Next Generation Interactive Experience

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tru2way™ is a trademark of Cable Television Laboratories, Inc.
Tru2way Benefits

• Uniformity: same interactive guide experience regardless of device manufacturer

• Open APIs: Standards based rather than proprietary, enabling MSO and 3rd party application providers to write to standard APIs

• Time to market: write one application and run on all devices rather than writing multiple similar applications

• Device qualification: devices are qualified to a standard, so integration of new devices is faster and less costly

• Interactivity: DSG (DOCSIS Set-top Gateway) environment facilitates fast bidirectional communication

• Abstraction: middleware abstracts hardware from applications

• Network Agnostic: devices are agnostic to the conditional access system
Tru2way Specification Hierarchy

<table>
<thead>
<tr>
<th>CableLabs OCAP / tru2way</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVB Globally Executable MHP (GEM)</td>
</tr>
<tr>
<td>Sun Java (VM, IO, AWT, JMF, Java TV, etc)</td>
</tr>
</tbody>
</table>

CableLabs specifications:

- OCAP
- DVR Extension
- Front Panel Extension
- Device Settings Extension
- Home Networking Extension (DLNA / UPnP)
- eTV (Application Messaging and Binary Interchange Format)
Tru2way Device Architecture
(Comcast Solution)

- **Device Mfr**
- **CA Provider**
- **Comcast (CVS)**
- **3rd Party**

### eTV
- **GW A2x**
- **TVA3.1 (C)**
- **VOD Client**

### STB Firmware
- **OS and Drivers**

### Device HW
- **A2x**

### Java Apps
- **Mon. App**
- **Navigator App**
- **Services Library**

### eTV Apps
- **TVA4.0 (Java)**

### CANH¹

### OCAP Stack & JVM

### OS and Drivers
- **M-Card**
- **Device HW**
- **eCM**

### tru2way
# Tru2way Device Architecture

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-Card</td>
<td>CA System abstraction</td>
</tr>
<tr>
<td>Embedded Cable Modem (eCM)</td>
<td>DOCSIS/DSG</td>
</tr>
<tr>
<td>Tru2way (OCAP) Stack</td>
<td>Includes JVM, OCAP APIs, and underlying native implementation</td>
</tr>
<tr>
<td>Monitor App</td>
<td>Enforces MSO business policies</td>
</tr>
<tr>
<td>CANH</td>
<td>App layer CA abstraction. Used for authorization and PPV.</td>
</tr>
<tr>
<td>Services Library</td>
<td>Provides services to Navigator App</td>
</tr>
<tr>
<td>Navigator App</td>
<td>Provides user interface and feature logic</td>
</tr>
<tr>
<td>Manufacturer Apps</td>
<td>Diagnostics &amp; Settings</td>
</tr>
<tr>
<td>eTV Apps</td>
<td>Interactive applications</td>
</tr>
</tbody>
</table>
Tru2way Devices

Device Capabilities:

- Embedded DOCSIS cable modem
- CableCard Interface
- Fast processor and extensive memory

Device Classes:

- Retail iDCR (Interactive Digital Cable Ready) televisions
- Retail settop/setback devices
- Leased DVR settops
- Leased non-DVR settops
Types of Java Applications:

- Bound Applications – Delivered with a program
- Unbound Applications – Not tied to a program
- Monitor Application
  - Type of unbound application
  - Enforces MSO policy
  - Allows other apps to run
- Manufacturer Applications
  - Diagnostics
  - Watch TV
  - Settings
Comcast tru2way Aspen Guide

TV Listings

<table>
<thead>
<tr>
<th>Channel</th>
<th>101</th>
<th>103</th>
<th>104</th>
<th>105</th>
<th>106</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program</td>
<td>NBC</td>
<td>ESPN</td>
<td>Nick</td>
<td>TNT</td>
<td>ABC</td>
</tr>
<tr>
<td>Shows</td>
<td>Biography</td>
<td>Totally NASCAR</td>
<td>Fairly OddParents</td>
<td>Shane</td>
<td>Brat Camp</td>
</tr>
<tr>
<td>Times</td>
<td>7-8:30pm</td>
<td>7:30pm</td>
<td>8:00pm</td>
<td>8:00pm</td>
<td>8:00pm</td>
</tr>
</tbody>
</table>

On Demand

Top Picks

- Meet The Parents
- French Open Finals
- SpongeBob SquarePants
- Home to Go
- Any Given Sunday

On Demand

- Movies & Events
- Network Shows
- Free Movies!
- HD On Demand
- Sports & Fitness
- TV Entertainment
- Premium Channels
- Kids
- Get Local

DVR

My Recordings

View a list of your DVR recordings.

Title Search

Title: AL
Select any listing to see program information. You may change your title entry at any time.

Results:

- The Alamo
- The Alamo HD
- Alaskan Christmas
- Alaska on the Edge
- Alaska: Wide Open
- Alabama Creek Confederacy
- Alabama Sunrise
Comcast tru2way Barcelona Guide

Next generation tru2way user experience:

- HD (16x9) graphics
- Enhanced TV (eTV) Applications
- Navigator enhancements
- VOD enhancements
- Expanded search capabilities
- Personalization
- Remote DVR
- Anyroom DVR
OpenCable Home Networking – mDVR

- One or more physical ports
- OCAP HN extension APIs
- DLNA

- UPnP DA and AV (content discovery)
- HTTP/RTP (content streaming)
- DTCP/IP (content protection)
Tru2way System

**System Highlights:**

- High speed data system (DOCSIS/DSG)
- National/Regional infrastructure is easier to operate, maintain and upgrade
- System Information delivered to Host Devices as SCTE-65 over DSG Broadcast Tunnel
- Device firmware downloaded via OpenCable Common Download (TFTP)
- Application download signaled via XAIT over DSG Broadcast Tunnel and downloaded via HTTP
- SCTE-18 EAS delivered over DSG Broadcast Tunnel
- System monitoring via SNMP
Tru2way System Context Diagram
Welcome to Comcast

You’re about to experience exciting TV programming and thousands of On Demand movies and shows on Comcast Digital Cable. Sit back, relax and enjoy.
Tru2way References

- http://www.tru2way.com
- http://www.cablelabs.com
- http://www.opencable.com
- https://opencable.dev.java.net
- http://www.mhp.org
- http://www.dlna.org
- http://www.upnp.org