broadband forum

Shaping the Future of Broadband with Cloud Technology

By Robin Mersh, CEO of Broadband Forum

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Robin Mersh joined the Broadband Forum as Chief Operating Officer in July 2006, and was promoted to Chief Executive Officer in July 2010. Robin has authored many articles and has spoken at and chaired many broadband industry conferences and exhibitions. He has worked in the telecommunications industry for over 20 years, starting at Cable & Wireless and then moving on to BT before meeting his wife and moving to the US in 1999. Robin has worked in business development and alliance management for various OSS software companies in the United States, mainly in network and service provisioning and activation, where he negotiated and managed several large OEM agreements. He is originally from Cambridge in the United Kingdom. He received a Bachelor of Arts degree with honors from Queen Mary and Westfield College, University of London in 1992.

The next phase of broadband deployment brings with it more widely distributed cloud services which promise greater responsiveness, higher performance and rapid availability of new revenue-generating services. If cloud technology can deliver on this vision, the end-result will truly be a game-changer – and work is already happening to make this vision a reality.

Unifying framework

A major industry initiative currently being undertaken by the Broadband Forum aims to ensure the huge potential the cloud holds for broadband networks is realized, by enabling new services and bringing cloud services and access networks closer together.

Cloud Central Office (CloudCO), an open interface and cloud-based broadband framework, is located at the heart of the broadband network and serves as a unifying framework for new technologies and important service developments. Utilizing Software Defined Networking (SDN), Network Functions Virtualization (NFV) and Cloud technologies, this newly published Cloud Central Office Reference Architectural Framework (TR-384) radically redefines the architectures of the access and aggregation networks that were developed in previous Broadband Forum specifications such as TR-101 and TR-178.
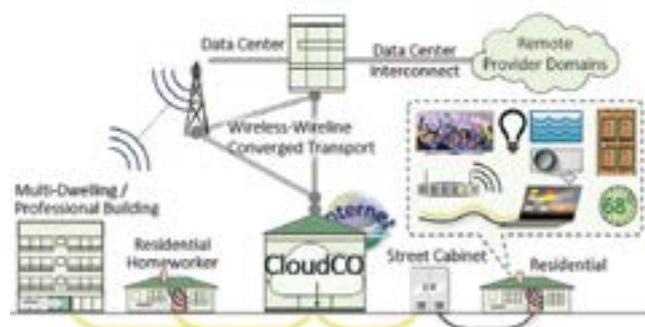
CloudCO provides a single agile, scalable and dynamic network with all varieties of access technologies. The unifying nature of CloudCO, the common platform and its re-use core functions is key to shaping the future of broadband, meeting several key service provider requirements including reduced CapEx, migration and OpEx costs. It also brings fast time-to-market for new value-added services to enable innovative new business models.

The CloudCO's functionality can be accessed through a Northbound API, allowing operators or third parties to consume its functionality, while hiding how the functionality is achieved from the API consumer.

These cutting-edge models are enabled easily through the platform, as third parties can easily be inserted to create anything-as-a-service opportunities which lead to prospects for resourcing pooling, sharing and scalable computing, as well as Operations, Administration and Management (OAM) automation and a new 'sharing' and Software as a Service (SaaS) model based on the public cloud.

TR-384 is the first published CloudCO project. Others include a complementary Use Cases document slated for April publication, along with a series of AppNotes that relate to Open Broadband implementations. Five other CloudCO projects are planned for 2018.

Programmable Broadband: CloudCO & Open Broadband
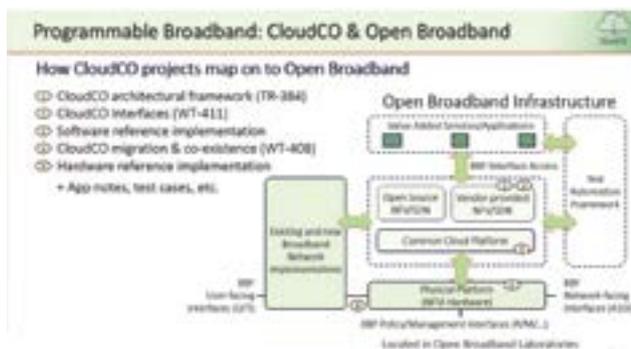
Enabling a new era of connectivity
To achieve the agility, scalability and dynamism service providers crave, CloudCO leverages a number of design principles such as SDN and NFV techniques, commodity compute and networking platforms, Virtual Network Functions (VNFs), and cloud-like APIs.

It also encompasses various Broadband Forum work areas, including virtualization projects like the Virtual Business Gateway, Fiber Access Network Sharing (FANS), and the new User Services Platform which expands the popular TR-069 specification beyond gateways and into device control, the Internet of Things (IoT), YANG modelling for access network management and carrier-grade in-premises Wi-Fi. Additionally, CloudCO is a natural focal point for converged networks enabling the new generation of hybrid wireless-wireline services that will be key to the success of 5G.

The building blocks
From a structural perspective, CloudCO reference architecture combines SDN and NFV over a hybrid physical and NFV infrastructure, which addresses the twin issues of coexistence and migration from existing networks. The latter orchestrates and manages the virtual functions and infrastructure, while the former controls data plane interactions among the Physical Network Functions (PNFs), the VNFs and the switch fabric. At the center of the whole architecture, and home to the Northbound API, is the CloudCO Domain Orchestrator, orchestrating across the Southbound SDN Controllers and the NFV management and operation functions.

PNF SDN Manager & Controller interfaces with the access node and Network I/O devices, as well as any other devices that have PNFs deployed inside the CloudCO. This interfaces with the VNF to handle related operation dynamics of the VNF instantiated by VNF manager within the CloudCO. Meanwhile, a data center SDN Manager & Controller directly access the NFV infrastructure networking resources to implement functions such as L3 routes in the switch fabric, that the virtualized infrastructure manager is not supposed to do.

There are already more ten examples of use cases for CloudCO in residential and business scenarios, including use on a Network Enhanced Residential Gateway (TR-317) where the gateway is separated into two functional elements for home cloud services. On a virtual Business Gateway (TR-328), CloudCO can be used where functions are virtualized to provide more flexibility to business users.

Forging ahead
As always with the Broadband Forum, this isn't just innovation for innovation's sake, but is the development of a profitable, revenue-generating broadband service that shows just how cloud technology can fulfil its potential.

The exciting use cases the CloudCO aims to realize are moving closer all the time thanks to the work of the Broadband Forum – and our latest Open Broadband projects represent a significant step forward.

The CloudCO User Managed Objects Framework project creates a cloud-based user interface framework, and a user managed oriented objects template that can be used by all providers. This aims to satisfy customer requirements such as SD-WAN, where the customer wants to have WAN resource telemetry in the user browsers, portals, and for use by their applications. This project will leverage and extend the Forum's work on the virtual Business Gateway (vBG) and will use standardized API's such as DMTF Redfish.®

The second key project is Broadband Access Abstraction Open Source which addresses the requirements, architecture, design, and software required to support the virtualization of access device functionality and enabling an open and interoperable unified management interface for access equipment from different vendors. This project will be managed under the Forum's agile Open Broadband software initiative, allowing for member and non-member participation to create a fast feedback loop between the specifications and the source code reference implementation that supports them.

The two new software projects are the first open source initiatives undertaken by the Forum and are spearheaded by groups of key operators and their manufacturer partners. With this sort of collaboration and standards-based approach, we are confident the possibilities of the new era of broadband can be realized for the benefit of the whole industry.
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