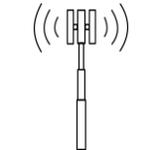


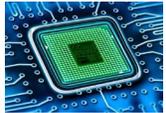
# Terminology

## Transport methods

| Component / Service Name  | Purpose and Definition  | User/Implementor   | Notes  |
|---|---|--|--|
|  DOCSIS - Data Over Cable Service Interface Specification | Protocol behind coaxial cable as a communications and content delivery method   | Comcast, Liberty Global, etc – founded by CableLabs consortium | “Cable” operators transport method for both broadband & video. Today, this is mostly a hybrid of fiber within the core network and cable for “last mile”   |
|  PON – Passive Optical Network                            | Fiber-based communications technology for delivering “last mile” broadband (and video) access to subscribers                      | Comcast, Sky, Liberty Global, NOS, Deutsche Telekom, etc       | Several overlapping standards that generally define the delivery (to the home) of data over a physical fiber link – see ONU/ONT  |
|  DSL – Digital Subscriber line                            | The technology behind broadband service delivered over traditional telephone (copper) lines                                       | Sky (broadband), Deutsche Telekom, Vodafone, etc               | More prevalent in Europe and overseas, and rapidly being replaced by PON technologies but still has a very large subscriber base despite a lack of new growth  |
|  DBS – Direct Broadcast Satellite                        | Primarily a <i>video</i> delivery method directly to end users via Satellite, but data can be sent as well                        | Sky (video), any Satellite provider                            | Typically 1-way communication from Satellite to end-user, but 2-way can be augmented using subscriber’s source of internet for additional features and services (such as OTT video)  |
|  Cellular based (4G/LTE, 5G)                            | Wireless transport method of delivering data (including OTT video) via existing cellular infrastructure for fixed residential use | T-Mobile, Verizon, many Cellular providers worldwide.          | Different use-case than data being served on mobile phones. Intended to be <b>primary</b> data connection for that subscriber at their fixed resi location - Cellular networks are used between towers and user’s cellular modem(s), while fiber serves the towers themselves. This is similar to how DOCIS uses cable as last-mile, but fiber within its core |

# Terminology

## Hardware



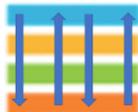
| Component / Service Name                        | Purpose and Definition  | User/Implementor   | Notes  |
|---|---|--|--|
| SoC – “System on a Chip”                        | Embedded Hardware providing the basis for OEMs to build devices – RDK-V, B C  | Broadcom, Intel, Amlogic, Realtek, Qualcomm, Quantenna             | Chipset, memory and other components – lowest level of a device’s componentry/hardware   |
| STB – Set Top Box                               | Typically provided by an MVPD to a subscriber, hardware/software device that allows playback of video and other content in a customer home    | Any MVPD providing video to end users, plus the OEMs building them | It is possible to provide a video service 100% OTT, such as HuluTV or YouTubeTV, or use COAM video playback devices to serve the STB function (eg Roku or AppleTV) |
| <a href="#">Video Accelerator</a>               | Platform(s) to rapidly develop, test and Delivery with RDK  | Manufactured by: Commscope, KAON, Humax and other OEMs             | Provides a “ready-made” platform to fast-track testing and development for efforts such as RDK4 and easy familiarization for new MVPDs                             |
| BLE – Bluetooth Low Energy<br>- (Voice remote*) | Efficient standards-based wireless data transmission method, used primarily in RDK(-V) for 2-way remote controller communication with the STB | Tech4Home, Commscope, Humax, Kaon, RDK Management, RDK community   | Used heavily within the <a href="#">Video accelerator program</a> , in the process of being spec’ed for further use within the rest of the RDK community           |



\*Also see voice search on slide 6

# Terminology

## Application and Software Framework



| Component / Service Name                 | Purpose and Definition  | User/Implementor  | Notes   |
|--|---|---|---|
| Compositor (see next slide for examples) | Window and input manager  | Necessary component of any multi-window, multi-app, multi-process software platform | The component that handles app window overlay, what is the active screen and minimizing/closing a resource based on available memory and user actions |
| Thunder                                  | Lightweight C++ Application Framework   | RDK community   | Modular architecture  |
| Lightning                                | Lightweight Javascript framework  | RDK community   | Lightning is an app development framework offering great portability and performance. Leverages WebGL to increase performance                         |
| HTML5                                    | Web-based technology allowing for the playback of video/audio/apps without specific development for the platform used   | Open Web + RDK community  | Web-based technology for rendering graphics and playing video/audio in a browser.   |
| Abstraction (Architecture concept)       | Well-defined, idealized interface, intended to reduce complexity of layered software systems  | Software development community (not RDK specific)                                   | Implementation is up the individual operator + component being engineered   |
| HAL - Hardware Abstraction Layer         | Software layer allowing application and component interaction with a hardware device at a general or abstract level rather than at a detailed more specific level | RDK Community, OEMs   | Eases both development and porting efforts, increases device reliability and can also assist support efforts on lower resource devices                |

# Terminology

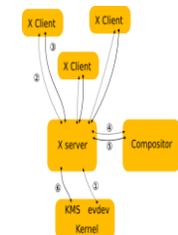
## Development, Testing and Telemetry

| Component / Service Name  | Purpose and Definition   | User/Implementor          | Notes   |
|---|--|---------------------------|---|
|  Raspberry Pi  | Commercial off the shelf - Open-source, Linux-based single board micro-computer with a low price point | RDK community             | Standardized hardware configuration and adequate processing power, its used by the RDK community as a reference platform for most initial testing and development of all things RDK |
| <a href="#">WebPA</a>   | protocol messaging system for communication between cloud server and client devices                    | Comcast, other ISPs       | Developed originally by Comcast and later open-sourced. Secure and web-based, not specific to RDK   |
| <a href="#">TR-069</a>  | protocol messaging system for communication between cloud server and IP-connected devices              | RDK Community, other ISPs | Messaging protocol that can co-exist with others such as WebPA depending on the requirements of the MVPD/ISP  |
| <a href="#">TR-181</a>  | Device data model used by protocols such as TR-069 and WebPA to communicate telemetry                  | RDK Community, other ISPs | Among other features, this is the list of codes, states, device issues that correspond to the remote management of devices in a customer's home                                     |



# Terminology

## Graphics and Window Management (RDK-V)



| Component / Service Name | Purpose and Definition  | Implementor            | Notes  |
|--------------------------|---|------------------------|--|
| RDK Shell                | Window manager  | Comcast                | Controls the management of composition, layout, Z order, and key handling                                |
| Essos                    | Abstraction that allows for easy implementation of a compositor | RDK community          | API + abstraction that allows implementation of Westeros   |
| Weston                   | Compositor based on Wayland                                     | Linaro                 | Lightweight implementation of Wayland  |
| Westeros                 | Compositor based on Wayland                                     | Comcast                | Feature-rich implementation of Wayland   |
| Wayland                  | Specification protocol used by the compositor                   | Open Source community* | protocol for a compositor to talk to its clients as well as a C library implementation of that protocol. |

# Terminology

## Applications

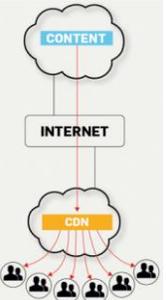


| Component / Service Name       | Purpose and Definition  | User/Implementor   | Notes  |
|--------------------------------|---|--|--|
| App Store (concept within RDK) | A pre-integrated platform of apps available for Operators using the RDK-V platform                          | Metrological, Comcast, RDK-Management, RDK-Community (+ Metro customers) | Metrological created, later fully integrated with RDK-V to dramatically ease the development, maintenance and reliability of applications within the RDK-V community   |
| Premium apps                   | RDK-V implemented user-apps that allow for the playback of content from said subscription and free services | MVPD provided, subscriber used   | Typically “OTT” apps that have their own subscriptions or access from the account level, RDK simply provides access to that resource for user consumption  |
| Native (entertainment) apps    | Apps integrated into RDK-V by default by an operator  | RDK community, Metrological, Comcast                                     | Eg Weather app, Sports, Games, Music streaming – simple apps often utilizing C-language as opposed to interpreted language (e.g. HTML5 or Lightning)   |
| Other user-apps                | Smarthome, Network apps, Account management apps  | RDK Community, Comcast   | Apps that could control other home services (Smarthome, internet management and/or home security) created for use via the RDK-V platform.  |
| Voice-search and navigation    | Voice-based interface for interacting with compatible STBs  | RDK Community, Comcast, Sky, Liberty Global, etc                         | Usually a cloud-based voice search and command translation + action engine for compatible STBs. There are concurrent similar components within the RDK community and outside that are being considered for integration |



# Terminology

## Rights Management and Content Delivery

| Component / Service Name   | Purpose and Definition   | User/Implementor   | Notes   |
|--|--|--|---|
|  CDN       | Content Delivery Network - network of geographically distributed data centers and proxy servers run by an MVPD for their subscribers | Any video provider/broadcaster/aggregator (Comcast, AT&T, Sky)       | The system that houses and delivers video, securely, to the end user when requested (VOD) or linear (Title 6, etc)  |
| CAS  | Conditional Access System – mode of securely transmitting video content from CDN to STB  | Any video provider/broadcaster/aggregator (Comcast, AT&T, Sky)       | The mechanism that authenticates and allows (or blocks) video asset access based on the customer subscription level, location and/or device state for broadcast content |
|  DRM       | Digital Rights Management – digital components or services tasked with controlling access to copyrighted material such as video      | Any content provider/retailer/broadcaster (Comcast, Apple, HBO, etc) | In short, copyright protection applied to files and digital assets before they're transmitted to the end user for OnDemand content                                      |
|  OpenCDN | A multi-site CDN implementation utilizing cache servers in strategic locations   | RDK Community, Many Video content delivery services                  | Intended to create conditions to “lower the distance between content and its users”, to increase speed, reliability, redundancy and quality when delivering video       |
| OpenCDM  | Open Content Decryption Module   | RDK Community  | Component intended to perform secure decryption of content with support for PlayReady and Widevine, etc   |

# Simplified Architecture

Generic - For example only

