Cisco Mobile Videoscape

Enhancing Mobile Video Efficiencies, Operator Revenue Opportunities, and Subscriber Experience

High bandwidth, low latency Internet applications, such as gaming and video, were unknown on mobile networks as recently as just a few years ago. As these services, along with thousands of applications and mobile devices, become ever more sophisticated and widespread, they threaten to overload existing mobile network infrastructures. The Cisco Visual Networking Index (VNI) Global Data Forecast for 2009-2014 predicts mobile data traffic volumes in 2014 will grow to 39 times what they were in 2009. The dominant application for 4G networks will be video, which is forecast to comprise 66 percent of all traffic by 2014.

Cisco Mobile Videoscape is an architecture of associated platforms and technologies that:

- Optimize and manage the delivery of video over the radio access network (RAN), mobile network edge, and core IP network
- Leverage the efficiencies of cloud computing
- Provide the intelligence operators need to better monetize video services - either directly or through innovative partnerships with service and content providers

Challenge

Consumers, mobile device vendors, application developers, and content providers are collectively forcing mobile operators to reinvent themselves. Mobile networks must evolve to deliver the services, features, coverage, and high quality experience that subscribers demand to retain their subscriber base. To balance increased costs of carrying the flood of new traffic with revenue generation, the mobile operator must compete, challenge, or partner with over-the-top content and application providers and avoid becoming just a data pipe for these services provided by others.

Mobile operators are therefore faced with three specific challenges:

- **Reduce costs** by managing over-the-top (OTT) applications, saving on capital expenditures (CapEx) by making better use of expensive spectrum and radio assets, and save on operational expenditures (OpEx) by better managing video bandwidth during peak usage.
- **Increase revenue** by providing high average revenue per user (ARPU) with premium video services, forging partnerships to generate new income from advertising and partnered content, and by introducing high-value interactive media applications.
- **Improve the customer experience** by enhancing video quality and delivering additional video content such as integrated “three screen” video services with mobile devices partnering and sharing with TV’s and computers.

Operational Benefits

Cisco Mobile Videoscape allows mobile operators to make video delivery more cost effective through network optimization, add revenue through the application of network and subscriber intelligence for new offerings and partnerships, and offer a better mobile video experience to subscribers. To do so, it provides a variety of operational and business benefits, including:

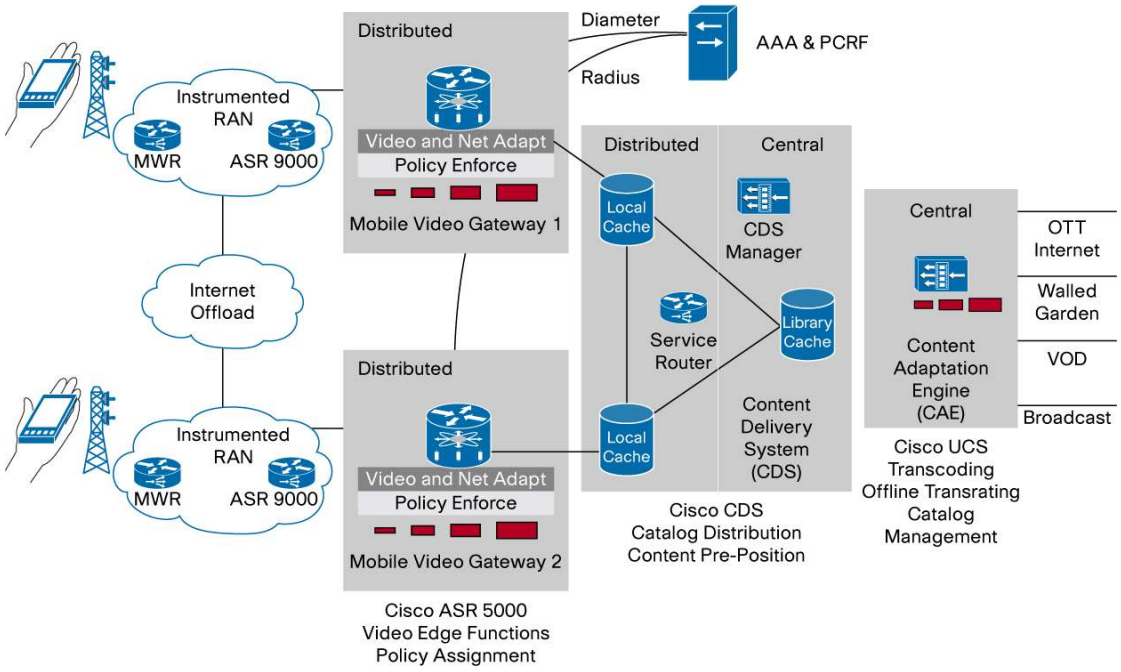
- Optimization of mobile video traffic with faster downloads and smoother streaming
- Increased control of over-the-top traffic

- Monetization of new services based on policy, partnered content, and advertising insertion
- Three screen video viewing experience, including session shifting

Solution

Cisco Mobile Videoscape applies multiple Cisco platforms and technologies to the optimization, monetization, and experience of mobile video. Solution components are shown in Figure 1.

Figure 1. Cisco Mobile Videoscape Solution Components



The Mobile Video Gateway runs on the Cisco ASR 5000 Series Multimedia Core Platform. It uses the Policy Control and Rating Function (PCRF) and Authentication, Authorization, and Accounting Function (AAA) to store subscriber profiles so that with each video request, the system identifies the subscriber's plan (e.g., gold, silver, bronze), user policies (e.g., child controls), device type (e.g. Android, iPhone, iPAD, PC) and network type (e.g. 3G, 4G). Based on this information, it determines the best version of the video to serve to the end user in that situation. Through deep packet inspection (DPI), the gateway identifies traffic and steers video traffic to the rest of the Mobile Videoscape architecture. Using TCP optimization, the gateway dynamically adjusts TCP parameters to further reduce traffic. Online transrating further reduces video bandwidth in real time when needed, based on network congestion. A video pacing feature reduces unwatched video downloads.

The Cisco Content Adaptation Engine (CAE), which runs on Cisco Unified Computing System (UCS) server infrastructure, performs bulk transcoding of video to formats that are optimal for the particular mobile device. It also performs bulk transrating to reduce video bandwidth to levels that are optimal for the various conditions. A catalog management function delivers optimal versions of a video based on a user profile derived from device type, user policy, and network type. The CAE also segments video for Adaptive Bit Rate (ABR) streaming.

The Cisco Content Delivery System (CDS) provides video content ingestion, caching, and distribution. It stores transcoded content to prevent re-transcoding and moves transcoded content to optimal locations closer to the subscriber. In conjunction with the catalog management function, the CDS delivers optimal versions of videos based on device type, user policies, and network constraints. CDS video streaming function supports various forms of ABR streaming.

Optimizing the Network for Viral Videos

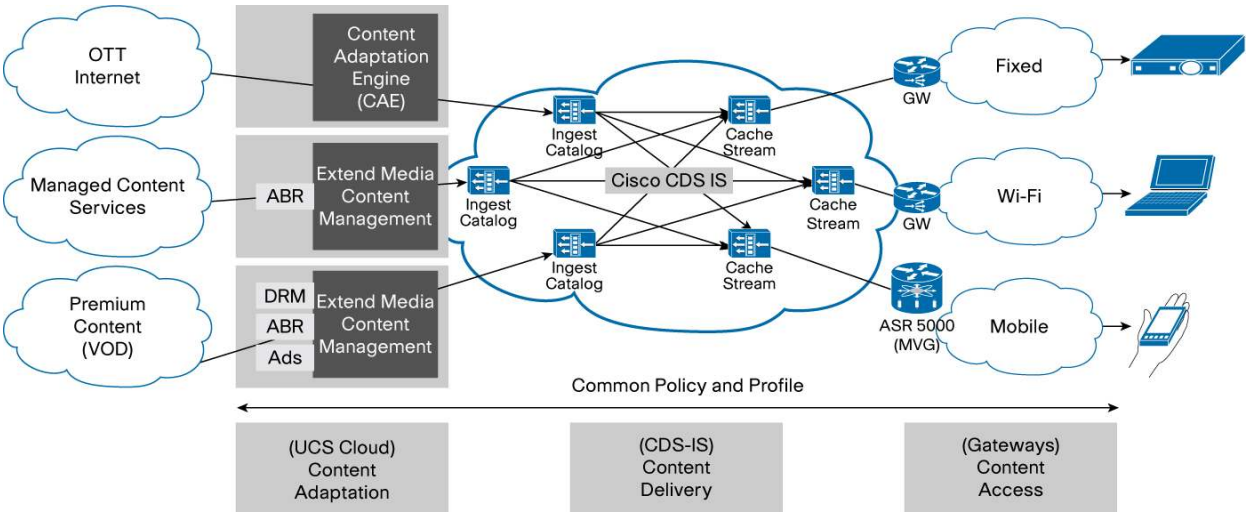
A highly unique solution provided by Cisco Mobile Videoscape is the system's ability to optimize content in real time, online, as well as the ability to create a optimization workflow, offline, for Internet video that has gone "viral" based on popularity. Such viral videos can result in huge traffic spikes that stress the end-to-end mobile network and impacts user experience.

With Cisco Mobile Videoscape, the CAE keeps track of how many hits are requested at a particular URL in a given period of time. At a certain volume of requests, the content is proactively transcoded and placed into a cache for offline consumption at the network edge. This functionality can significantly reduce traffic, lowering costs for core elements and decreasing congestion, resulting in faster setup times for subscribers.

Flexible Video Delivery for Different Needs and Architectures

Leveraging Cisco's best in class mobility, IP and video platforms and vision, Cisco Mobile Videoscape provides a cohesive end-to-end architecture for video that optimizes and manages video delivery from multiple managed and unmanaged sources to devices connected to various network types. Common user policies and profiles are shared throughout the solution and are used to determine the best version of video content to serve to the end user regardless of source. Figure 2.

Figure 2. Cisco Videoscape for Mobility Support for Multiple Architectures, Devices, Video Applications



With Cisco Mobile Videoscape, mobile operators gain broader flexibility in what type of video services they offer and how those services are delivered, managed, and monetized. From optimizing unmanaged over-the-top content to partnering with content and application providers to managing video via a Walled Garden to offering premium content available on-demand, the mobile operator can enjoy a new degree of differentiation and competitiveness in the new mobile ecosystem.

Why Cisco?

Cisco is working closely with mobile operators around the world to redefine the delivery environment for the mobile Internet. Mobile video presents numerous challenges as well as opportunities and Cisco Mobile Videoscape was designed to address both areas. It leverages existing infrastructure and network design to add intelligent new capabilities that help operators optimize video delivery, monetize video services through new business models and intelligent features, and build subscriber loyalty with unbeatable video experiences.

For More Information

http://www.cisco.com/go/mobileinternet.

Americas Headquarters
Cisco Systems, Inc.
San Jose, CA

Asia Pacific Headquarters
Cisco Systems (USA) Pte. Ltd.
Singapore

Europe Headquarters
Cisco Systems International BV Amsterdam,
The Netherlands

Cisco has more than 200 offices worldwide. Addresses, phone numbers, and fax numbers are listed on the Cisco Website at **www.cisco.com/go/offices.**

Printed in USA C22-642915-00 02/11