

# Telecom COTS World

Broadband Broadcast IoT Convergence

Telecom IT - HPC - A.I.  
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Video Networks - Broadcast  
Internet of Things

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Jan-Feb 2018

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  - CCAP: Converged Cable Access Platform

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# ADLINK and Radisys Showcase Telecom Industry's Open Compute Project Carrier Grade Spec

*Representing a significant step in the evolution of OCP's CG-OpenRack-19 specification, the first hands-on demonstration of OpenRack, OpenSled infrastructure was featured at the Broadband World Forum*

Hillsboro, OR and San Jose, CA – Oct. 19, 2017 – The telecom industry got its first view of the Open Compute Project (OCP) carrier grade CG-OpenRack-19 specification featuring ADLINK's OCP-ACCEPTED™ OpenSled configuration using the latest Intel® Xeon® Scalable Processors with Intel® C620 Series Chipsets, formerly codenamed Purley (Skylake-SP and Lewisburg). The CG-OpenRack-19 specification is the result of OCP's Telecom Working Group, which develops open architecture for carrier grade, frame-level solutions. The open architecture for CG-OpenRack-19 based on the Radisys® contributed OCP-ACCEPTED™ OpenRack specification and ADLINK's OCP-ACCEPTED™ OpenSled specification was on display in the OCP Experience Zone, Booth FA13B, Hall 22b, at the international Broadband World Forum on October 24-26 in Berlin, Germany.

The OCP-ACCEPTED™ OpenRack, OpenSled configuration marks a significant milestone in the evolution of OCP CG-OpenRack-19 as it continues the expansion of OCP-CG open architectures. The specification offers telecom data center operators the benefits of open platform standards combined with the needed carrier-grade and environmental enhancements required for Edge Computing in telecom data center environments. The open system approach drives innovation in the market and allows operators to avoid vendor lock-in that comes with proprietary solutions.

"As the networking and communications market continues to transform itself into a virtualized network, including Edge Computing technologies, the need for operators to integrate multiple hardware and software assets is one of the most critical factors in NFV/SDN and Multi-access Edge Computing deployments in the next few years," said Jeff Sharpe, director, strategic product planning at ADLINK.

"Non-proprietary open architecture enables a broad spectrum of partners and suppliers, while reducing their total cost of ownership," said Bryan Sadowski, vice president, FlowEngine and DCEngine, Radisys. "Based on collaboration with our CSP customers and partners, OCP for carrier-grade deployments is one of the best ways to reduce costs and provide faster time-to-market. Radisys is committed to enabling open telecom solutions in this emerging ecosystem."

ADLINK and Radisys are active members in OCP and have been instrumental in defining a technology path to an open architecture solution for the telecom industry. Radisys laid the foundation for the OCP-ACCEPTED™ CG-OpenRack-19 spec by submitting definitions for the frame, power, interconnect and sled dimensions. Its **DCEngine™** is the industry's first open hardware solution based on the specification.

The OCP-ACCEPTED™ OpenSled spec, based on ADLINK's OCCERA (Open Compute Carrier-grade Edge Reference Architecture), enhances the original spec by providing definitions for the internal configuration options of the CG-OpenRack-19 sled, including options for key appliances to utilize additional components inside the sled.

The ADLINK sled displayed with the OCP CG-OpenRack-19 implementation at the Broadband World Forum will feature the latest Intel® Xeon® Scalable Processors with Intel® C620 Series Chipsets. The platform provides compelling benefits across a broad variety of use models, including big data, artificial intelligence, high-performance computing, enterprise-class IT, cloud, storage, communication and IoT. Feature enhancements over previous versions of Intel® Xeon® Processor-based platforms include 1.5x memory bandwidth, integrated network/fabric and optional integrated accelerators.

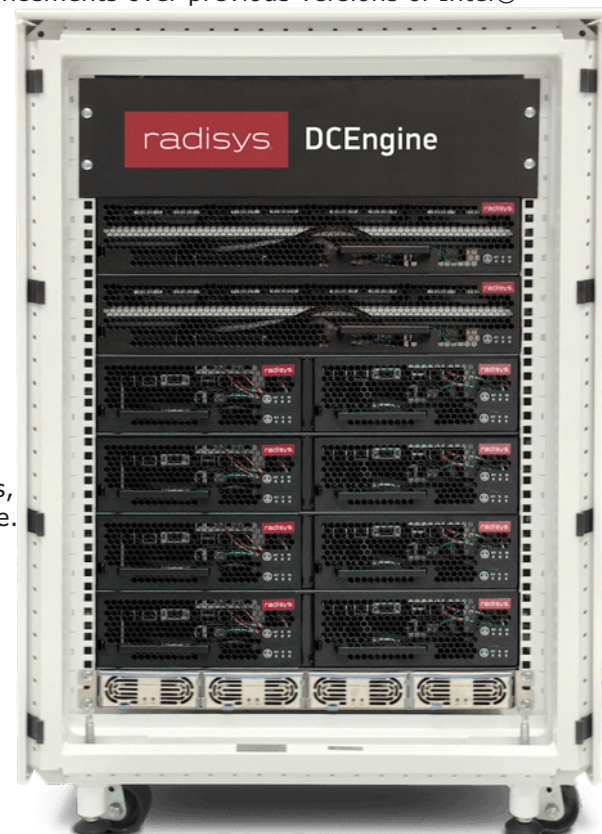
"The collaboration on the OCP CG-OpenRack-19 between Radisys and ADLINK is an exciting and much anticipated milestone in the realization of a carrier-grade open architecture for the telecom market," said Bill Carter, chief technology officer at the OCP Foundation. "Working closely with the service provider community, ADLINK and Radisys are delivering innovation and driving openness."

"Our OpenSled design integrates smoothly with the OpenRack specification," said Sharpe. "It's designed mainly for network deployed products for telecom specific applications, for example: DPI, security, policy, media and transcoding."

Sharpe added that ADLINK will continue its collaboration efforts, which will allow the company to provide useful specifications for full-width sleds, storage and other key technologies consistent with OCP-CG infrastructure.

**To download** ADLINK's OCP-ACCEPTED™ OpenSled specification or Radisys' CG-OpenRack-19 specification, visit the OCP website at [www.opencompute.org/wiki/Telcos#Approved](http://www.opencompute.org/wiki/Telcos#Approved).  
**For more** information on ADLINK's OCCERA, visit [www.adlinktech.com/OCCERA/](http://www.adlinktech.com/OCCERA/).

**About Radisys** [www.Radisys.com](http://www.Radisys.com)



# Telco Systems provides Open NFV Platform « x86 & ARM »

By Linda Hardesty is Managing Editor at SDxCentral

Telco Systems built its business providing carrier Ethernet equipment and software for service providers. Now it has created a network functions virtualization (NFV) platform for its service provider customers. And its platform can run on open universal CPE (uCPE) hardware that supports both Intel x86 and ARM architectures.

Telco Systems has been around since 1972. It owns bragging rights for its url — telco.com. But about five years ago, the company started working on a platform to deliver services via software. That has since morphed into its NFVTime product, which is generally available. NFVTime includes an operating system and a marketplace of virtual network functions (VNFs) from third-party vendors. The portfolio of certified VNFs in its marketplace includes software-defined wide-area networking (SD-WAN), vFirewall, vProbe, and vSecurity.

Today, Telco Systems announced that it added 6WIND's vRouter software to the VNF marketplace. Telco Systems says it will be the first vRouter on an open uCPE with support for both Intel x86 and ARM architectures.

Ariel Efrati, Telco Systems' CEO, said it's significant that the vRouter can run on both hardwares. "If you think about it, most edge connections use ARM," he said. "ARM exists in all our cellphones for example. We came up with a technology that can run on whatever architecture that exists."

The 6WIND vRouter — named Turbo Router — is a software network appliance deployed in bare metal environments or as a virtual machine (VM). It's filling the gap left when AT&T bought Brocade's vRouter and discontinued support of the product for other customers. The company stepped in with its Turbo Router technology to grab this market share.

"The fact that we have background in networking is key here to build an operating system for operators," said Efrati.

## Telco Systems and Marvell introduce deployment-ready uCPE

February 26, 2018 -- Sabrina Labanowski -- Telco Systems added the Marvell ARMADA 8040 system-on-chip (SoC) from CyberTAN to its white box offerings in its growing ecosystem of Arm-based uCPE solutions.

Telco Systems, Arm and Marvell offer together a high performance uCPE solution. Telco Systems' NFVTime NFVi-OS will power the Marvell ARMADA 8040 SoC integrated on the CyberTAN white box.

Telco Systems and Marvell demonstrated their new joint uCPE offering at Arm's booth at the Mobile World Congress.

This new solution meets ongoing market requirement for additional high-performance options for telcos and managed service providers to select the appropriate hardware architecture for their specific operational and business needs.

"As the build-out of edge computing systems continues to grow across multiple industries, there is a significant need in the ecosystem for cost-effective, power-efficient solutions that meet the requirements that edge computing deployments demand," said Chris Koopmans, Executive Vice President, Networking and Connectivity at Marvell. "We are pleased to be collaborating with Telco Systems and Arm to introduce a high performance uCPE solution that we believe will bring the compute power, efficiency and flexibility to support the successful launch of NFV services for edge computing applications."

"We see uCPE as a key area in enabling compute at the edge, and one where Arm can show a real technology advantage," said Drew Henry, Senior Vice President and General Manager, Infrastructure Business Unit, Arm. "Telco Systems and its underlying technology are an important contribution to this market, enabling uCPE solutions for service providers and enterprises. Adding Marvell to the NFVTime ecosystem is an important step in enhancing the overall Arm-based uCPE ecosystem."

NFVTime is an advanced NFVi-OS that can turn any white box appliance into an open, carrier-class uCPE solution. NFVTime comes with a broad portfolio of tested and certified VNFs, including SD-WAN, vRouter, vFirewall, vProbe, vSecurity and more. It can match any solution that is centrally managed and orchestrated by either Telco Systems' uCPE manager or any other MANO solution.

**NFVTime can run on both Intel x86 and Arm architectures, seamlessly giving service providers the freedom to choose any hardware and any VNF.**

The CyberTAN white box platform is comprised of several key Marvell technologies that bring an integrated solution designed to enable significant hardware cost savings. The platform incorporates the power-efficient Marvell ARMADA 8040 SoC based on the Arm Cortex-A72 quad-core processor, with up to 2GHz CPU clock speed, and Marvell E6390x Link Street Ethernet switch. The Marvell Ethernet switch supports 10G uplink and 8 x 1GbE ports along with integrated PHYs, four of which are auto-media GbE ports (combo ports).



# Marvell and Cavium to Combine Creating an Infrastructure Solutions Powerhouse

- Complementary portfolios and scale enable world-class end-to-end solutions
- Diversifies revenue base and end markets; increases SAM to \$16 billion+
- Combined R&D innovation engine and IP portfolio accelerates product leadership
- Creates best-in-class financial model

Santa Clara, and San Jose Calif. (November 20, 2017) –Marvell Technology Group Ltd. (NASDAQ: MRVL) and Cavium, Inc. (NASDAQ: CAVM) today announced a definitive agreement, unanimously approved by the boards of directors of both companies, under which Marvell will acquire all outstanding shares of Cavium common stock in exchange for consideration of \$40.00 per share in cash and 2.1757 Marvell common shares for each Cavium share. Upon completion of the transaction, Marvell will become a leader in infrastructure solutions with approximately \$3.4 billion<sup>1</sup> in annual revenue.

The transaction combines Marvell's portfolio of leading HDD and SSD storage controllers, networking solutions and high-performance wireless connectivity products with Cavium's portfolio of leading multi-core processing, networking communications, storage connectivity and security solutions. The combined product portfolios provide the scale and breadth to deliver comprehensive end-to-end solutions for customers across the cloud data center, enterprise and service provider markets, and expands Marvell's serviceable addressable market to more than \$16 billion. This transaction also creates an R&D innovation engine to accelerate product development, positioning the company to meet today's massive and growing demand for data storage, heterogeneous computing and high-speed connectivity.

"This is an exciting combination of two very complementary companies that together equal more than the sum of their parts," said Marvell President and Chief Executive Officer, Matt Murphy. "This combination expands and diversifies our revenue base and end markets, and enables us to deliver a broader set of differentiated solutions to our customers. Syed Ali has built an outstanding company, and I'm excited that he is joining the Board. I'm equally excited that Cavium's Co-founder Raghiv Hussain and Vice President of IC Engineering Anil Jain will also join my senior leadership team. Together, we all will be able to deliver immediate and long-term value to our customers, employees and shareholders."

"Individually, our businesses are exceptionally strong, but together, we will be one of the few companies in the world capable of delivering such a comprehensive set of end-to-end solutions to our combined customer base," said Cavium Co-founder and Chief Executive Officer, Syed Ali. "Our potential is huge. We look forward to working closely with the Marvell team to ensure a smooth transition and to start unlocking the significant opportunities that our combination creates."

The transaction is expected to generate at least \$150 to \$175 million of annual run-rate synergies within 18 months post close and to be significantly accretive to revenue growth, margins and non-GAAP EPS.

## Management and Board of Directors

Matt Murphy will lead the combined company, and the leadership team will have strong representation from both companies, including Marvell's current Chief Financial Officer Jean Hu, Cavium's Co-founder and Chief Operating Officer Raghiv Hussain and Cavium's Vice President of IC Engineering Anil Jain. In addition, Cavium's Co-founder and Chief Executive Officer, Syed Ali, will continue with the combined company as a strategic advisor and will join Marvell's Board of Directors, along with two additional board members from Cavium's Board of Directors, effective upon closing of the transaction.

## About Marvell

Marvell first revolutionized the digital storage industry by moving information at speeds never thought possible. Today, that same breakthrough innovation remains at the heart of the company's storage, networking, and connectivity solutions. With leading intellectual property and deep system-level knowledge, Marvell's semiconductor solutions continue to transform the enterprise, cloud, automotive, industrial, and consumer markets. To learn more, visit: [www.marvell.com](http://www.marvell.com).

## About Cavium

Cavium, Inc., offers a broad portfolio of infrastructure solutions for compute, security, storage, switching, connectivity and baseband processing. Cavium's highly integrated multi-core SoC products deliver software compatible solutions across low to high performance points enabling secure and intelligent functionality in Enterprise, Data Center and Service Provider Equipment. Cavium processors and solutions are supported by an extensive ecosystem of operating systems, tools, application stacks, hardware-reference designs and other products. Cavium is headquartered in San Jose, CA with design centers in California, Massachusetts, India, Israel, China and Taiwan. For more information, please visit: <http://www.cavium.com>.



# CommAgility LTE platform supports eNodeB and UE LTE-Advanced functionality



## *Stand-alone system supports software-defined LTE configuration*

Loughborough, UK, February 1st, 2018 – CommAgility, a Wireless Telecom Group company (NYSE MKT: WTT), today announced the CA-D8A4-RF4, a stand-alone hardware platform supporting eNodeB and UE configurations for LTE-Advanced (LTE-A) networks.

The platform comes pre-integrated and tested with CommAgility's Small Cell or Mobile LTE software providing out-of-the box connectivity, thus cutting time to market and reducing risk. The CA-D8A4-RF4 has been designed for use in applications such as small cell, relay and terminal equipment, in private network markets including Citizens Broadband Radio Service (CBRS) and ground-to-air. By providing high-performance, flexible processing and interfacing, it delivers a platform that enables customers to benefit from CommAgility's world-leading experience of LTE adaptation for specialized private networks.

"CA-D8A4-RF4 is the result of CommAgility's deep expertise in private network requirements and long-term experience working with customers' unique needs," said Edward Young, Vice President and General Manager at CommAgility. "By providing a fully software-defined platform and bespoke LTE customization at all protocol layers, we can enable customers to leverage the benefits of LTE into real-world applications."

Baseband processing is performed by the TCI6638K2K System on Chip (SoC) from Texas Instruments. The CommAgility LTE SmallCell software supports an eNodeB with 120 active, 360 connected users and a throughput of up to 300Mbps downlink, 102Mbps uplink. EPC integration can also be supported to create a stand-alone network on the platform.

As a terminal the mobile platform supports a Release 10 feature set with 20MHz bandwidth, 2x2 MIMO and 64QAM. Combined with CommAgility's LTE UE software, it is ideal for highly differentiated LTE UE products that require customization. Enhancements such as extended Doppler shift and latency for high-speed, long range applications are available.

The CA-D8A4-RF4 has a software-defined RF front end with four transmit and receive channels supporting bands between 410MHz and 5925MHz with bandwidths up to 100MHz, making the platform ideal for 5G new radio development. Independent front end modules support TDD and FDD modes of operation at up to +21dBm rated power output per antenna and allow easy customisation for different frequency bands or higher power outputs. The channels can be operated in 4x4 MIMO or 2x2 MIMO 2CC carrier aggregated mode. Three CPRI interfaces are provided to support remote radio head operation if required.

A range of build options is available, and further customization of the platform and enclosure design is possible in volume, to enable the best technical and commercial fit to a customer application to be achieved.

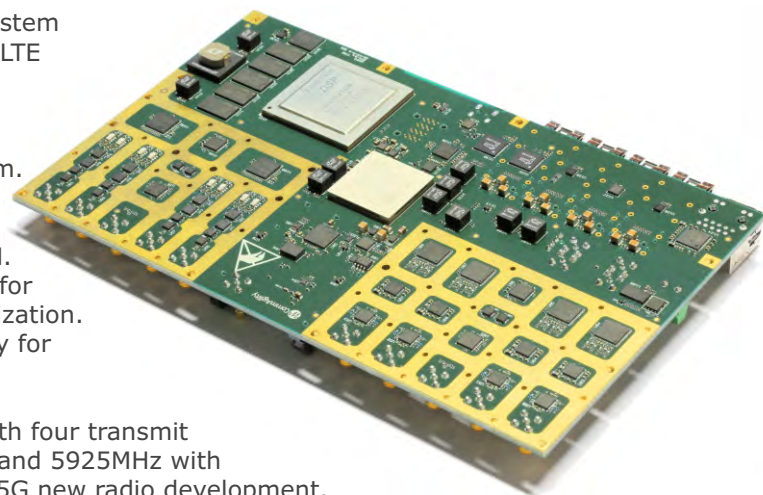
The CA-D8A4-RF4 will be available from July 2018.

**For more information** please contact CommAgility at +44 1509 228866 or +1 (408) 641 4135, [sales@commagility.com](mailto:sales@commagility.com) or [www.commagility.com](http://www.commagility.com).

### **About Wireless Telecom Group, Inc.**

Wireless Telecom Group, Inc., comprised of Boonton Electronics, CommAgility, Microlab and Noisecom, is a global designer and manufacturer of advanced RF and microwave components, modules, systems and instruments. Serving the wireless, telecommunication, satellite, military, aerospace, semiconductor and medical industries, Wireless Telecom Group products enable innovation across a wide range of traditional and emerging wireless technologies. With a unique set of high-performance products including peak power meters, signal analyzers, signal processing modules, LTE PHY and stack software, power splitters and combiners, GPS repeaters, public safety monitors, noise sources, and programmable noise generators, Wireless Telecom Group supports the development, testing, and deployment of wireless technologies around the globe. [www.wtcom.com](http://www.wtcom.com)

CommAgility, a Wireless Telecom Group company, is an award-winning developer of embedded signal processing and RF modules, and LTE PHY/stack software, for 4G and 5G mobile network and related applications. CommAgility designs the latest DSP, FPGA and RF technologies into compact, powerful, and reliable products based on industry standard architectures. CommAgility's LTE software for mobile devices and wireless infrastructure includes physical layer and protocol stack for small cells, physical layer and protocol stack for terminals, an advanced scheduler for small cells, and IP development in the areas of advanced PHY algorithms in multi-core SDR platforms.



# DICE offers enhanced security and unique device identification

January 22, 2018 -- By Dennis Mattoon, Microsoft Research

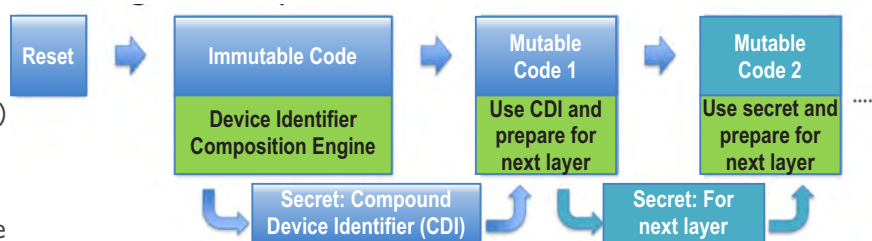
With the prevalence of connected devices, especially in Internet of Things (IoT) applications, embedded systems designers increasingly must contend with the types of trust and security issues that computing systems engineers have had to cope with for years.

The Trusted Computing Group (TCG) has a long history of developing standards-based trust technology to address these trust and security issues. And recently, the TCG has expanded its focus to include embedded systems. TCG's newly released Device Identity Composition Engine (DICE) architecture aims to provide enhanced security and unique device identification and attestation for the embedded space.

DICE relies on a combination of simple silicon capabilities and software techniques that work together to provide a cryptographically strong device identity. Improvements over software-only security are based, in part, on breaking the boot process into layers. Secrets unique to each layer and hardware configuration are created using a Unique Device Secret (UDS) known only to the DICE (and, optionally, manufacturer).

The device secrets and keys, unique to the device and each software layer, ensure that if code or configuration is modified, the secrets and keys will be different. With this approach, each software layer keeps the secret it receives completely confidential to itself. If a secret is disclosed through a vulnerability, patching the code will automatically re-key the device. Figure 1 shows how trusted code in DICE provides a hardware-based root of trust for the platform. In the DICE boot model:

1. Power-on unconditionally starts the DICE
2. DICE has exclusive access to the UDS
3. Each layer computes a secret for the next layer (via a cryptographic one-way function)
4. Each layer protects the secret it receives



[Figure 1 | Using new secrets at each layer, the DICE model builds upon trusted immutable code to build a trust chain and provide strong device identity.]

Hardware, with features to limit access to the UDS only to the DICE, performs the initial step for DICE security. Both the UDS and the measurement of the first mutable code that runs on the DICE platform, where DICE provides the root of trust for the measurement, are used to compute the Compound Device Identifier (CDI). Starting with the CDI, each successive software layer uses the secret and a measurement of the next layer to derive a new secret for the following layer. Each layer must erase its own secret before transferring control. This process continues during startup, resulting in a measurement chain that is rooted in the device's identity and based on measured code.

For a real-world look at this technology, Microsoft's Robust Internet of Things (RIoT) architecture provides a reference implementation for leveraging DICE. This is the same architecture that underpins the Device Provisioning Service in Azure IoT. In the RIoT reference, a DICE-enabled processor runs a first-stage bootloader called RIoT Core. RIoT Core is responsible for deriving the device identity based on measurements performed by the DICE. RIoT Core then combines its own measurement of device firmware with the CDI it received from the DICE and passes this secret value to firmware so it may further derive its secrets and keys.

In this architecture, device firmware relies on attestation (the cryptographic reporting of the security configuration of a device) elements encoded in a cryptographic hash value called the Firmware Identity (FWID). The FWID is the hash of the Firmware Security Descriptor (FSD) that together with the UDS are simulated inputs to a function that derives the DICE-based identities and certificates.

There are three basic requirements for implementing a DICE platform. These include:

1. The ability to compute a hash (ideally in hardware or ROM),
2. A UDS of at least 256 bits,
3. A protection mechanism that limits access to the UDS to the DICE exclusively and only resets on platform reset

These characteristics are typically found in available microcontrollers (MCUs) used in embedded applications, but MCUs specifically designed for the DICE architecture can optimize their implementation. Hardware available to implement the DICE architecture includes existing MCUs: STMicroelectronics' STM32L0\L4 family of MCUs, Micron Technology's Authentica-based flash memory. New MCUs specifically designed for DICE include Microchip Technology's CEC1702 with a SecureIoT1702 Demo board and flash memory from WinBond.

With the DICE specification nearing finalization, even more design-in tools and support will be available from a broader range of suppliers.

**Dennis Mattoon** is a Senior Software Development Engineer for Microsoft Research. As one of the founding members of the Security and Privacy Research and Engineering team in MSR, Dennis and his team have spent the last 10 years focused on advancements in trusted computing and system security. His most recent work has been on the creation of the Device Identifier Composition Engine Specification and Architectures (TCG DiceArch), Robust and Resilient IoT (RIoT), and the Cyber-Resilient Platform Initiative.

# CMTS/CCAP market to reach \$7 billion by 2023

CMTS: Cable Modem Termination System

CCAP: Converged Cable Access Platform

January 17, 2018 -- By BTR Staff <http://www.broadbandtechreport.com/index.html>

According to MarketsandMarkets, the CMTS and CCAP market is estimated to be worth \$3.87 billion by 2017 and is likely to reach \$7.23 billion by 2023, at a CAGR of 10.96% between 2017 and 2023.

The research house says the major factors driving the market include increasing investment in broadband services, the advent of over-the-top (OTT) services such as Netflix, Amazon Prime, and Hulu, and growing demand for Internet of Things (IoT) applications.

CCAP is expected to hold the largest market share in the forecast period. The CCAP market is growing because of booming Internet and over the top (OTT) services, which is driving the adoption of new headend hardware. CCAP is capable of fulfilling all the requirements related to high-speed Internet and OTT services, whereas CMTS is lagging. The cable industry's DOCSIS 3.1 upgrade is also a major instigating factor for high adoption of CCAP. The CMTS market is expected to continue to fall slowly.

DOCSIS 3.1 standard systems to hold the largest market share during the forecast period. With the increased demand for CCAP systems and DOCSIS 3.1 across verticals, the market for DOCSIS 3.1 standard systems is expected to hold the largest market in the forecast period. It is expected to continue the same during the forecast period owing to the increase in the demand for high-speed Internet and OTT services such as internet TV, video on demand, music, and communications.

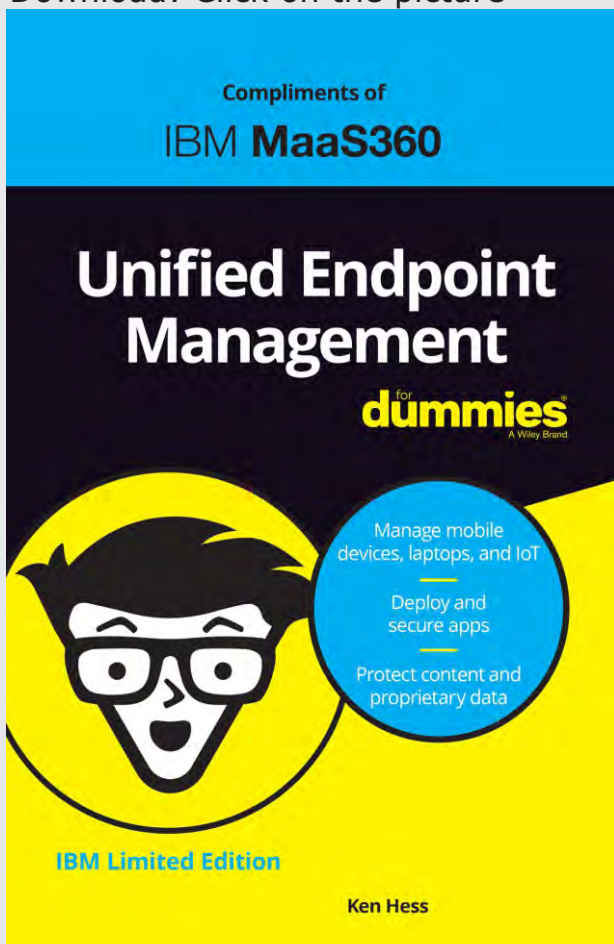
North America is expected to hold the largest market share during the forecast period. Increasing demand for high-speed Internet and OTT services is expected to propel the CMTS and CCAP market. Major companies such as ARRIS, Harmonic and Cisco are launching their products in this region. Moreover, DOCSIS 3.1 upgrades are encouraging CMTS and CCAP system manufacturers to manufacture systems to the DOCSIS 3.1 specification.

## UEM for Dummies

IBM Limited Edition

by Ken Hess

Download: Click on the picture



## Introduction

Today's devices are more powerful than enterprise-level servers were ten years ago. They help you multitask, communicate, compute, and mobilize — making security a more complicated issue than ever before. Users enjoy continuous connectivity through their devices — to the Internet, other personal devices, the corporate network, and everywhere in between. Now with anytime, anywhere accessibility, today's employers expect their workers to be productive around the clock, whether at home, onsite, or in the field.

In addition to traditional desktop and laptop computers, smartphones, tablets, wearables, and even the Internet of Things (IoT) present enterprise IT teams with challenges they never encountered before. Chief among these problems are users violating corporate standards, data leakage occurrences — especially from enterprise apps — and the prevalence and evolution of malware and other advanced threats. Not only do enterprises want their users to be accessible and productive, but also they want them to be secure.

Ever-evolving device technology has led enterprises to seek out management options to ensure security without overburdening the user, especially in bring your own device (BYOD) scenarios.

Because devices continue to advance, employees come and go, and the security landscape is in constant flux, IT leadership must rise to the challenge of managing a disparate and growing number of devices, operating systems, and platforms. The only efficient method of managing and securing all endpoints, their users, apps, content, and data is to implement and deploy a unified endpoint management (UEM) solution that changes and adapts with new technology, more skilled users, and increasingly sophisticated attacks by hackers. Ultimately, workers want the freedom to use the endpoints of their choosing, and enterprises want to secure those endpoints to protect their proprietary data.



# WHITE PAPER

## Enabling the Digital Era in Media and Entertainment

### Transforming Media and Entertainment with End-to-end Infrastructure

By Scott Sinclair, ESG Senior Analyst

Dell EMC: Enabling the Digital Era in Media and Entertainment is a collaborative White Paper with Dell EMC and ESG which reflects on the economics of the digital transformation of the media industry. In the digital era of media and entertainment, firms must look toward technology not as a new opportunity, but as a necessary engine where success is often decided by how efficiently that engine can be leveraged.

#### Executive Summary

For many industries, digital transformation presents a future opportunity, an aspirational model for how a firm wishes to conduct business and interact with its customers. For the media and entertainment industry, however, digital transformation has become an everyday reality. In the past several years, technological innovations have not only fundamentally altered the business but have also democratized content creation and delivery. New content-creation firms continue to emerge, disrupting the competitive landscape. As just only one of multiple recent examples, Apple announced this year that the company has allocated \$1 billion dollars to procure and produce original media content.<sup>1</sup>



It is not just the creation of content that has changed; the consumption model for media also has been fundamentally altered. The days of audiences sitting on the couch watching a predictable schedule of broadcast television are quickly eroding. The mobile device, once called a phone, is quickly growing as the display of choice. According to Nielsen's Comparable Metrics Report on the average audience composition by platform for ages 18-34, the score for smartphones (28%) was nearly identical to that of television (30%). In other words, this highly desirable demographic is already nearly just as likely to be viewing content on a mobile device as they are on a television.<sup>2</sup> The most dramatic industry change, however, may be the evolution of audience expectation. Media is becoming less appointment viewing, and more viewing whenever and wherever the audience desires. The expectation is on demand.

All three of these transformational elements—the democratization of the market, the rise of the mobile device, and the expectation for on demand—have arisen thanks to the transition away from film to digital media. While the transition away from film to digital media offered early efficiency gains, those benefits have already become established parts of the competitive landscape—no longer opportunities, but rather expectations. In the digital era of media and entertainment, firms must look toward technology not as a new opportunity, but as a necessary engine of the media industry where success is often decided by how efficiently that engine can be leveraged.

A core tenet of a digital industry is that IT capability transitions from a necessary, but altogether ancillary, expense to a chief enabler of revenue generation. As a result, firms that wish to thrive in this new digital media entertainment industry need to develop new skills sets, and one IT innovation leader helping media firms understand this new landscape is Dell EMC.

**DOWNLOAD  
THE WHITE PAPER**

# New LTE End-to-End Solution for Private Networks Meets Security, Latency Requirements for IoT and Industry 4.0

ADLINK has joined MECSSware at Mobile World Congress in Barcelona to demonstrate the new Private LTE technology, which provides end-to-end, wireless connectivity for private networks. Representatives of the companies have showcased the Private LTE solution during the world's largest exhibition for the mobile industry.

An industrial use case, the demonstration features a low-latency video uplink transmission from an Automated Guided Vehicle (AGV) to a control center over an LTE connection. On-site measurements of the transmission's latency will underscore the technology's high efficiency.



**LTE Small Cell Base Station (s)**

**Mobile Edge Computing Server (MECS)**

"Private LTE complements mobile network technology with operational flexibility, low latency and strong privacy," said Torsten Musiol, founder and CEO of MECSSware in Velbert, Germany. "MECSSware's Mobile Edge Cloud Server, based on ADLINK's robust hardware, enables reliable wireless connectivity for next-generation industrial networks. Industry 4.0 networks will generate huge productivity gains through real-time processing in use cases such as control of autonomous vehicles, power grids, warehousing, logistics and factory automation."

ADLINK's SETO-1000 Extreme Outdoor Server combined with MECSSware software comprise the Mobile Edge Cloud Server for Private LTE. All combined, the end-to-end Private LTE solution is designed to work within Industry 4.0.

Private LTE will primarily address industrial and agro-industrial users (enterprises), which have a need for wireless connectivity on their premises. The system, however, can also be used for other use cases where connectivity is missing or less developed.

"Once the powerful results of the technology become evident, we anticipate a lot of interest in this groundbreaking solution," said Roy Wan, managing director of ADLINK's EMEA region. For more information please visit [www.adlinktech.com](http://www.adlinktech.com) [www.mecssware.com](http://www.mecssware.com)



# Artesyn and Gamestream to Cut the Cost of New Gaming-as-a-Service by More Than Half with the Latest Intel® Processors

Powered by Intel processors with high performance discrete graphics and memory on a single package

Las Vegas, Nev. [7 January, 2018] — At the Consumer Electronics Show (CES) in Las Vegas today, **Artesyn Embedded Technologies and Gamestream in collaboration with Intel unveiled a new industry-leading cloud gaming solution** that will enable telecom operators and hospitality providers to dramatically lower the cost and eliminate the complexity of rolling out branded gaming-as-a-service offerings to their customers.

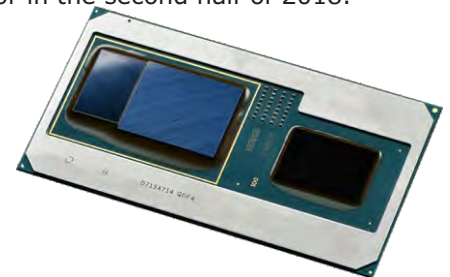


Gamestream, a cloud gaming innovator, will offer its white label cloud gaming platform and premium gaming catalog using the MaxCore® high-performance server from Artesyn, a leader in computing platforms for communications networks. The server is powered by the new 8th Gen Intel® Core™ processor, which brings together a high-performing Intel Core H-series processor, second generation High Bandwidth Memory (HBM2) and a custom-to-Intel Radeon RX Vega M graphics processor – all in a single package. This hardware and software combination offers more than double the user density and half the power consumption per server than current server-based solutions. A single 3U MaxCore server, loaded with PCI Express cards featuring the new Intel Core processor, running the Gamestream cloud gaming solution will be able to host up to 60 concurrent gaming sessions.

Artesyn expects to have PCI Express add-in cards featuring the new Intel processor in the second half of 2018.

## Gamestream

Gamestream has developed a highly portable thin client for network operator set-top-boxes, cable modems or smart TVs which can be ported at very low cost and simplifies deployment of the OTT cloud gaming solution. With licensed games ready to stream, customers can go live with a solution quickly and easily with minimal upfront capital expenditure.



Ivan Lebeau, chairman and CEO of Gamestream, said: "Currently, the distribution of video games still depends on physical and downloadable models. However, the evolution of the music and movie industries leads us to believe that the gaming industry is set to follow the same pattern. The unlimited streaming model in the video game industry is still in its early stages and its development faces several technical challenges, which the combination of the latest Intel processors and Artesyn's MaxCore server helps us to overcome. We can now offer more than double the user density and half the power consumption per server than current solutions, dramatically reducing the cost to our customers and maintaining an excellent gaming experience for their subscribers."

Gamestream has the widest range of negotiated games licenses for streaming in the industry, giving their customers access to the largest potential catalogue of games. Gamestream has partnered with software houses such as Disney, Konami, Codemasters, THQ Nordic and Maximum Games. These partnerships allow Gamestream to distribute hits such as Lego Star Wars, Pro-Evolution Soccer 2018, GRID AutoSport and Red Faction. Gamestream customers are free to define their own catalogue of games depending on geographical preferences and targeted audiences.

## Artesyn

Artesyn's MaxCore platform uses Artesyn microserver cards and PCI Express add-in cards in an innovative chassis with internal networking to offer versatility and maximum performance density per rack unit for data center and carrier-grade applications. A single 3U MaxCore platform can host up to 15 add-in cards with a total of 30 processors supported by dedicated hard drive bays, and redundant hot-swappable cooling and power supplies.

Barry Dolan, vice president of sales and marketing at Artesyn, said: "Telcos can now offer their subscribers a cloud gaming service under their own brand to monetize the investment in their existing network infrastructure, while the hospitality offering goes beyond hotels to include cruise ships, airplanes and even hospitals. With first deployments already underway, this is an exciting collaboration that could be as disruptive in gaming as streaming has been in other entertainment markets. The low cost of entry makes it easy to test the service with customers and scale out as subscriptions grow.

"For sheer performance density and versatility, nothing beats the MaxCore platform. It is already the highest density platform for voice and video streaming services worldwide, so cloud gaming is a natural and ideal application whether it is virtualized in a data center or as a mobile edge computing (MEC) scenario."

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## Artesyn and Gamestream to Cut the Cost of New Gaming-as-a-Service by More Than Half with the Latest Intel® Processors

... from previous page

### Intel

Lynn Comp, general manager of the Visual Cloud Division in Intel's Data Center Group, said: "Remote gaming provides an exciting opportunity for a wide range of cloud and communications service providers to deliver windows PC games to their customers. The combination of Intel® Quick Sync Video for quality and low-latency compression of frames into industry standard AVC/HEVC video, combined with high performance discrete graphics in one solution, offers a compelling user experience with excellent gameplay."

### About Gamestream

Gamestream has developed a high quality cloud gaming solution, allowing it to stream in HD (1080p/60fps) a catalog composed of the latest AAA games and a selection of the best independent games. The company's white-label solution is designed to enable hotels, cruise ships and hospitals; and telecom operators, media groups and internet access providers to provide their customers with a latest generation console experience, with no dedicated console or appliance.

### About Artesyn Embedded Technologies

Artesyn Embedded Technologies is a global leader in the design and manufacture of highly reliable power conversion and embedded computing solutions for a wide range of industries including communications, computing, consumer electronics, medical, military, aerospace and industrial automation. For more than 40 years, customers have trusted Artesyn to help them accelerate time-to-market and reduce risk with cost-effective advanced network computing and power conversion solutions. Headquartered in Tempe, Arizona, Artesyn has over 16,000 employees worldwide across ten engineering centers of excellence, four wholly-owned world-class manufacturing facilities, and global sales and support offices.

## Commission proposes to invest EUR 1 billion in world-class European supercomputers

### European Commission - Press release -- Brussels, 11 January 2018

The European Commission unveiled today its plans to invest jointly with the Member States in building a world-class European supercomputers infrastructure.

Supercomputers are needed to process ever larger amounts of data and bring benefits to the society in many areas from health care and renewable energy to car safety and cybersecurity.

Today's step is crucial for the EU's competitiveness and independence in the data economy. Today, European scientists and industry increasingly process their data outside the EU because their needs are not matched by the computation time or computer performance available in the EU. This lack of independence threatens privacy, data protection, commercial trade secrets, and ownership of data in particular for sensitive applications.

A new legal and funding structure – the EuroHPC Joint Undertaking – shall acquire, build and deploy across Europe a world-class High-Performance Computing (HPC) infrastructure. It will also support a research and innovation programme to develop the technologies and machines (hardware) as well as the applications (software) that would run on these supercomputers.

The EU's contribution in EuroHPC will be around EUR 486 million under the current Multiannual Financial Framework, matched by a similar amount from Member States and associated countries. Overall, around EUR 1 billion of public funding would be invested by 2020, and private members of the initiative would also add in kind contributions.

**Andrus Ansip**, European Commission Vice-President for the Digital Single Market, said: "Supercomputers are the engine to power the digital economy. It is a tough race and today the EU is lagging behind: we do not have any supercomputers in the world's top-ten. With the EuroHPC initiative we want to give European researchers and companies world-leading supercomputer capacity by 2020 – to develop technologies such as artificial intelligence and build the future's everyday applications in areas like health, security or engineering."

**Mariya Gabriel**, Commissioner for Digital Economy and Society added: "Supercomputers are already at the core of major advancements and innovations in many areas directly affecting the daily lives of European citizens. They can help us to develop personalised medicine, save energy and fight against climate change more efficiently. A better European supercomputing infrastructure holds great potential for job creation and is a key factor for the digitisation of industry and increasing the competitiveness of the European economy."

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# Commission proposes to invest EUR 1 billion in world-class European supercomputers

## European Commission - Press release -- Brussels, 11 January 2018

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### Benefits of supercomputing

**High-Performance Computing is a critical tool for understanding and responding to major scientific and societal challenges, such as early detection and treatment of diseases or developing new therapies based on personalised and precision medicine. HPC is also used for preventing and managing large-scale natural disasters, notably for forecasting the paths which the hurricanes are following or for earthquake simulations.**

**The EuroHPC infrastructure will provide European industry and in particular small and medium-sized enterprises (SMEs) with a better access to supercomputers to develop innovative products. The use of High Performance Computing has a growing impact on industries and businesses by significantly reducing product design and production cycles, accelerating the design of new materials, minimising costs, increasing resource efficiency and shortening and optimising decision processes. For example, car production cycles can be reduced thanks to supercomputers from 60 months to 24 months.**

**High-Performance Computing is also essential for national security and defence, for example when developing complex encryption technologies, tracking and responding to cyberattacks, deploying efficient forensics or in nuclear simulations.**

### Research and innovation matched with infrastructure

**Today's initiative will pool investments to establish leading European supercomputers and big data infrastructure. The EuroHPC Joint Undertaking aims to acquire systems with pre-exascale performance (a hundred million billion or  $10^{17}$  calculations per second), and support the development of exascale (a billion billion or  $10^{18}$  calculations per second), performance systems based on EU technology, by 2022-2023.**

### The activities of the Joint Undertaking will consist of:

**1. Acquisition and operation of** two world-class pre-exascale supercomputing machines and at least two mid-range supercomputing machines (capable of around  $10^{16}$  calculations per second), and providing and managing access to these supercomputers to a wide range of public and private users starting from 2020.

**2. Research and innovation programme on HPC:** to support the development of European supercomputing technology including the first generation of European low-power microprocessor technology, and the co-design of European exascale machines, and to foster applications, skills development and a wider use of High-Performance Computing.

The EuroHPC Joint Undertaking will operate in 2019-2026. The planned infrastructure will be jointly owned and operated by its members consisting at first of the countries that have signed the EuroHPC declaration (list below) and private members from academia and industry. Other members can join this cooperation at any moment, provided their financial contribution.

### Background

Since 2012, the Commission drives EU initiatives in this field, including: the European Cloud Initiative of 19 April 2016, as part of its Digitising European Industry strategy, called for creating a leading European Big Data ecosystem, underpinned by a world-class HPC, data and network infrastructure the EuroHPC declaration, signed on 23 March 2017 at the Digital Day in Rome by seven Member States – France, Germany, Italy, Luxembourg, the Netherlands, Portugal and Spain They were joined during 2017 by Belgium, Slovenia, Bulgaria, Switzerland, Greece and Croatia. These countries agreed to build a pan-European integrated exascale supercomputing infrastructure Other Member States and associated countries are encouraged to sign the EuroHPC declaration.

### For More Information

[Questions and Answers](#)

[Factsheet with examples of the use of HPC and other relevant documents](#)

# NVIDIA Announces Financial Results for Fourth Quarter and Fiscal 2018

Thursday, February 8, 2018 -- Source NVIDIA



- Record quarterly revenue of \$2.91 billion, up 34 percent from a year ago
- Record full-year revenue of \$9.71 billion, up 41 percent from a year ago
- Record quarterly GAAP gross margin of 61.9 percent, non-GAAP gross margin of 62.1 percent
- Record full-year GAAP EPS of \$4.82, up 88 percent from a year ago

NVIDIA today reported record revenue for the fourth quarter ended January 28, 2018, of \$2.91 billion, up 34 percent from \$2.17 billion a year earlier, and up 10 percent from \$2.64 billion in the previous quarter.

GAAP earnings per diluted share for the quarter were a record \$1.78, up 80 percent from \$0.99 a year ago and up 34 percent from \$1.33 in the previous quarter. Non-GAAP earnings per diluted share were \$1.72, also a record, up 52 percent from \$1.13 a year earlier and up 29 percent from \$1.33 in the previous quarter.

For fiscal 2018, revenue was a record \$9.71 billion, up 41 percent from \$6.91 billion a year earlier. GAAP earnings per diluted share were a record \$4.82, up 88 percent from \$2.57 a year earlier. Non-GAAP earnings per diluted share were \$4.92, also a record, up 61 percent from \$3.06 a year earlier.

"We achieved another record quarter, capping an excellent year," said Jensen Huang, founder and chief executive officer of NVIDIA. "In a powerful sign of our progress, attendees at NVIDIA's GPU Technology Conferences reached 22,000, up tenfold in five years, as software developers working in AI, self-driving cars, and a broad range of other fields continued to discover the acceleration and money-saving benefits of our GPU computing platform.

"Industries around the world are racing to incorporate AI. Virtually every internet and cloud service provider has embraced our Volta GPUs. Hundreds of transportation companies are using our NVIDIA DRIVE platform. From manufacturing and healthcare to smart cities, innovators are using our platform to invent the future," he said.

## Fourth Quarter Fiscal 2018 Highlights

During the fourth quarter, NVIDIA achieved progress in these areas:

### Datacenter

Announced that NVIDIA Tesla® V100 GPU accelerators are now available through every major computer maker and have been chosen by every major cloud to deliver AI and high performance computing.

Added a record **34 GPU-accelerated systems to the Top500 supercomputer** list, bringing the total to 87.

Announced partnerships to further AI in key vertical industries, including initiatives with **GE Health** and **Nuance** in medical imaging; **Baker Hughes**, a GE company, in oil and gas; and Japan's **Komatsu** in construction and mining.

Expanded the NVIDIA® GPU Cloud container registry to support scientists using HPC applications, and AI researchers using desktop GPUs.

### Gaming

Announced gaming laptops using the Max-Q design, which are 3x faster and 3x thinner than previous-generation gaming laptops.

Introduced BFGDs™, big format gaming displays, providing ultra-low latency PC gaming and integrated streaming on a high-end 65-inch display using NVIDIA G-SYNC™ technology with NVIDIA SHIELD™.

Enhanced GeForce Experience™ with new tools, including NVIDIA Freestyle for customizing gameplay and an updated interface for the NVIDIA Ansel photo mode, as well as new titles including PlayerUnknown's Battleground and Fortnite that support NVIDIA ShadowPlay™ Highlights for capturing gaming achievements.

Increased its GeForce GPU share among gamers on the Steam online gaming platform to 86 percent.

Introduced two new collector's edition Star Wars-themed NVIDIA TITAN Xp GPUs, tied to the release of Star Wars: The Last Jedi.

### Automotive

Announced and demonstrated NVIDIA DRIVE™ Xavier™, the world's first autonomous machine processor, with customer availability in the first quarter.

Announced NVIDIA DRIVE, the world's first functionally safe AI self-driving platform, plus a suite of tools to test and validate neural networks by simulating all kind of driving conditions.

Unveiled partnerships with **Uber** and **Aurora** to develop self-driving cars using the open NVIDIA DRIVE AI self-driving platform.

Partnered with **ZF** and **Baidu** to create the first production AI autonomous vehicle platform for the China market, with **Chery** as the first customer.

Partnered with **Volkswagen** to integrate AI into future VW vehicles using the NVIDIA DRIVE IX intelligent experience platform and create AI cockpits with enhanced convenience and safety features.

Announced NVIDIA is powering the **Mercedes-Benz** MBUX in-car AI smart cockpit system, going into production next month with the new A-Class.

Announced NVIDIA is partnering with **Continental** to build AI self-driving vehicle systems, from enhanced Level 2 to Level 5, for production in 2021.

[FULL REPORT CLICK HERE](#)

# World's Largest Server Companies Announce NVIDIA Volta Systems Supercharged for AI



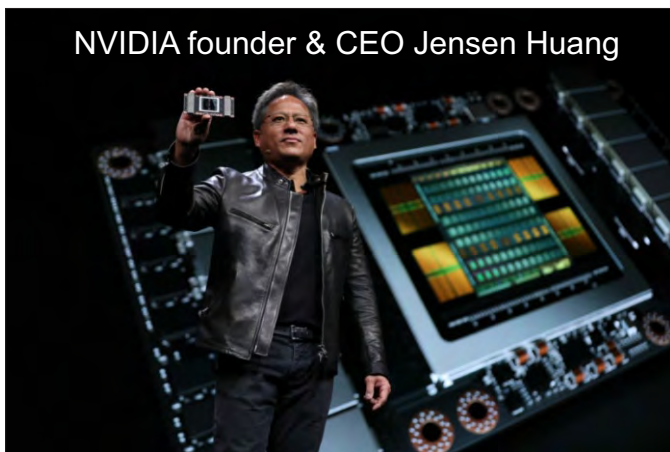
Wednesday, September 27, 2017

Dell EMC, Hewlett Packard Enterprise, IBM, Supermicro Announce Servers Based on NVIDIA Tesla V100 Accelerators -- World's Most Advanced Data Center GPU



SANTA CLARA, CA - NVIDIA (NASDAQ: NVDA) and its systems partners Dell EMC, Hewlett Packard Enterprise, IBM and Supermicro today unveiled more than 10 servers featuring NVIDIA® Volta architecture-based Tesla® V100 GPU accelerators -- the world's most advanced GPUs for AI and other compute-intensive workloads.

NVIDIA V100 GPUs, with more than 120 teraflops of deep learning performance per GPU, are uniquely designed to deliver the computing performance required for AI deep learning training and inferencing, high performance computing, accelerated analytics and other demanding workloads. A single Volta GPU offers the equivalent performance of 100 CPUs, enabling data scientists, researchers and engineers to tackle challenges that were once impossible.



NVIDIA founder & CEO Jensen Huang

**Nvidia Tesla V100: First Volta GPU is one of the largest silicon chips ever**

**21-billion-transistor Volta GPU has new architecture, 12nm process, crazy performance**

Seizing on the AI computing capabilities offered by NVIDIA's latest GPUs, **Dell EMC, HPE, IBM** and **Supermicro** are bringing to the global market a broad range of multi-V100 GPU systems in a variety of configurations.

"Volta systems built by our partners will ensure that enterprises around the world can access the technology they need to accelerate their AI research and deliver powerful new AI products and services," said Ian Buck, vice president and general manager of Accelerated Computing at NVIDIA.

#### **V100-based systems announced include:**

**Dell EMC** -- The PowerEdge R740 supporting up to three V100 GPUs for PCIe, the PowerEdge R740XD supporting up to three V100 GPUs for PCIe, and the PowerEdge C4130 supporting up to four V100 GPUs for PCIe or four V100 GPUs for NVIDIA NVLink™ interconnect technology in an SXM2 form factor.

**HPE** -- HPE Apollo 6500 supporting up to eight V100 GPUs for PCIe and HPE ProLiant DL380 systems supporting up to three V100 GPUs for PCIe.

**IBM** -- The next generation of IBM Power Systems servers based on the POWER9 processor will incorporate multiple V100 GPUs and take advantage of the latest generation NVLink interconnect technology -- featuring fast GPU-to-GPU interconnects and an industry-unique OpenPOWER CPU-to-GPU design for maximum throughput.

**Supermicro** -- Products supporting the new Volta GPUs include a 7048GR-TR workstation for all-around high-performance GPU computing, 4028GR-TXRT, 4028GR-TRT and 4028GR-TR2 servers designed to handle the most demanding deep learning applications, and 1028GQ-TRT servers built for applications such as advanced analytics.

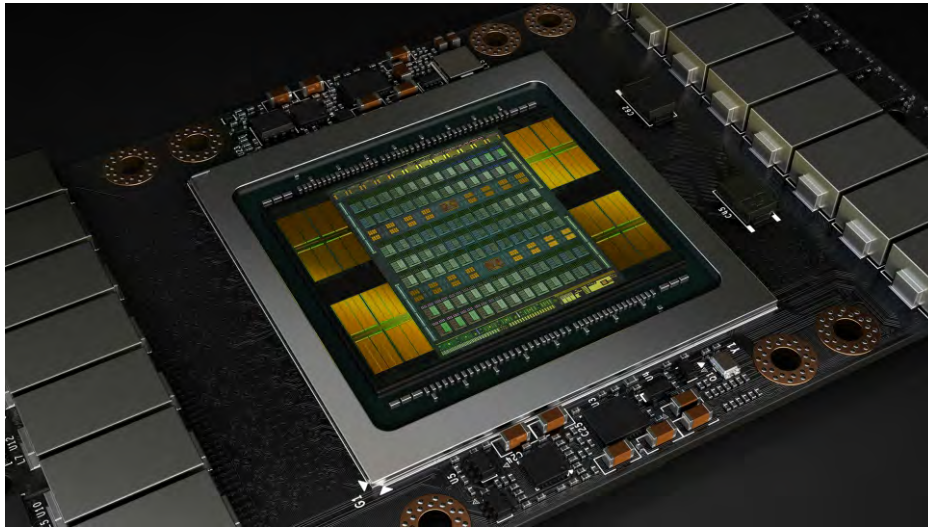
These partner systems complement an announcement yesterday by China's leading original equipment manufacturers -- including **Inspur, Lenovo** and **Huawei** -- that they are using the Volta architecture for accelerated systems for hyperscale data centers.

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# World's Largest Server Companies Announce NVIDIA Volta Systems Supercharged for AI



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## Additional NVIDIA V100 Details

Each NVIDIA V100 GPU features over 21 billion transistors, as well as 640 Tensor Cores, the latest NVLink high-speed interconnect technology, and 900 GB/sec HBM2 DRAM to achieve 50 percent more memory bandwidth than previous generation GPUs.

V100 GPUs are supported by NVIDIA Volta-optimized software, including CUDA® 9.0 and the newly updated deep learning SDK, including TensorRT™ 3, DeepStream SDK and cuDNN 7 as well as all major AI frameworks. Additionally, hundreds of thousands of GPU-accelerated applications are available for accelerating a variety of data-intensive workloads, including AI training and inferencing, high performance computing, graphics and advanced data analytics.

## Partner Quotes

"One of the core principles for Dell EMC is to deliver differentiated solutions to our customers so that they can leverage the most advanced technology for a competitive advantage. To that end, we are proud of the work we do with partners like NVIDIA to build PowerEdge servers ideal for compute-intensive workloads including data analytics, high-performance computing, machine learning and AI."

-- Armughan Ahmad, senior vice president and general manager of Hybrid Cloud and Ready Solutions at Dell EMC

"As deep learning continues to become more pervasive, technology advancements across systems and accelerators need to evolve in order to gain intelligence from large datasets faster than ever before. The HPE Apollo 6500 and HPE ProLiant DL380 systems combine the industry-leading GPU performance of NVIDIA Tesla V100 GPU accelerators and Volta architecture with HPE unique innovations in system design and manageability to deliver unprecedented levels of performance, scale and efficiency for high performance computing and artificial intelligence applications."

-- Bill Mannel, vice president and general manager of High Performance Computing and Artificial Intelligence at Hewlett Packard Enterprise

"IBM's upcoming POWER9 servers will support NVIDIA's Volta GPU, and will be the only one to support the latest generation of NVLink and PCIe 4.0, which will deliver maximum throughput. With accelerators like Volta, IBM will scale deep learning performance to new heights."

-- Brad McCredie, vice president and IBM Fellow, Cognitive Systems Development at IBM

"Supermicro designs the most application-optimized GPU systems and offers the widest selection of GPU-optimized servers and workstations in the industry. Our high performance computing solutions enable deep learning, engineering and scientific fields to scale out their compute clusters to accelerate their most demanding workloads and achieve fastest time-to-results with maximum performance per watt, per square foot and per dollar. With our latest innovations incorporating the new NVIDIA V100 PCI-E and V100 SXM2 GPUs in performance-optimized 1U and 4U architectures with next-generation NVLink, our customers can accelerate their applications and innovations to help solve the world's most complex and challenging problems."

-- Charles Liang, president and CEO of Supermicro

## About NVIDIA

NVIDIA's (NASDAQ: NVDA) invention of the GPU in 1999 sparked the growth of the PC gaming market, redefined modern computer graphics and revolutionized parallel computing. More recently, GPU deep learning ignited modern AI -- the next era of computing -- with the GPU acting as the brain of computers, robots and self-driving cars that can perceive and understand the world. More information at <http://nvidianews.nvidia.com/>.



# 5G takes center court

Feb 20, 2018 Network



Last month, Verizon [demonstrated](#) how 5G technology – connecting a pair of first person goggles and helmet-mounted cameras – could give two NFL players the ability to run plays and catch footballs in a virtual reality environment. This month, we took the technology from the football field to the basketball court and put it in the hands of two of the NBA's best players.

Shooting guard Bradley Beal and power forward Anthony Davis took a break from practice for the 2018 NBA All-Star Game to try on a pair of 5G-powered first-person goggles with attached video cameras for some shooting practice. The live video from the cameras was streamed over Verizon's 5G pre-commercial network and back to the goggles in near real-time, allowing both players to catch the ball and drain their shots almost as if they were seeing with the naked eye. A significant delay, or "lag," in that transmission could have impacted the players' hand-eye coordination and ability to make their shots. But 5G's super-fast speed and ultra-low latency made it possible.



"Verizon used NBA's All-Star Game weekend to test 5G technology and give NBA fans a sneak peek at the power of 5G," said Sanyogita Shamsunder, executive director of Technology for Verizon. "This is just the beginning of what Verizon and the NBA are doing to develop cool new technology experiences for the game and the fans."

Verizon continues to push the limits of 5G technology and to demonstrate some of the ways it will ultimately transform the ways people work, learn, travel and entertain themselves.

**Tags: 5G Technology, VR and AR Technologies** [Click Here](#)

## Verizon, Nokia and Qualcomm complete first call using 3GPP-compliant 5G New Radio technology

### Successful over-the-air test completed on Verizon's millimeter wave spectrum

NEW YORK – Verizon is the first network provider to conduct an over-the-air call on a 3GPP-compliant 5G New Radio (NR) system using licensed spectrum. This successful test on Verizon's millimeter wave spectrum – using Nokia 5G network technology on a 5G NR prototype device provided by Qualcomm Technologies, Inc., a subsidiary of Qualcomm Incorporated – was an important milestone on the road to preparing Verizon's network for widespread implementation of commercial 5G mobile services for consumers and enterprises. The test was conducted this month at Nokia's facility in Murray Hill, NJ and follows prior interoperability testing between Nokia and Qualcomm Technologies. The 5G NR standard was approved by the 3GPP in December 2017.

"With this first 3GPP NR standards-based connection, Verizon continues to lead the development of 5G technology," said Ed Chan, senior vice president and chief technology architect, Corporate Network & Technology, Verizon. "By partnering with Nokia and Qualcomm to combine 5G technology with our deep millimeter wave spectrum, we're well on the way to being the first to usher in the next era of wireless communications for customers."

The test was completed over Nokia's CloudRAN solution, which is comprised of the Nokia AirScale baseband and radio, AirFrame server, and AirScale Cloud RAN running 5G NR 3GPP-compliant software.

"Nokia's 3GPP-compliant high-capacity 5G solution supports pioneering operators like Verizon in leveraging their assets to make a true difference with 5G for their customers," said Marc Rouanne, president of Mobile Networks, Nokia. "Using the successful interoperability testing we conducted with Qualcomm as a basis, we're now applying our standard-compliant 5G technology in this trial with Verizon to push the commercialization of 5G."

The test utilized Qualcomm Technologies' cutting-edge 5G NR millimeter wave prototype device, which includes an optimized millimeter wave RF front-end design in a smartphone form factor.

"Qualcomm Technologies is committed to supporting the launch of standard-based commercial 5G networks and products beginning in 2019," said Joe Glynn, vice president of business development, Qualcomm Technologies, Inc. "The successful completion of standard-compliant 5G NR millimeter wave testing with leading mobile industry innovators such as Nokia and Verizon prove that we are well on the path to making this a reality."

Verizon's deployment of 5G technology over millimeter wave spectrum – beginning in 2018 – will provide massive bandwidth, ultra-high speed and single digit latency for emerging fixed and mobile use cases. As 5G continues to evolve, and as new use cases are developed and deployed, Verizon will be well positioned to deliver the capabilities those use cases call for to become a commercially viable solution.

Learn more about [Verizon's plans to launch 5G residential broadband services](#) in up to five markets in 2018.

# IP-Based Sports Production Becomes Reality with NewTek

World's first native IP and SDI replay system offers feature-rich affordability for sports production

San Antonio – December 14, 2017 — NewTek introduced today the **NewTek 3Play® 3P1**, the most cost-effective, easy-to-use and feature-rich replay solution in the world with native IP video processing. 3Play 3P1 offers both NDI® and 3G SDI input, cross conversion, and output. An intuitive dual-channel “first replay” telestration solution allows talent to draw over live NDI video, or optionally reverse-keyed on the field-of-play on any PC, tablet, or touchscreen with a single network cable.

Via NDI, NewTek's innovative video over IP technology, 3Play 3P1 automatically translates connected SDI sources to NDI, enabling local inputs to be shared simultaneously across the network with compatible systems and devices. Built-in dual-channel “first replay” telestration empowers on-air talent with transport controls to start, stop, and scrub video in either direction. Users also benefit from the presence of familiar workflow paradigms for sports production and replay, recognizable from not only current and previous 3Play systems, but established solutions from other manufacturers as well.

“3Play 3P1 gives the producer more power on game day than any other turnkey sports production system,” said Dr. Andrew Cross, president and CTO for NewTek. “It doesn't matter whether you are producing on a traditional infrastructure or moving to an IP workflow, our goal is to provide all of the tools needed to give fans the best possible viewing experience, whether they are on the couch, on their phone or sitting in the stands.”

3Play 3P1's tight integration with NewTek IP Series, TriCaster® TC1, and NVG1 Graphics Server create an unparalleled IP production powerhouse delivering a full IP workflow that is the most cost-effective and complete sports production solution in the world. 3Play 3P1 natively supports custom user-interfaces to be built from almost any browser on any networked device via NewTek LivePanel™, available as an option. Multi-channel recording, internal transitions, social media publishing, and more make 3Play 3P1 the ideal replay system for almost any application.

With simple Ethernet connectivity, 3Play 3P1 delivers competitive advantages ideal for contemporary sports networks, production companies, professional sports organizations, college athletic programs, esports producers, and venues limited by conventional replay systems that want to leverage modern networking technology and interconnected production workflows.

## 3Play 3P1 supports a wide range of advanced features including:

- 1080p60 SDI, hybrid, and end-to-end IP connectivity
- Support for up to 4 external inputs and 2 outputs - SDI or NDI
- 4 multi-viewer outputs
- Synchronized, continuous, full-resolution capture
- Record and playback simultaneously
- Preview all angles simultaneously while recording and playing back video
- Show all angles of recording synced on output
- Build playlists with full transitions, audio, sound effects, and stinger animations
- Per output overlays with positioning and transitions
- Integrated dual-channel telestration with remote transport control
- LivePanel™ option to build browser-based user interfaces and workflows
- Multi-purpose video server with clip preview
- Real-time social media export or transcode files for immediate delivery
- Import external video, audio, and stills in common formats
- Intuitive asset management and tagging system
- Automation with custom macro commands
- Support for MIDI, GPI, AMP protocol, and much more



NewTek 3Play 3P1, a 2RU rack-mountable unit with 4 SDI inputs, 16 hours of media storage, and dual Ethernet network connections with included control surface, is available this month.

For more information please visit [[https://www.newtek.com/3play/3p1/\(/3play/3p1/\)](https://www.newtek.com/3play/3p1/(/3play/3p1/))]

## About NDI

NDI is in use on millions of devices and allows multiple video systems to identify and communicate with one another over IP. NDI can encode, transmit and receive many streams of high quality, low latency, frame-accurate video and audio in real time. This benefits any network-connected video device, including video mixers, graphics systems, capture cards, and many other production devices. This makes it possible to exponentially increase the number of sources available for live production switching, without directly attaching to devices, changing locations, or investing in expensive, high-bandwidth networks that simply replace SDI-based workflows.

## About NewTek

As the leader in IP video technology, NewTek is transforming the way people create network-style television content and share it with the world. From sporting events, Web-based talk shows, live entertainment, classrooms, and corporate communications, to virtually any place people want to capture and publish live video, we give our customers the power to grow their audiences, brands and businesses faster than ever before.

**Clients include:** New York Giants, NBA Development League, Fox News, BBC, NHL, Nickelodeon, CBS Radio, ESPN Radio, Fox Sports, MTV, TWiT.TV, USA TODAY, Department of Homeland Security (DHS), the National Aeronautics and Space Administration (NASA), and more than 80% of the U.S. Fortune 100.

# QCT, Intel, and Red Hat Target Telco Central Offices



Jessica Lyons Hardcastle  
February 6, 2018 - 10:48 am PT

Quanta Cloud Technology (QCT), along with Intel and Red Hat, announced telco products that target telecommunications operators' central offices. The new systems, based on commodity hardware and open, software-defined architectures, will help operators meet performance and low-latency demands of 5G applications, according to the vendors.

Last October, QCT and Intel launched new data center infrastructure called Rackgo R. These systems are based on the Intel Rack Scale Design (RSD) software framework, which disaggregates compute, storage, and network resources. They run on QCT hardware and use QCT management software that allows operators to spin up or spin down compute or storage resources within the same data center as workloads change.

The new telco products, unveiled today at QCT's Central Office 2.0 event in San Jose, California, build on the October launch. They aim to further extend the benefits of disaggregation and composable infrastructure to communication service providers' central offices, said Mike Yang, president of QCT in a statement.

"QCT's long-term collaboration with Intel and Red Hat now extends to the telco space," he said. "With our partners, we directly address emerging requirements in the telco market with an optimized NFVI [network functions virtualization infrastructure] platform that supports carrier-grade infrastructures and delivers a practical software-defined networking solution for disaggregating the control and data plane and providing performance consistency on IA [Intel architecture]-based systems."



## The products include:

**QxStack NFV Infrastructure with Red Hat OpenStack Platform:** These systems run on QCT hardware powered by Intel Xeon processors. They come with Red Hat's Linux-based OpenStack Platform and Red Hat Ceph Storage built in, and use QCT's QxStack software to automate NFV deployments.

**QCT Central Office Re-architected as a Datacenter (CORD) Ready Rack:** QCT collaborated with the Open Networking Foundation (ONF) to build this CORD-ready pod with Intel processors. CORD uses white-box hardware and open source software-defined networking (SDN) and NFV software to bring data center economics and cloud agility to the telco central office. This product is preconfigured and prevalidated, which means operators don't have to build their own CORD platforms.

**QCT Rackgo R Vertical Integration with OpenStack:** This is the Intel RSD-based product launched in October with added auto-deployment and auto-scaling specifically for telcos.



### About Jessica Lyons Hardcastle

Jessica is a Senior Editor, covering next-generation data centers, security, and software-defined storage at SDxCentral. She has worked as an editor and reporter for more than 15 years at a number of B2B publications including Environmental Leader, Energy Manager Today, Solar Novus Today and Silicon Valley Business Journal. Jessica is based in the Silicon Valley.

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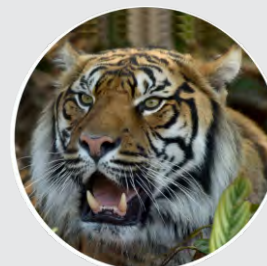
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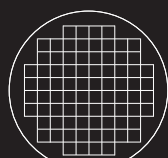
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