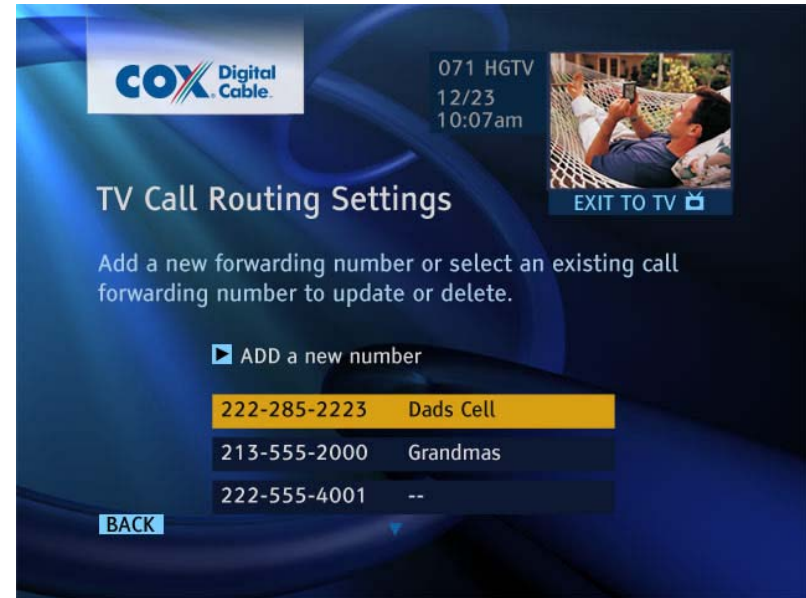
Most Recent Calls
Select an account.

777-555-1212

CALL FROM: Alexandria Williams PHONE: 415-456-1212

Alexandria Williams	New	8:03am	Today
Unknow Caller	New	12:03pm	Thu
Paulo Rodriguez		12:03am	Dec 20
Beverly Smith		1:03pm	Dec 18

BACK



COX Digital Cable

071 HGTV
12/23
10:07am

TV Call Routing Settings

Add a new forwarding number or select an existing call forwarding number to update or delete.

ADD a new number

222-285-2223	Dads Cell
213-555-2000	Grandmas
222-555-4001	--

BACK

Enhanced Telephone Integration

Disposition Banner with Active Call Forward List



Summary

- Java Platform Middleware on set-tops are being deployed
- Java applications are gaining in popularity
- Advertising is gaining momentum
- Development Roadblocks are being Eliminated
- Ubiquitous Acceptance is soon



OCAP Future Interactive Services on Cable TV

Michael Lobb

TVWorks

Cox Communications

<http://www.cox.com>

TS-5931

What Is a Library in OCAP?

- OCAP provides the ability to deploy library code via its `org.ocap.system.RegisteredApiManager` class
- Code registered in this way is then made available to applications in other Java platform contexts
- Each application that wishes to use the code will have its own copy on its system heap, i.e. static variables do not exist across applications
- The library code is effectively added to each application's classpath

Why Would I Use This?

- Code sharing within a suite of applications to save footprint
- Code implemented by one company with usage sold to others
- A game pack could have an extended set of widgets that are common to each one
- Providing middleware type APIs as new features or extensions of an existing platform (more on this later)

How an Application Uses a Library

- In OCAP applications are signalled with an XAIT which is conceptually similar to a Java Application Descriptor (JAD) file in the mobile space
- One of the XAIT fields is a list of library names an application is allowed to use
- Application must be signed with the same certificate as the library
- The library must be registered before the application is launched or it will not be able to “see” the code

RegisteredApiManager

static RegisteredApiManager getInstance()

Gets the singleton instance of the Registered API manager.

abstract java.lang.String[] getNames()

Gets a list of registered APIs.

abstract java.lang.String[] getUsedNames()

Gets a list of registered APIs that are in use by the caller.

abstract java.lang.String getVersion(java.lang.String name)

Gets the version of a registered API, or null if it is not registered.

abstract void register(java.lang.String name, java.lang.String version,

java.io.File scdf, short storagePriority)

Registers an API with the implementation.

abstract void unregister(java.lang.String name)

Unregisters an API from the implementation.

SCDF Sample

```
<?xml version="1.0" encoding="UTF-8"?>
<applicationdescription>
  <dir name="com">
    <dir name="tvworks">
      <dir name="package1">
        <file name="BinaryProtocol.class" size="438"/>
        <file name="CommandMessage.class" size="971"/>
        <file name="Element.class" size="2834"/>
      </dir>
      <dir name="package2">
        <file name="ElementVisitor.class" size="147"/>
        <file name="LogMessage.class" size="1519"/>
      </dir>
    </dir>
  </dir>
</applicationdescription>
```

Code Sample

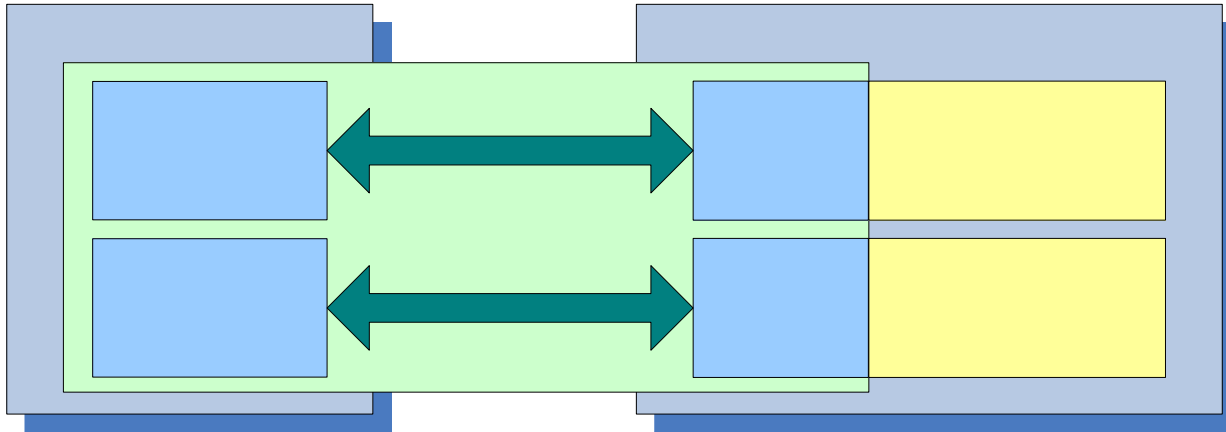
```
public void registerAnApi() {  
    //establish the library's name  
    String name = ...  
    //establish the library's version number  
    String version = ...  
    //locate the descriptor file  
    File scdf = new File(...);  
    //obtain an instance of the RegisteredApiManager  
    RegisteredApiManager manager = RegisteredApiManager.getInstance();  
    //register the descriptor file  
    manager.register(name, version, scdf, (short)255);  
}
```

Code Sample (Cont.)

```
public void enumerateApis() {
    //obtain an instance of the RegisteredApiManager
    RegisteredApiManager manager = RegisteredApiManager.getInstance();
    String[] registeredNames = manager.getNames();
    for ( int i=0, length = registeredNames.length; i < length; i++ ) {
        System.out.println(registeredNames[i]);
    }
}

public void upgradeApi(String name) {
    //locate the descriptor file
    File scdf = new File(...);
    //obtain an instance of the RegisteredApiManager
    RegisteredApiManager manager = RegisteredApiManager.getInstance();
    String newVersion = manager.getVersion(name)+".1";
    manager.unregister(name);
    manager.register(name, newVersion, scdf, (short)255);
}
```

Model for Services



- Each application runs in its own Java execution context; these VM instances do not and can not share memory
- Interprocess communication is handled via the LinkRegistry and the Registered API mechanism

Uses of Library Code

- Program listings database
- Video On Demand—streaming video
- PVR—personal video recorder
- Parental Control storage and enforcement

Program Guide Prototype

TV Works

House on Haunted...
 Thursday, April 19, 2007
 8:00-10:00
 A theme-park mogul invites five guests to an abandoned asylum and offers \$1 million to anyone who stays there all night. Based



8:30pm
9:00pm
9:30pm

409 VERSUS	NHL Hockey	
410 KTVX	Ugly Betty	Grey's Anatomy
411 SCIFI	House on Haunted...	
412 WE	Scent of a Woman	
413 HBO2	United 93	Doctor Dolittle
414 HBOSIG	Pride & Prejudice	
415 SHOTOO	Eyes of an Angel	The Machinist

VOD Category Listing Prototype



VOD Movie Listing Prototype



BRAND *On Demand* **TITLES**

ACTION ◀ **ALL TITLES** ▶ **COMEDY**

A.I. Artificial Intelligence
 All the President's Men
 American Pie 2

▶ **An American Rhapsody**
 A Hungarian girl finds strife with her strict parents and a desire to find herself in the 1960's. (2001)

▶ **PG13** **160 minutes** **\$3.50**



Atlantis: The Lost Empire
 Baby Bedlam
 Bandits

1 Home **2** Buy Now **SEL** More Info **EXIT** To TV

VOD Movie Information Prototype


On Demand
MORE INFO

An American Rhapsody

A Hungarian girl finds strife with her strict parents and a desire to find herself in the 1960's.

PG13 - Appropriate for all ages

Running time: 160 minutes

Rental Period: 24 hours

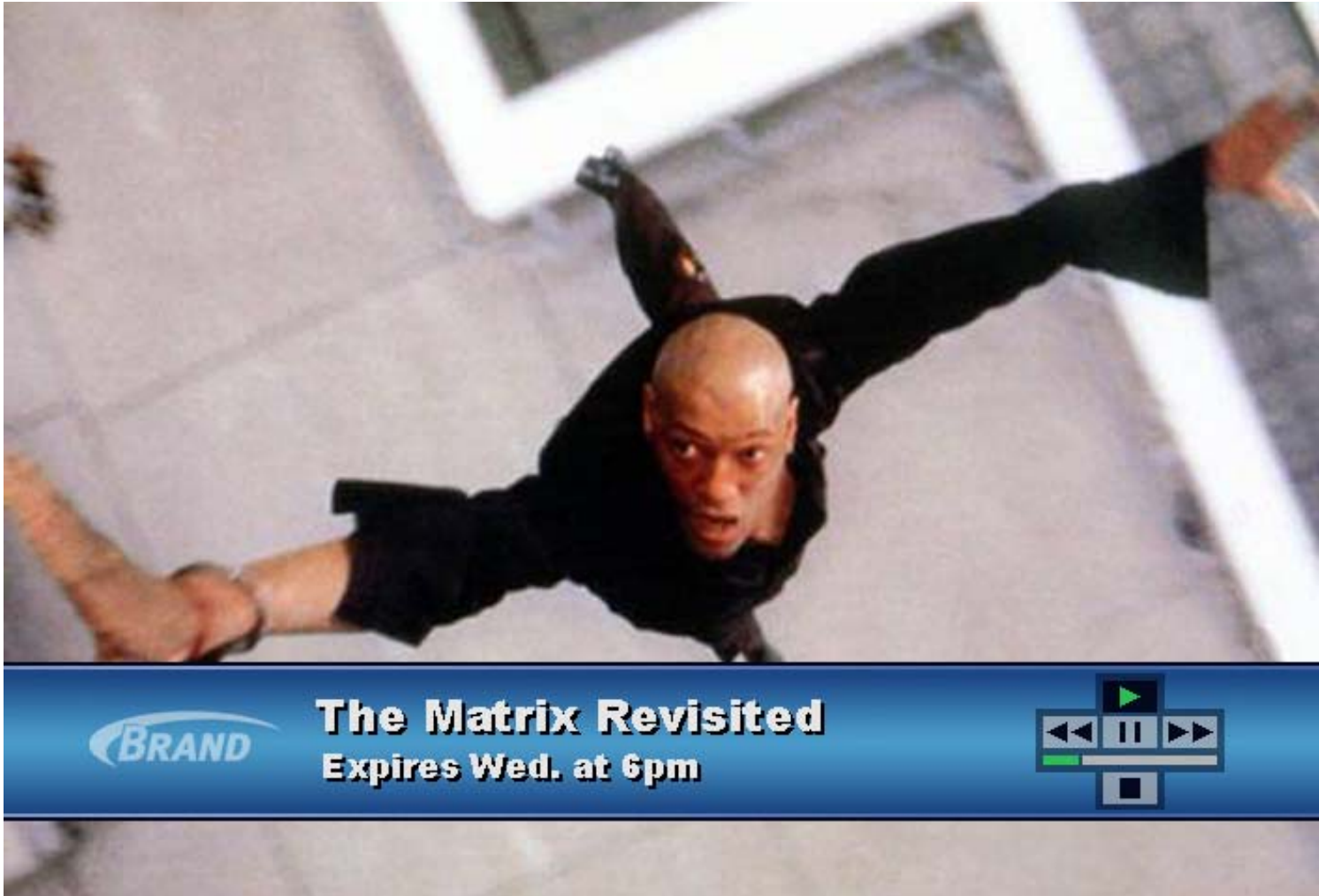
Actors: Nastassja Kinski, Margit Scarlett Johansson, Suzanne Tony Goldwyn, Peter Mae Whitman, Young Maria Ágnes Bánfalvy, In Zoltán Seress,



▼

1 Home
2 Buy Now
SEL
Back
EXIT
To TV

VOD Streaming Video Prototype





Q&A

<code />



OCAP Roadmap and Future Services

Frank Sandoval

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