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Key

- *Green boxes show similarities to current set-top boxes.*
- *Orange boxes and connections in the diagram are the functional components needed to support OCAP.*
- *Blue boxes and connections represent legacy systems in network headends.*

This wall chart illustrates one conceptual notion of an OCAP network headend compared to today's network and illustrates how set-top boxes, or any OpenCable 2.0 device such as a DVR or television, will look in the OCAP universe.

OpenCable and OCAP

CableLabs defined two key components necessary for an OpenCable platform:

- **OpenCable Host Device Core Functional Requirements 2.0** specification defines core hardware requirements for portable cable devices including set-top boxes, televisions and terminals.
- **The OpenCable Application Platform 1.0 (OCAP)** specification defines a common application programming platform for cable content, including interactive applications.

New device components

The OpenCable host device requirements specification defines basic hardware requirements to support OCAP applications.

OCAP 1.0: Host 2.0 devices require OCAP middleware, as defined in the OCAP 1.0 specification. OCAP middleware implementations are specific to the Host Device; however, they expose a set of Java APIs for applications, regardless of the device manufacturer.

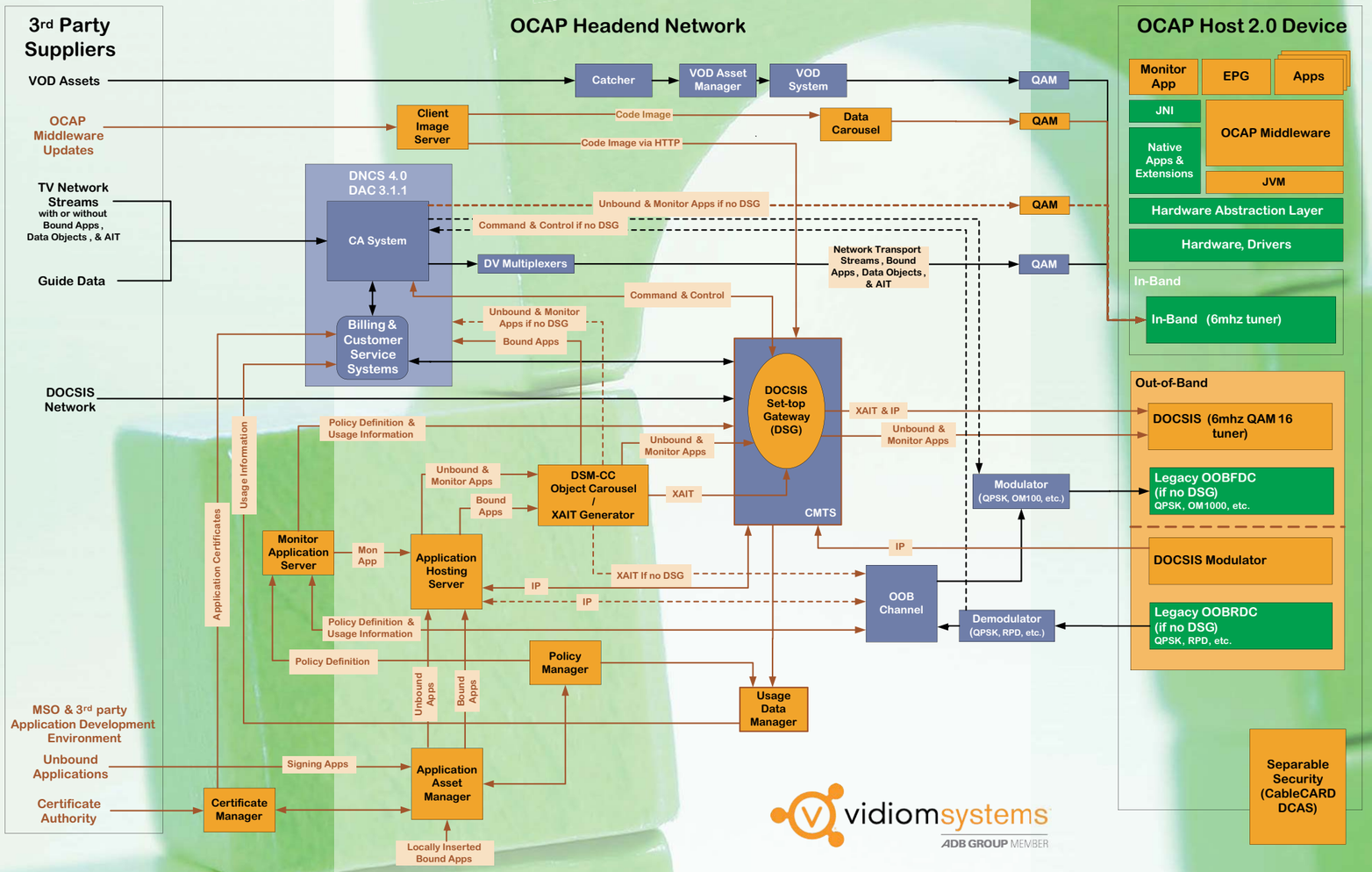
Applications: The OCAP Specification defines both Bound and Unbound applications. Bound applications are tied to a broadcast transport stream and run only while their associated service is selected. Unbound applications are not tied to a broadcast transport stream thus their lifecycles are independent from service selection. This allows applications such as the EPG to be delivered to a wide range of devices as an unbound OCAP application rather than being tied to the host device as a native, resident application specific to the device.

Monitor Application: OCAP 1.0 defines a Monitor Application that may serve as a policy engine for the cable operator to, among other things, allow and disallow applications, adjust application priorities, filter remote-control key presses, and manage resource usage and contention between applications. The monitor application is specific to and therefore provided by the network operator.

Java Virtual Machine: The OCAP Specification requires a Java Virtual Machine, which is an execution environment that converts platform-independent Java bytecode into machine language and executes it. OCAP 1.0 uses the Java Virtual Machine version 1.1.8 with PersonalJava extensions and is expected to support CDC and PBP versions 1.1 in the OCAP 1.1 release, bringing OCAP in line with the current Java ME standards.

DOCSIS: OpenCable requires two-way network support for an out-of-band return channel via legacy OOB (Aloha and DAVIC) and/or DOCSIS. The OpenCable Host 2.0 Device specification requires DOCSIS tuner and modulator in the device. However, the network is not required to support DOCSIS. See DOCSIS Set-top Box Gateway (DSG).
Separable Security: Security is required to be separated from the device in the form of a point-of-deployment module (CableCARD) or downloadable from the network (DCAS). CableCARDs have been defined by CableLabs. DCAS specifications are under development and should be available in the future.

OCAP Headend Network



New Network Components

Substantial changes to cable networks are required in order to support OCAP. Most of the elements listed are not defined in any OpenCable specification since actual implementations will vary based on MSO policies and requirements.

Application Asset Manager, Signing and Delivery: OCAP Networks need the ability to manage the delivery of unbound and locally inserted OCAP applications, including related code objects, certificates, XAITs, and ancillary files. An Application Asset Manager could be first stop for applications not tied to a network stream as they enter the network.

Application Hosting Server: To distribute both unbound applications, such as the Monitor Application and EPG, and locally-inserted bound applications, network operators need a place to store, manage, and distribute these applications through the system and onto host devices. The role of the Application Hosting Server is to manage the storage of these applications and coordinate their transmission to host devices either via an In-Band DSM-CC Object Carousel or via IP through the optional DOCSIS Set-top Gateway.

Monitor Application Server: Hosts, manages, and downloads the Monitor Application to host devices after their initial network sign-on, configuration, and OCAP client image download. It then continues to manage and transmit cable operator policies and permissions to the host device.

Policy Manager: Works with a Monitor Application Server to convert legal agreements between the cable operator and the application provider into policies that control CE software updates through the cable network, application permissions, and rules for collecting billing or usage data.

Usage Data Manager: Collects billing and usage data from the host device and communicates with the Billing System to ensure proper 3rd party billing and to the Policy Manager to ensure that policies are being adhered to in-line with established contracts.

Certificate Manager: Interfaces with external certificate authorities and alerts the system operator if a Host device fails attempted authentication, if a Subject Host ID appears on a Certificate Revocation List (CRL), or if a Host Device ID appears on an updated CRL.

DSM-CC Object Carousels: As defined in MHP allow for application delivery In-Band. OCAP additionally adds definitions for Out-Of-Band (OOB) object carousel for data delivery.

DOCSIS Services: Cable Modem Termination Systems (CMTS) optionally need to be upgraded to support the DOCSIS Set-top Gateway (DSG) as defined by CableLabs.

If no DSG is implemented, IP and XAIT may be communicated to and from the client host device through legacy Out-of-Band Forward and Reverse Data Channels (OOBFDC and OOBRDC, respectively).

DNCS/DAC : DNCS (Scientific Atlanta) and DAC (Motorola) must be upgraded to support OpenCable and OCAP additions.

Client Image Server: If Host manufacturers need to update the middleware on an OCAP device, they may optionally do so in cooperation with the MSO via the means specified in the OpenCable Common Download Specification. In this scenario MSOs maintain a database of code images for all supported devices sending those images via one of several methods defined in the Common Download Specification. Networks are not required to support Code Download; however Host 2.0 devices are required to support several different means of delivery.

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