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The SDN, NFV & Network Virtualization Bible: 2014 - 2020

https://marketpublishers.com/r/S55AE5C248CEN.html
Date: September 2013
Pages: 263
Price: US$ 2,500.00 (Single User License)
ID: S55AE5C248CEN

Abstracts

While the benefits of Software Defined Networking (SDN) and network virtualization are well known in the enterprise IT and data center world, both technologies also bring a hosts of benefits to the telecommunications service provider/carrier community.

Not only can SDN and network virtualization help address the explosive capacity demand of mobile traffic, but they can also reduce the CapEx and OpEx burden faced by service providers to handle this demand by diminishing reliance on expensive proprietary hardware platforms.

SDN and network virtualization solutions have been widely deployed in data center and enterprise environments, and many service provider deployments are already underway.

Network Functions Virtualization (NFV) is service provider led initiative aimed at virtualizing network components in a service provider network. While NFV is still a developing technology with its first set of specifications published in October 2013, many vendors have already developed commercial-grade solutions that align well with the NFV initiative.

Driven by the thriving ecosystem, SNS Research estimates that the SDN, NFV and network virtualization market will account for nearly $4 Billion in 2014 alone. Despite barriers relating to standardization and co-existence with legacy networks, SNS Research estimates further growth at a CAGR of nearly 60% over the next 6 years.

This report presents an in-depth assessment of the global SDN, NFV and network virtualization market. In addition to covering underlying technology, key market drivers,

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challenges, future roadmap, value chain analysis, use cases, deployment case studies, expert interviews, company profiles, product strategies and strategic recommendations, the report also presents comprehensive forecasts for the market from 2013 till 2020. Historical revenue figures for 2010 – 2012 are also presented. The forecasts and historical revenue figures are individually segmented for 3 individual submarkets, 2 user base categories, 7 use case categories, 6 geographical regions and 34 countries.

The report comes with an associated Excel datasheet covering quantitative data from all figures presented within the report.

Key Findings:

The report has the following key findings:

Driven by the thriving ecosystem, SNS Research estimates that the SDN, NFV and network virtualization market will account for nearly $4 Billion in 2014 alone. SNS Research estimates further growth at a CAGR of nearly 60% over the next 6 years

Although network virtualization in the enterprise IT and data center domain has received significant attention in the past years, service provider network virtualization is still at a nascent stage

SDN and NFV empower a multitude of network functions to be implemented cost effectively in software, ranging from standard mobile IP Multimedia System (IMS) services to features such as Deep Packet Inspection (DPI)

By 2017 we expect to see significant price and gross margin erosion for traditional hardware-based network switching equipment driven by alternative software based solutions

By 2020 SNS Research estimates that SDN and NFV can enable service providers (both wireline and wireless) to save up to $32 Billion in annual CapEx investments

Topics Covered:

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The report covers the following topics:

The scope and implementation of SDN, NFV and network virtualization across the globe

SDN, NFV and network virtualization technology

Market drivers and key benefits of SDN, NFV and network virtualization

Challenges and inhibitors to the ecosystem

Standardization and regulatory initiatives

Use cases and application case studies of SDN and NFV

SDN and NFV deployment case studies

SDN and NFV induced service provider CapEx savings

Value chain analysis of the ecosystem and the recognition of key players in each segment of the value chain

Industry roadmap from 2014 till 2020

Key trends in the ecosystem; SDN and NFV's impact on the network infrastructure value chain, the stance of incumbent vendors towards SDN and NFV, impact on the proprietary hardware market and co-existence with legacy networks

Exclusive interview transcripts of 17 players in the ecosystem; Alvarion, Aricent, Arista Networks, Broadcomm, Connectem, ConteXtream, Extreme Networks, GENBAND, Mavenir, Netronome, Open Networking Foundation (ONF), Openwave Mobility, Pica8, Plexxi, Radisys, Spirent Communications and Tellabs

Profiles and strategies of 122 key players in the ecosystem

Strategic recommendations for silicon & server OEMs, network & mobile Infrastructure vendors, IT giants, pure-play SDN/NFV specialists, enterprises,

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data center operators and service providers

Historical revenue figures and forecasts till 2020

Historical Revenue & Forecast Segmentation:

Market forecasts and historical revenue figures are provided for each of the following submarkets, user base and use case categories:

Submarkets

SDN Software & Hardware

Non-NFV Network Virtualization Software

NFV Software

SDN Submarkets

SDN Controller Hardware Appliances

SDN Controller Software

User Base Categories

Service Providers

Data Centers & Enterprises

Service Provider Use Case Categories

Radio Access Networks

Mobile Core, EPC, IMS & Services

OSS/BSS

Data Center

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Mobile Backhaul

Wireline Fixed Access Networks

CPE/Home Environment

The following regional and country markets are also covered:

Regional Markets

Asia Pacific

Eastern Europe

Latin & Central America

Middle East & Africa

North America

Western Europe

Country Markets

Argentina, Australia, Brazil, Canada, China, Czech Republic, Denmark, Finland, France, Germany, India, Indonesia, Israel, Italy, Japan, Malaysia, Mexico, Norway, Pakistan, Philippines, Poland, Qatar, Russia, Saudi Arabia, Singapore, South Africa, South Korea, Spain, Sweden, Taiwan, Thailand, UAE, UK and USA

Additional forecasts are provided for:

SDN and NFV Induced Service Provider CapEx Savings by Region

Key Questions Answered:

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The report provides answers to the following key questions:

What are the key market drivers and challenges for SDN, NFV and the wider network virtualization ecosystem?

How can SDN and NFV complement each other?

What are the key applications and use cases of SDN and NFV?

How is the SDN, NFV and network virtualization value chain structured and how will it evolve overtime?

What opportunities do SDN and NFV offer to silicon & server OEMs, network & mobile Infrastructure vendors, IT giants, pure-play SDN/NFV specialists, enterprises, data center operators and service providers and other players in the value chain?

What strategies should these players adopt to capitalize on the SDN and NFV opportunity?

How are SDN and NFV vendors positioning their product offerings?

How big is the SDN, NFV and network virtualization ecosystem, and how much revenue will it generate in 2020?

What particular submarkets does the ecosystem constitute?

What geographical regions, countries and submarkets offer the greatest growth potential for SDN and NFV investments?

Who are the key players in the SDN and NFV ecosystem and what are their strategies?

How will SDN and NFV impact the network infrastructure value chain?

Is there a ring leader in the SDN and NFV ecosystem?

How long will service providers continue to utilize proprietary hardware

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platforms?

How can SDN and NFV help make the Voice over LTE (VoLTE) and Rich Communication Services (RCS) business case work?

How can software-defined Deep Packet Inspection (DPI) complement SDN functionality?

What level of CapEx savings can SDN and NFV facilitate for service providers in each region?

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LIST OF COMPANIES MENTIONED

6CONNECT, 6WIND, A10 NETWORKS, ACCEDIAN NETWORKS, ACCTON, ACTIONPACKED NETWORKS, ACTIVE BROADBAND NETWORKS, ADARA NETWORKS, ADTRAN, ADVA OPTICAL NETWORKING, ADVANTECH, AEPONYX, AFFIRMED NETWORKS, ALCATEL-LUCENT, ALGAR TELECOM, ALIBABA, ALLOT COMMUNICATIONS, ALTARO, ALTEN GROUP, ALTERA CORPORATION, ALVARION, AMARTUS, AMAZON, AMDOCS, ANUTA NETWORKS, APPLE, ARGELA, ARICENT GROUP, ARISTA NETWORKS, ARM LIMITED, ARNOLD CONSULTING, ARUBA NETWORKS, AT&T, ATAC INITIATIVES, AVAYA, BEIJING INTERNET INSTITUTE (BII), BELL CANADA, BENU NETWORKS, BIG SWITCH NETWORKS, BII GROUP, BOUNDARY, BROADCOM, BROCADE, BROWAN COMMUNICATIONS, BSKYB, BT, BTI SYSTEMS, CABLELABS, CALIENT TECHNOLOGIES, CALSOFT LABS, CANONICAL, CARIDEN TECHNOLOGIES, CARMEL VENTURES, CAVIUM NETWORKS, CELESTICA, CELLCOM, CENTEC NETWORKS, CENTURYLINK CORPORATION, CERAGON NETWORKS, CETAN CORPORATION, CHECK POINT SOFTWARE TECHNOLOGIES, CHINA MOBILE, CHINA MOBILE (US RESEARCH CENTER), CHINA MOBILE RESEARCH INSTITUTE (CMRI), CHIPSTART, CIENA, CIMI CORPORATION, CISCO, CITRIX, CLOUDFX, CLOUDNFV, CLOUDSCALING, COHESIVEFT, COLT, COMCAST, CONNECTEM, CONTEXTREAM, CONTRAIL

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SYSTEMS, CORAID, CORIANT, CORSA TECHNOLOGY, CPLANE, CUMULUS NETWORKS, CYAN, DELL, DELL FORCE10, DELTA ELECTRONICS, DESS GMBH AND CO CONSULTING, DEUTSCHE TELEKOM, DIALOGIC, DIRECTV, DORADO SOFTWARE, ECI TELECOM, ECODE NETWORKS, EDGENET, EDGEWATER NETWORKS, ELBRYS NETWORKS, ELECTRONICS AND TELECOMMUNICATIONS RESEARCH INSTITUTE (ETRI), ELISA OYJ, EMBRANE, EMC, EMERSON NETWORK POWER, EMULEX, ENTERASYS NETWORKS, ENTERPRISEWEB, EQUINIX, ERICSSON, ESTINET TECHNOLOGIES, EUROPEAN TELECOMMUNICATIONS STANDARDS INSTITUTE (ETSI), EXTREME NETWORKS, EZCHIP, F5 LINERATE SYSTEMS, F5 NETWORKS, FACEBOOK, FIBERHOME TECHNOLOGIES, FIDELITY INVESTMENTS, FIREMON, FISHNET SECURITY, FLANAGAN CONSULTING, FLASH NETWORKS, FORTINET, FRAUNHOFER FOKUS, FREESCALE, FRENCH INSTITUTE FOR RESEARCH IN COMPUTER SCIENCE (INRIA), FTW - TELECOMMUNICATIONS RESEARCH CENTRE VIENNA, FUJITSU, GE INTELLIGENT PLATFORMS (GE ENERGY), GEMTEK TECHNOLOGIES, GENBAND, GENCORE SYSTEMS, GIGAMON, GIGASPACES TECHNOLOGIES, GLIMMERGLASS, GLUE NETWORKS, GOGRID, GOLDMAN SACHS, GOOGLE, GUAVUS, HEWLETT-PACKARD (HP), HITACHI, HTC, HUAWEI, IBM, IBS GROUP, INDIANA UNIVERSITY, INEOQUEST TECHNOLOGIES, INFINERA, INFINETICS, INFOBLOX, INKTANK, INOCYBE TECHNOLOGIES, INSIEME NETWORKS, INSTITUTE FOR INFORMATION INDUSTRY (III), INTEL, INTERNATIONAL TELECOMMUNICATIONS UNION (ITU), INTERNET ENGINEERING TASK FORCE (IETF), INTERNET RESEARCH TASK FORCE (IRTF), INTERPHASE, INTUNE NETWORKS, IP INFUSION, IPGALLERY, ISC8, ISKRATEL, ITALTEL, IXIA, JARA NETWORKS, JDS UNIPHASE (JDSU), JUMPGEN SYSTEMS, JUNIPER NETWORKS, KANAZAWA UNIVERSITY HOSPITAL, KDDI, KEMP TECHNOLOGIES, KLOUDSPUN, KOREA TELECOM, KULCLOUD, KYOCERA, L3 COMMUNICATION SYSTEMS – EAST, LAGRANGE SYSTEMS, LANCOPE, LANNER, LANSCOPE, LAYER123, LEVEL 3 COMMUNICATIONS, LG ELECTRONICS, LOCAWEB, LSI CORPORATION, LUMETA, LUXOFT, LYATISS, M2MI, MAINLINE INFORMATION SYSTEMS, MARIST COLLEGE, MARVELL, MAVENIR, MEADOWCOM, MEDIATEK, MELLANOX TECHNOLOGIES, MENTOR GRAPHICS, METASWITCH NETWORKS, METRATECH, MICROSOFT, MIDOKURA, MIRANTIS, MKI USA, MOJATATU NETWORKS, MONTAVISTA, MOTOROLA, MOTOROLA SOLUTIONS, MRV COMMUNICATIONS, NARI NETWORKS, NARINET, NCL COMMUNICATION (NCLC), NEBULA, NEC, NEPHOS6, NET OPTICS, NETAPP, NETCRACKER TECHNOLOGY, NETFLOW LOGIC, NETGEAR, NETNUMBER, NETRONOME, NETSCOUT SYSTEMS, NETSOCKET, NETSTRUCTURES, NETYCE, NICE, NICIRA, NIPPON EXPRESS, NIPPON TELEGRAPH AND TELEPHONE

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CORPORATION, NISSHO ELECTRONICS, NOKIA SOLUTIONS & NETWORKS (NSN), NOMINUM, NOVIFLOW, NTT COMMUNICATIONS, NTT DATA, NTT DOCOMO, NUAGE NETWORKS, NUTANIX, OBJECT MANAGEMENT GROUP (OMG), ON.LAB, ONE CONVERGENCE, OPEN NETWORKING FOUNDATION (ONF), OPEN NETWORKING RESEARCH CENTER (ONRC), OPEN VIRTUALIZATION ALLIANCE (OVA), OPENDAYLIGHT (LINUX FOUNDATION), OPENET, OPENSTACK FOUNDATION, OPENWAVE MOBILITY, OPERA SOFTWARE, OPSCODE, OPTELIAN, OPTUS, ORACLE, ORANGE, ORCHESTRAL NETWORKS, ORIENT LOGIC, OVERTURE NETWORKS, PACKETFRONT SOFTWARE, PANTHEON, PAXTERRA SOLUTIONS, PEAKCOLO, PEERAPP, PERTINO, PHILLIPS TECHNOLOGY SOLUTIONS, PICA8, PIVOTAL, PLEXXI, PLUMGRID, PLURIBUS NETWORKS, PLVISION, PMC SIERRA, POLATIS, PORTUGAL TELECOM (PT) /OI, POZNAN SUPERCOMPUTING AND NETWORK CENTRE, PROCERA NETWORKS, QOSMOS, QUALCOMM, QUANTA, RABOBANK, RACKSPACE, RAD DATA COMMUNICATIONS LTD, RADISYS, RADWARE, REAL STATUS, RED BEND SOFTWARE, RED HAT, RIGHTSCALE, RIVERBED TECHNOLOGY, ROGERS COMMUNICATIONS, RUAHTAO, SAISEI NETWORKS, SAMSUNG, SANCTUM NETWORKS, SANDVINE, SCALR, SCLID INNOVATIONS, SDNSQUARE, SERVICEMESH, SEVEN PRINCIPLES, SEVONE, SHARP, SILVER PEAK, SINGTEL, SK TELECOM, SKYFIRE, SNABB, SOFTBANK, SOLARFLARE COMMUNICATIONS, SOLARWINDS, SOLIDFIRE, SONUS NETWORKS, SPIRENT, SPLUNK, SPRINT COMMUNICATIONS, STACKIQ, STANFORD UNIVERSITY, STATELESS NETWORKS, STORK LAB, STRATOSPHERE, SUNBAY, SUPER MICRO, SWISSCOM, SYMANTEC, SYS SOFTWARE, TAIL-F SYSTEMS, TALLAC NETWORKS, TATA CONSULTANCY SERVICES, TECH MAHINDRA, TEKELEC, TEKTRONIX, TELCHEMY, TELCO SYSTEMS, TELECOM ITALIA, TELEFÓNICA, TELEKOM AUSTRIA, TELIASONERA, TELLABS, TELSTRA, TELUS, TENCENT, TERVELA, TEXAS INSTRUMENTS (TI), THALES, TIETO, TILERA, TM FORUM, T-MOBILE, TORREYPOINT, TRANSMODE, TRAVELPING GMBH, TUCANA, TURK TELEKOM, TW TELECOM, UBICITY CORPORATION, UBIQUBE SOLUTIONS, UNITED NATIONS, UNIVERSITY OF CALIFORNIA, BERKELEY, UPRC, VARMOUR NETWORKS, VELLO SYSTEMS, VERISIGN, VERIZON, VERIZON WIRELESS, VERSA NETWORKS, VERYX TECHNOLOGIES, VIRTELA, VIRTUAL OPEN SYSTEMS, VIRTUALLOGIX, VISIONAEL CORPORATION, VMWARE, VODAFONE, VSS MONITORING, VYATTA, WEBSENSE, WIND RIVER, WINDSTREAM COMMUNICATIONS, WIRETAP, WVNET, XFLOW RESEARCH, XIUS, XPLIANT, XSIGO, YAHOO, YOKOGAWA, ZHONE TECHNOLOGIES, ZTE CORPORATION"

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About

Path Computation Element Protocol (PCEP)

Path Computation Element Protocol (PCEP), a relatively old Internet Engineering Task Force (IETF) standard, is a visibility and control protocol that works in MPLS networks, and partially removes the control plane from head-end routers to define network paths. Although PCE has not witnessed the same level of publicity or support as OpenFlow in the early years of SDN, it is likely to play an important role in emerging SDN architectures, especially in service provider networks.

Service providers have found PCE particularly attractive because upgrading entire MPLS networks would be high expensive and disruptive. A standard OpenFlow based SDN implementation requires replicating all of the logic of an MPLS-enabled router in the OpenFlow controller. On the other hand, PCE requires upgrading only head-end routers.

Interface to the Routing System (I2RS)

The IETF Interface to Routing System (I2RS) working group was created in November 2012 with the goal of developing a set of use cases and a basic architecture to support an interface to the routing system. The term "routing system" describes a hardware device, a virtual router or any software that provides routing functions.

IBM

IBM is a multinational technology and consulting corporation, with headquarters in New York, USA. IBM manufactures and markets computer hardware and software, and offers infrastructure, hosting and consulting services in areas ranging from mainframe computers to nanotechnology.

In Q4’2012, IBM unveiled its SDN controller application, the “System Networking Programmable Network Controller” which that runs on a Linux-based platform to provide SDN capabilities based on the OpenFlow standard.

In Q1’2013, IBM announced a new software solution that provides scalable overlays via SDN technology based on IBM’s DOVE (Distributed Overlay Virtual Ethernet) architecture. Replacing the DOVE name, IBM’s Software Defined Network for Virtual

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Environments (SDN VE) is a virtual overlay network solution that is supposed to provide for faster provisioning and more scalable virtual networks. IBM SDN VE uses a modified version of VxLAN as the overlay encapsulation, allowing for up to 16 Million distinct networks.

During the same quarter, IBM announced its support for the NFV initiative, while marketing its “PureFlex” platform.

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