Express

Autumn/Winter 2015

NEXCOM
The Intelligent Systems

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Innovates Telecom Services with NFV and SDN

In Depth
NEXCOM NEXC2C and IoT Studio

Technology Focus
Bring Harmony of Accuracy, Agility, and Amusement

Market Story
Enterprise Wi-Fi Controllers Unify Wireless Working Environment

Dear Partners,

Following the COMPUTEX 2015 in the early June, NEXCOM joined the TAIROS (Taiwan Automation Intelligence and Robot Show) in middle of July. Besides many innovative products in Robotics and Industry 4.0, we also had an Ally Engagement Ceremony with important partners from different industries. They are HIWIN, the Robot Arm vendor, and FUBURG, the wet wipe maker. The purpose of this partnership is to co-develop a robot solution for the packing station of FUBURG production line, and then form a sales/service team to promote this solution to worldwide market! NEXCOM, combining the robot arm from HIWIN, using the domain know how from FUBURG, together with our unique EtherCAT master based robot controller, cooks the total robot solution and live demo it during the TAIROS. The solution now is being deployed to FUBURG factory.

As I mentioned earlier, the IoT market is not a homogeneous one, but very diverse into thousands of vertical application domains. When the widely accepted Wintel Standard in the PC market lost its advantages in the multi-CPU Architecture, multi-Operating System IoT arena, the game rule totally changed. You can never do the business by just offering the pure H/W or pure S/W, like those in the PC heydays. The vertical solution pack becomes the key or the "password" to open the door into the promising "IoT Treasury". However, due to so many vertical domains needing so many solutions and domain know how, the "cross industry" ally engagement becomes imperative to approach every single vertical domain!

As you know very well, NEXCOM is the unique EtherCAT Master vendor from Asia, and we are leading the industry developing the building blocks of Industry 4.0. We also recruit many necessary solution partners like CoDeSys in Soft PLC, Hilscher in Field Bus, EXOR in HMI, Interval Zero in RTX, even Formosa Plastic in DCS…

Put all these well proven modules or solutions together, NEXCOM has built up the complete set of Industry 4.0 building blocks! That's why we have completed one factory wide automation project with Formosa Plastics, the biggest petro-chemistry company from Taiwan, and soon continued by the 2nd Industrial IoT project, IIoT, or the Industry 4.0! These solutions will soon be implemented to the 300+ Formosa factories worldwide! We also got many Industry 4.0 projects from the ICT manufacturers, the Pulp & Paper giants, even the Health Care communities. To open the doors for all solution partners, we also open the huge opportunities for all channel partners!

Today, we desperately need the qualified SI partners to help NEXCOM deploy the vertical solutions to the world market in the categories like Robotics, the IoT, and the Industry 4.0. We hope all our partners in the field can be upgraded and qualified to catch the big new opportunities. The game rule is changing from the platform moving to the Vertical Solution Providing, even to the Service Providing! And, the rule is: the Earliest Wins the Most!

To enrich NEXCOM's offerings in these booming markets, all our new products will be "IoT Aware"! In Q4, We'll have the brand new Sensors—the new IP Cams, the new Gateways, the new Robots for Education market, the new in-vehicle platforms & solutions, and the new Wireless products, etc. All these products enable NEXCOM to be one of the major E2E players in the so-called "IoT Rush", i.e., from Gateways, to Sensor Nodes, to Vertical Solutions, and up to Private Clouds—from the Front End to the "Middle" End! As to the "Back" End, all the Cloud Service Providers need us together to complete the IoT Last Mile! This could be a market with the scale of Trillions of Dollars! Let's make it happen!

Clement Lin

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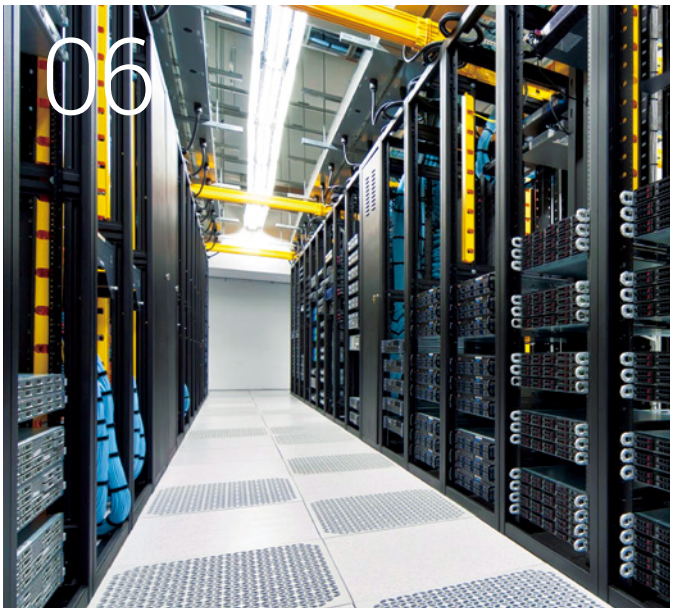

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About NEXCOM

Founded in 1992, NEXCOM integrates its capabilities and operates six global businesses, which are Multi-Media Solutions, Mobile Computing Solutions, IoT Automation Solutions, Network and Communication Solutions, Intelligent Digital Security, and Medical and Healthcare Informatics. NEXCOM serves its customers worldwide through its subsidiaries in five major industrial countries. Under the IoT megatrend, NEXCOM expands its offerings with solutions in emerging applications including IoT, robot, connected cars, Industry 4.0, and industrial security. www.nexcom.com

NEXCOM NEXC2C and IoT Studio

As Internet of Things (IoT) has been a hot topic for recent years. IoT depicts an aspiring scenario where everything is connected, information collected, and knowledge extracted. A better life than ever before is lying ahead of us. IoT also seems to be a remedy for a weakening IT market, including industrial PC (IPC) and almost all subcategories of the IT industry. The future seems so bright, but there is a drawback. The underlying technologies behind IoT are too complicated.

For IoT to success, three issues must be resolved when implementing IoT. The first issue is unified communication. As legacy devices and equipment communicate over proprietary protocols, synchronizing heterogeneous data can be a daunting task, let alone exchanging data over different networks using different protocols.

The second issue is device management including authentication, authorization, and accounting. A management mechanism is also required to manage a high volume of widely distributed, discrete heterogeneous devices and sensors.

And third, the security issue must be addressed to ensure that device- and sensor-generated data is not sabotaged or compromised during the transfer. The data integrity is especially critical to some applications, not to mention that the malicious attacks on IT infrastructure must be contained.

With expertise and years of experience in many vertical markets, NEXCOM has solutions to all three issues. As the lack of unified communication is the major obstacle hindering the growth of IoT, NEXCOM has developed a new technology NEXC2C to remove the communication barrier and therefore realize heterogeneous data exchange. NEXCOM's NEXC2C technology can translate different protocols and data formats so users can focus on developing innovative applications by making use of data, instead of spending time and efforts customizing a gateway platform for data acquisition.

NEXC2C is composed of two function sets: Click-to-Connect and Connect-to-Cloud. Click-to-Connect provides Plug-n-Play mechanism with NEXCOM IoT Studio which is a GUI using Node.js and Node-RED. With built-in drivers and algorithms, the core logic of NEXC2C treats devices and sensors as data generators, and refers to each data extracted from the devices and sensors as a node.

Based on the tags, raw data, and pre-defined patterns, these nodes

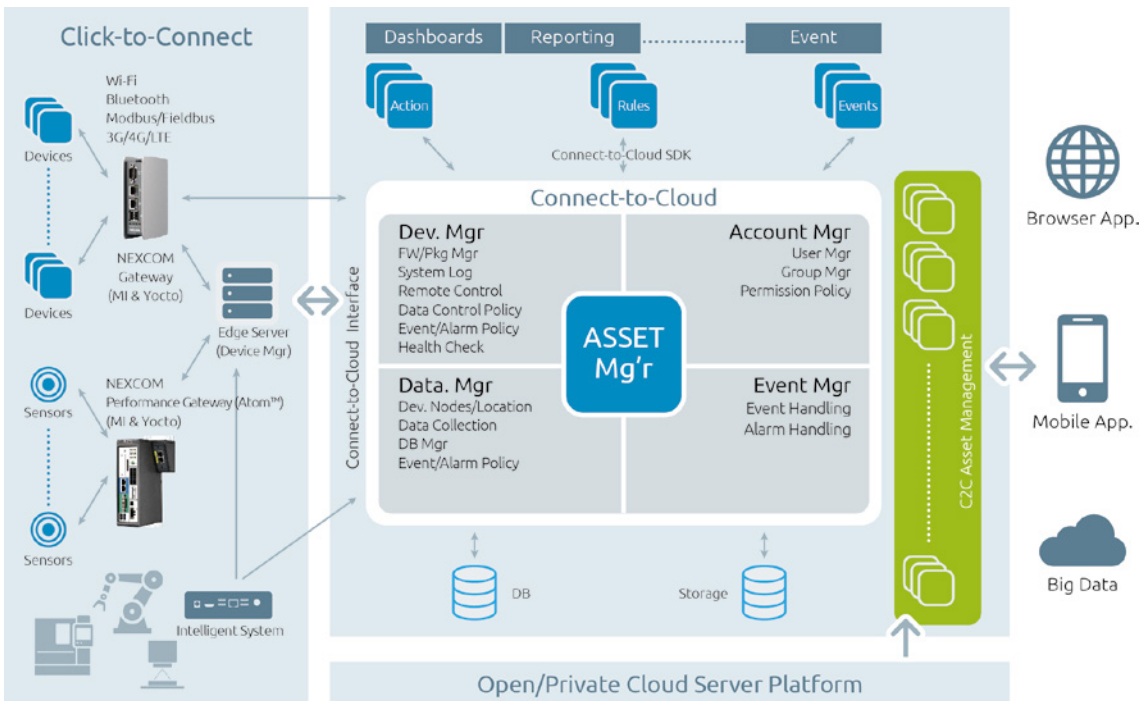


Figure 1. The core infrastructure of NEXC2C and IoT Studio

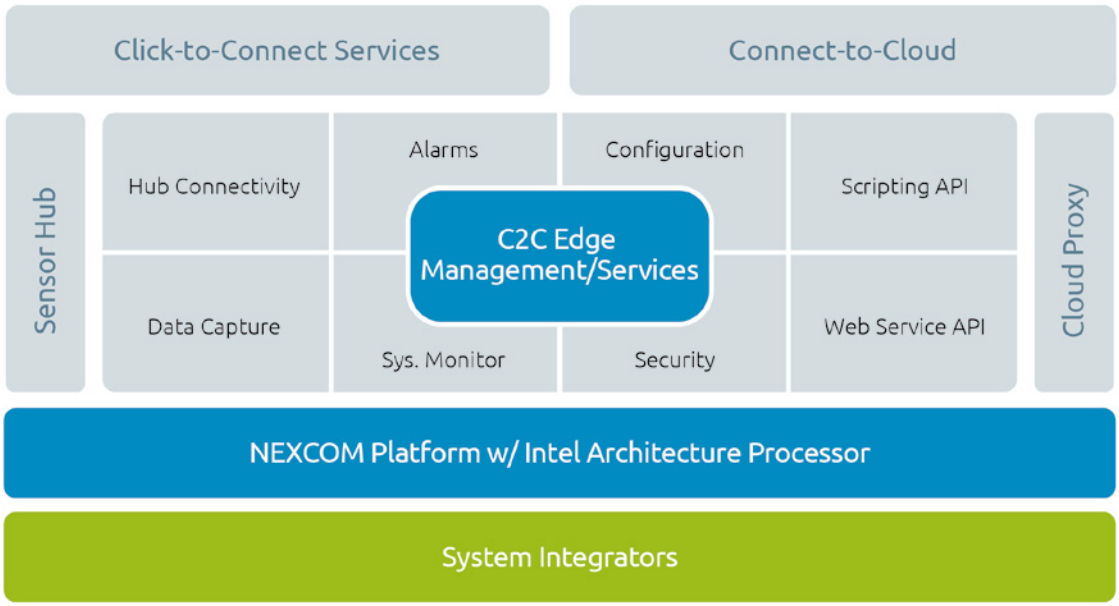


Figure 2. The built-in software stack of NEXCOM NEXC2C

are collected, identified, categorized, and represented on a data node board in NEXCOM IoT Studio. Node categories are defined by data formats, protocols, and other attributes and are shown in different colors and texts so they can be very distinguishable.

Through drag-n-drop operations, a node can be easily linked to another node which could be a process node for data parsing or other operations. At the end of a link node, a node will be added to determine where information users need should be sent.

After data flow is set, users can create a dashboard to build a customized view of information, such as pressure readings, temperature measurements etc. It may be enough for local management. However, to build enterprise-level manageability into a wide-area sensor network will require internet access and cloud service. Furthermore, cloud services offer more practical and comprehensive solutions for processing high volume of device-generated data so implementing cloud services becomes more important than ever.

To help users integrate cloud services without going through complicated setting and configuration steps, NEXCOM Connect-to-Cloud is designed to make implementing cloud service as easy as navigating through a self-service menu. NEXCOM Connect-to-Cloud provides built-in connections to major public and private cloud services. Checking the desired cloud services and confirming the connections are all it takes for the implementation. The core infrastructure of NEXC2C is illustrated in Figure 1, and Figure 2 shows built-in software stack of NEXC2C.

NEXCOM's NEXC2C technology can extract information from heterogeneous data sources and provide an easy way to use cloud services. Meanwhile, NEXC2C's functionality is being expanded to facilitate management of large-scale widely distributed network. A new function set is under development and will include device management, data management, event management, and account management tools.

In addition, the upcoming revamped NEXCOM IoT Studio GUI will provide users a single unified interface for accessing NEXC2C Click-to-Connect, Connect-to-Cloud, and management function sets as well as other IoT technologies. In other words, users can define data flow and create dashboards and applications within a single GUI. Moreover, NEXCOM IoT Studio will support Open Interconnect Consortium (OIC), Intel Mashery, and other well-known IoT services to form a complete ecosystem.

As a leading IoT solution provider focusing on vertical domains, NEXCOM is dedicated to developing solutions for technical challenges arising from the IoT trend. In addition to NEXC2C and IoT Studio, NEXCOM will create more tools to help our customers focus on their core competitiveness and value creation.

Innovate Telecom Services with NFV and SDN

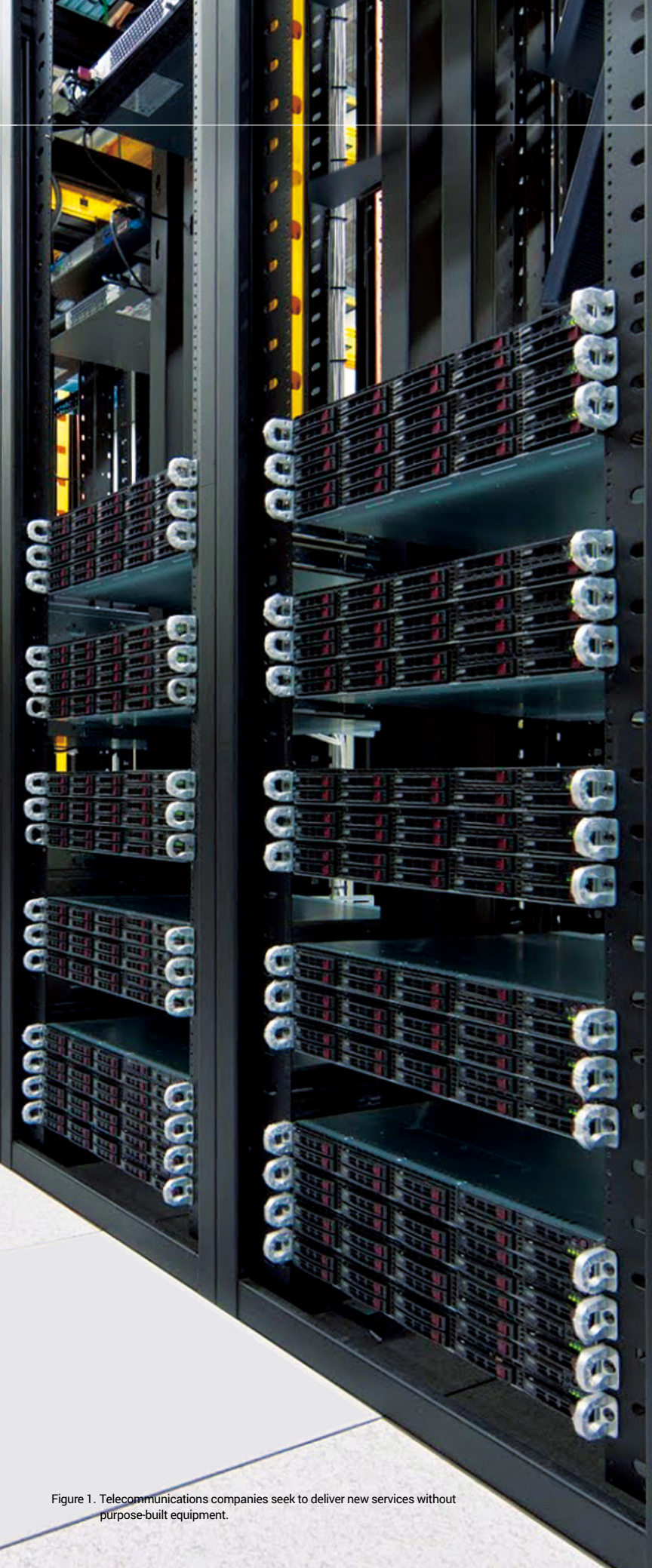


Figure 1. Telecommunications companies seek to deliver new services without purpose-built equipment.

As telecommunications companies seek to expand beyond telecommunications services to data services, they find their purpose-built telecommunications equipment inappropriate for new data services such as teleconference and network security services (Figure 1). In consideration of constant evolving business needs and customer demands, telecommunications companies need an elastic approach to cost-effective network architecture, fast service delivery, and lean network management. To this end, NEXCOM has developed the network communication server NSA 7130, a solution designed to deliver network function virtualization (NFV) under the software-defined networking (SDN) framework.

This article explains how, based on the Intel® Xeon® processor E5-2600 v3 product family, the NEXCOM NSA 7130 handles heavy data workloads. We address how virtualization performance can be enhanced with Intel® Xeon® processors with intel® Virtualization Technology (Intel® VT); how network orchestration can be conducted through support for the open source software OpenStack; and how the bottleneck of the networking stack for SDN can be relieved by the Intel® Data Plane Development Kit (Intel® DPDK) with enhanced packet processing capabilities. In addition, we show how the NSA 7130's PCIe-based modular design can provide a necessary performance boost to the NFV platform when needed.

The need for generic servers

Telecommunications services are traditionally delivered by purpose-built telecommunications equipment consisting of several computing boards which depend on different branded communication chips to run specific networking functions. Seeking to develop new business opportunities in data communication, telecommunications companies are exploring new ways of offering both networking and

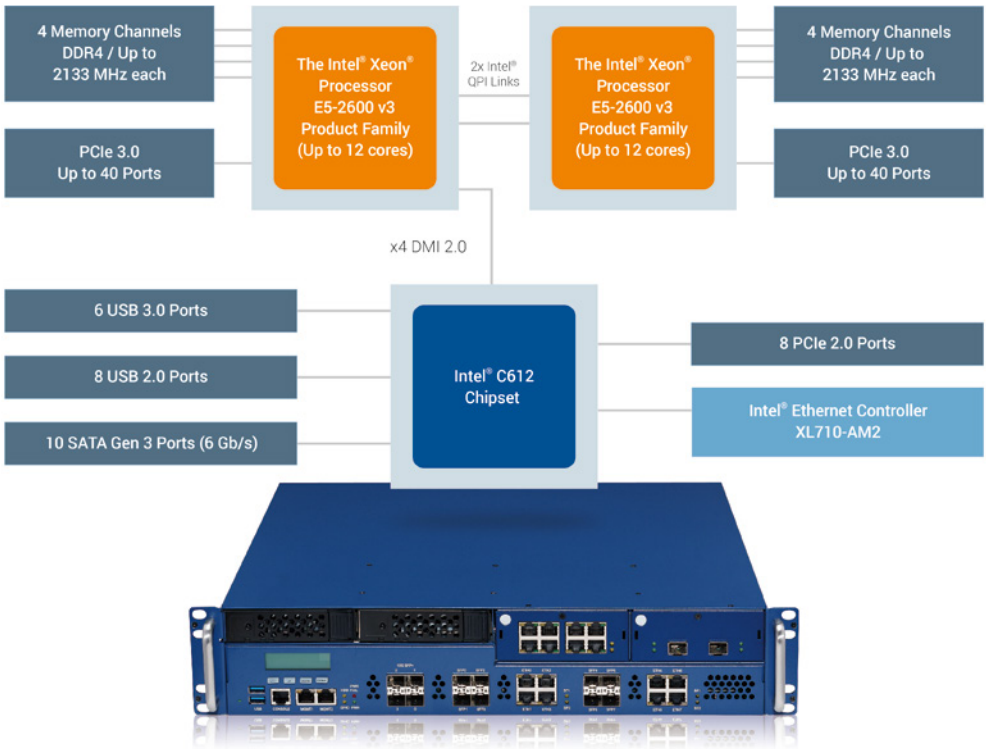


Figure 2. NSA 7130 supports a two-socket configuration and the full range of the Intel® Xeon® E5-2600 v3 product family for network virtualization.

services while exempting business clients from deploying dedicated appliances for unified threat management (UTM), load balancing, and Voice over IP (VoIP), for instance.

In the meanwhile, telecommunications technology continues to evolve and these advancements almost always come with expensive infrastructure overhauls. The capital expenditure is so significant that it takes years to pay off. Needless to say, telecommunications companies are eager to avoid this predicament. What is needed are ways to use generic-purpose high-volume servers that through virtualization, interoperability and scalability can consolidate functions and blend telecommunications and data center capabilities.

Move to speed and simplicity

Virtualization is a must for such a generic-purpose high-volume server. The server must interoperate with other servers in telecommunications server rooms, and its hardware resources should be shared with other servers, creating a common resource pool that network functions can tap into. Also, high-throughput connectivity is another essential requirement. To satisfy these requirements, NEXCOM network communication server NSA 7130 employs the Intel Xeon processor E5-2600 v3 product family paired with an Intel® C612 chipset and Intel® Ethernet Controller XL710-AM2.

Using virtualization to consolidate multiple network functions onto a single server adds management simplicity, high server density, and space utilization efficiency to network operations, yet requires considerable compute and memory resources. To handle multiple guest operating systems (OS) and virtual machines (VM) on a single server, the NSA 7130 supports a two-socket configuration and the full range of the Intel Xeon E5-2600 v3 product family (Figure 2). The server can pack as many as 24 computing cores and up to 512GB of the latest memory technology of DDR4.

The NSA 7130 also benefits from Intel VT which offers a number of capabilities that can be used to optimize and accelerate the deployment of virtualized NFV applications. There are a broad range of virtualization specific enhancements in the platform such as Intel® Virtualization Technology (Intel® VT) for IA-32, Intel® 64 and Intel® Architecture (Intel VT-x), Intel® Virtualization Technology (Intel® VT) for Directed I/O (Intel® VT-d) and Intel® Virtualization Technology (Intel® VT) for Connectivity (Intel® VT-c). There is also a set of configuration capabilities on Intel architecture-based servers that can help to deliver improved performance and predictability characteristics for NFV applications.

Act like one server

To create a network environment where network functions can be scaled on demand, servers across telecommunications server rooms need to act like one giant virtual server and be decoupled with network functions—the essence of NFV. Implementing NFV will rely on a network orchestrator, such as OpenStack, which is an open source cloud operating system that controls large pools of computing, storage, and networking resources throughout a datacenter, all managed through a dashboard[i]. Although OpenStack is commonly used in platform-as-a-service (PaaS), it also has a place in telecommunications services.

An orchestrator is vital because it allows telecommunications companies to dynamically assign network workloads. With pre-defined application and operational policies, an orchestrator can automate network provisioning and configuration, reducing manual, error-prone operations. A new service can be deployed utilizing available hardware computing, storage and networking resources without the need to purchase new servers (Figure 3), while a launched service can be elastically scaled up and/or down based on changing business needs. Simplified network management, granular control of network traffic, and faster time to market of new business are some of benefits that telecommunications companies can enjoy from NFV.

Intended for high volume telecommunications servers, the NSA 7130 features high speed network interfaces including four 10 GbE ports, eight 1 GbE copper ports, and eight 1 GbE fiber ports. Along with two 3rd generation PCIe x8 slots, the NSA 7130 can add on extra computing, storage, and networking performance with NEXCOM Smart Network Interface Cards (SmartNIC), LAN, and HDD modules to meet expanding service demands. In respect to telecommunication server room environments, the 17-inch (450mm) rackmount NSA 7130 can be directly fitted in a standard two-post rack. The 48V DC power supply is also worth mentioning as telecommunication server rooms use low voltage power sources for safety reasons. The power design can spare the trouble of power conversion.

NFV for telecom

In today's telecommunications environment, living up to the speed expectation promised by a new generation of telecommunications technology requires server upgrades for bandwidth control. To expedite the technology transition, the NFV-enabled NSA 7130 can accelerate the implementation of load balancing, quality of service (QoS), and even media server applications, enhancing end-to-end user experience of online video streaming and other bandwidth-hungry web applications (Figure 4).

Client premises equipment (CPE) can also take advantage of NFV. Telecommunications companies offer wireless broadband services via CPE to business clients. Under the concept of NFV, the NSA 7130-based CPE can be divided into several virtual machines, running virtual private network (VPN), firewall, and load balancing applications.

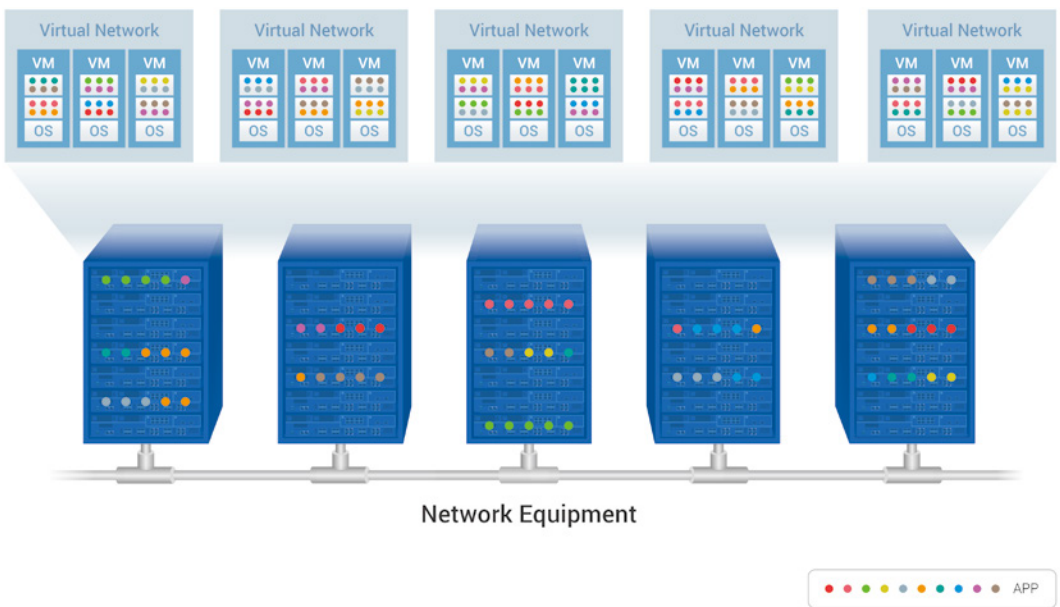


Figure 3. New services can be deployed utilizing available hardware computing, storage and networking resources without the need to purchase new servers.

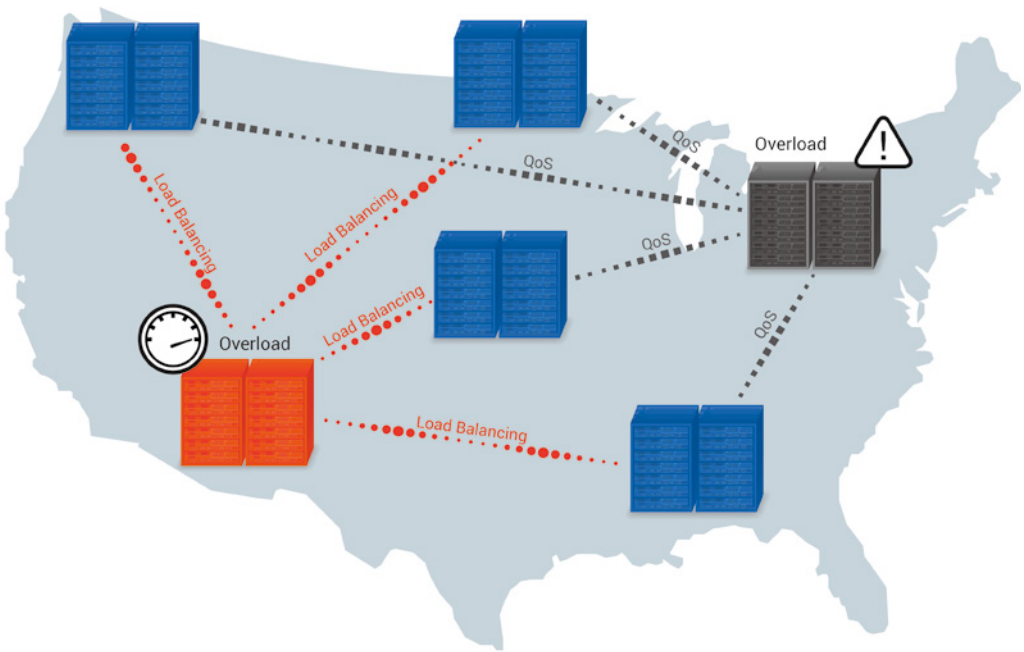


Figure 4. The NFV-enabled NSA 7130 can accelerate the implementation of bandwidth control to expedite telecommunications technology transition.

More importantly, NFV-enabled CPE can interoperate with other NFV-enabled equipment, acting as a computing node in a telecommunications server room and letting its hardware resources be accessed by other network function applications or vice versa. This flexibility enables creation of new revenue-generating services at a reduced cost in terms of capital and operating expenses.

Software-defined infrastructure

To establish a centralized, programmable network infrastructure, the NEXCOM NSA 7130 uses Intel DPDK to implement an SDN framework where data plane and control plane are separated. Intel DPDK—which is a set of software libraries designed to improve—packet processing performance across virtual switches—makes it possible to achieve over 80 million packets per second (Mpps) of L3 forwarding throughput for 64 byte packets on a single Intel Xeon processor[ii].

With Intel DPDK, packet processing can be combined onto a generic-purpose high-volume server, eliminating the need for dedicated networking components, such as network processors (NPUs), application specific integrated circuits (ASICs), and field-programmable gate arrays (FPGAs). Control plane, on the other hand, is managed by a SDN controller which communicates with physical and virtual switches through standard communications interfaces, like OpenFlow, supported by the NSA 7130.

Conclusion

Creating new revenue streams at lower capital and operating expenses is a common pursuit of telecommunications companies as they are seeking new business opportunities in data communication, putting them in direct competition with established service providers. For providers implementing NFV and SDN, the NEXCOM NSA 7130 provides a generic purpose high volume server that can interoperate with other network platforms through network abstraction while simplifying network provision, configuration, and management with policy-based network automation. As opposed to traditional purpose-built telecommunications equipment requiring arduous manual processes, the NEXCOM NSA 7130 helps optimize hardware resource allocation, allowing telecommunications companies to deliver new services with enhanced agility and scalability, as well as significant cost savings.

[i] Source: https://www.openstack.org/software/
[ii] Source: http://www.intel.com/content/www/us/en/intelligent-systems/intel-technology/packet-processing-is-enhanced-with-software-from-intel-dpdk.html

Bring Harmony of **Accuracy, Agility, and Amusement**

4K visualization delivers immersive, detailed pictures, and 2D/3D graphics accuracy beyond entertainment to wider adoptions including healthcare, public transportation, and manufacturing. To bring the harmony of speedy graphics processing, accuracy, and smooth interoperability, NEXCOM has launched IoT controller NIFE 300, COM Express ICES 5100 Series, and media players NDiS B535 and NDiS M535 based on 6 generation Intel® Core™ processors.

IoT Controller

NIFE 300

The NIFE 300 accelerates the migration of automation systems to cyber-physical systems for smart manufacturing. The controller is suited for graphic- and compute-intensive applications such as motion control and machine vision, while the 4K2K support enables HMI to show great details of working pieces and 3D simulation.

PC-based open architecture also uplifts protocol barriers with real-time industrial Ethernet technology of EtherCAT and fieldbus communication. The controller enables fast deployment by allowing easy control programming with CODESYS Control RTE and CODESYS SoftMotion tool kit .Gigabit Ethernet connection brings access to MES and ERP systems, letting manufacturers make to orders with agility.

Type 6 COM Express Module

ICES 5100 Series

The ICES 5100 series upscales 3D and 4K graphics for virtual reality (VR) stimulators in medical education and training.

The module boosts imaging performance with next-generation HEVC/H.265 codecs and DDR4 memory sockets while offering flexible display outputs along with swift I/O expansions including PCIe Gen3 and USB 3.0. Healthcare professionals can leverage these to build a more engaging and accurate training context.

4K Media Player

NDiS B535

The NDiS B535 gives retailers technology makeovers. Accelerated by Intel® HD Graphics, DDR4 memory, and HEVC/H.265 codecs, the media player can run both in-store promotions in 4K resolution and video analytics including facial recognition for groups, zone traffic, and dwell time.

Diverse interfaces including LAN, COM, and USB 3.0. M.2 and mini-PCIe simplify integrations with cameras, product tags, and detectors, POS, and Wi-Fi expansions. Fanless design delivers high system reliability, allowing the NDiS B535 for long-hour operation.

4K OPS Media Player

NDiS M535

The NDiS M535 brings clearer passenger information to large displays at airports and stations for enhanced viewing experiences and engagement. The high-performance OPS player bolsters triple independent outputs supporting 4K display with 60Hz. Dual channel DDR4 memory sockets and USB 3.0 ports facilitate high-responsive, interactive peripherals including touchscreen displays, cameras, and access control readers via RFID, NFC or fingerprints.

Featuring OPS design, upfront HDMI 2.0 and DisplayPort ports, the NDiS M535 shortens installation hours while Intel® AMT allows remote access and diagnostics wirelessly. This preventive maintenance design lowers onsite visits and maintenance costs.

6th Gen Intel® Core™ Processors at a Glance

- The 6th generation Intel® Core™ processor provides latest DDR4 memory.
- Latest Intel® Graphics and High Efficiency Video Coding (HEVC) boast faster graphics performance, Ultra HD 4K display across three independent displays, and faster 3D and video playback for more immersive computing experiences.
- Hardware-assisted security features including AES New Instructions, Security Key, and Intel® SGX protect systems against boot threats, malware intrusions and data from tampering.

Enterprise Wi-Fi Controllers **Unify Wireless Working Environment**

As business expands and mobile tech gadgets flock into the working environment, enterprises need a wireless network that is reliable, secure, manageable, and yet flexible to keep up with their operation and worldwide expansions. Like other enterprises, NEXCOM also faced challenges in building a scalable Wi-Fi infrastructure when its staff numbers increased from about 400 to over 700 and its manufacturing and office space quadrupled during 2011 to 2015.

The staff numbers almost doubled and applications such as video conferencing, voice communication and multimedia streaming accessed by bring your own device (BYOD) all consumed significant amount of wireless bandwidth. This placed a heavy resource burden on the existing wireless network. In addition, the existing wireless infrastructure lacked centralized management and the capability to provide a seamless and secure roaming network between NEXCOM global headquarters and factory site that operated in different areas, each with many floors. A trusted, manageable wireless network infrastructure was required to unify data communications.

In this use case, NEXCOM is going to share what its MIS team has done in its global headquarters and factory site to build a trusted, seamless wireless network environment. The new wireless network even covers two China subsidiaries into its infrastructure. Soon, NEXCOM will also implement this successful model to its worldwide subsidiary offices and fulfillment centers located in China, Japan, Italy, Taiwan, United Kingdom, and United States.

Key Objective

Build a high bandwidth, reliable wireless infrastructure with security mechanism to enhance working efficiency and protect confidential information.

Challenges

The existing wireless networking infrastructure struggled to handle the increased bandwidth demands of growing staffs, and lacked flexible security policies to define, restrict and control access of the many different types of BYOD devices. Management of the wireless network was also cumbersome as no centralized management was in place.

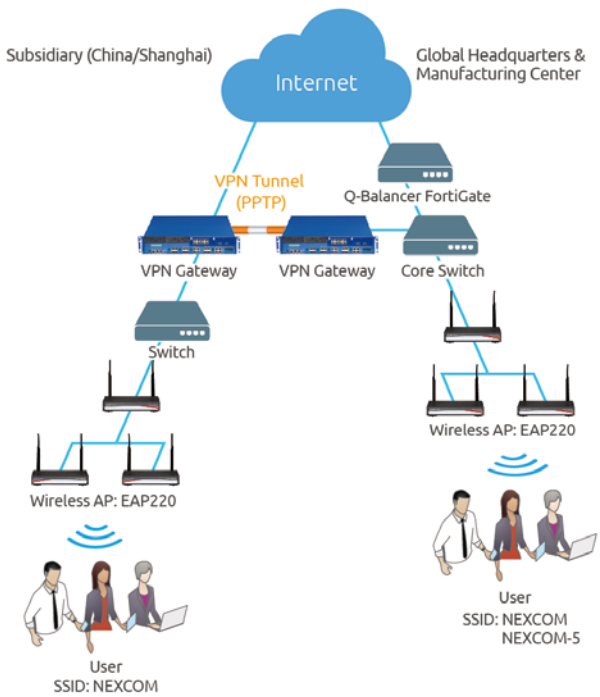


Figure 1. Former Wi-Fi solution management layout

The challenges that NEXCOM's MIS team faced included:

How to deliver seamless roaming with a one-time login

All NEXCOM staffs needed to login to the corporate domain network first then to the Wi-Fi access points (AP) to gain connectivity. A one-time login through employee account can simplify login process and offer staffs seamless wireless roaming when moving across different work floors and factory sites.

How to build a trusted and secure Wi-Fi access

Implement flexible security policies for different users and BYOD devices based on the authentication, authorization and accounting (AAA) framework, and support user-based login tracking for monitoring access and usage.

How to carry out central management of field APs

Map out and design a wireless network with a single point of centralized management that can manage up to thousands of APs. In addition, implement remote management capabilities to aid the MIS team to remotely access, diagnose, and solve issues for field APs across offices and factory sites.

How to offer visitors Wi-Fi service

Provide visiting guests with seamless Wi-Fi connectivity while making sure that the public guest network and internal private network are securely separated to ensure critical data is secured and protected.

Solution and Benefits

Realizing that these challenges will require a wireless network with broad Wi-Fi coverage, seamless roaming, and central management, NEXCOM's MIS team chose to implement an enterprise Wi-Fi network using WLAN controllers to supervise all field APs across its global headquarters, factory sites, and worldwide subsidiaries.

Deploy AAA to build secure, seamless roaming with one-time login

NEXCOM's WLAN controllers offer 802.1X user authentication to ensure that only authorized users can access the corporate network through validating their original employee login name. For security control, role-based policies define the permissions of different user groups on the corporate network. Combined with multiple AP roaming support and one-time login, users can experience uninterrupted Wi-Fi connections when traversing between office floors and factory sites.

Incorporate high availability (HA) into enterprise Wi-Fi controllers

The WLAN controllers support controller service failover to provide HA to ensure a reliable and always-on wireless network.

Offer secure remote AP management and maintenance

VPN and remote management allow real-time AP management, monitoring and reporting to simplify troubleshooting and enable MIS

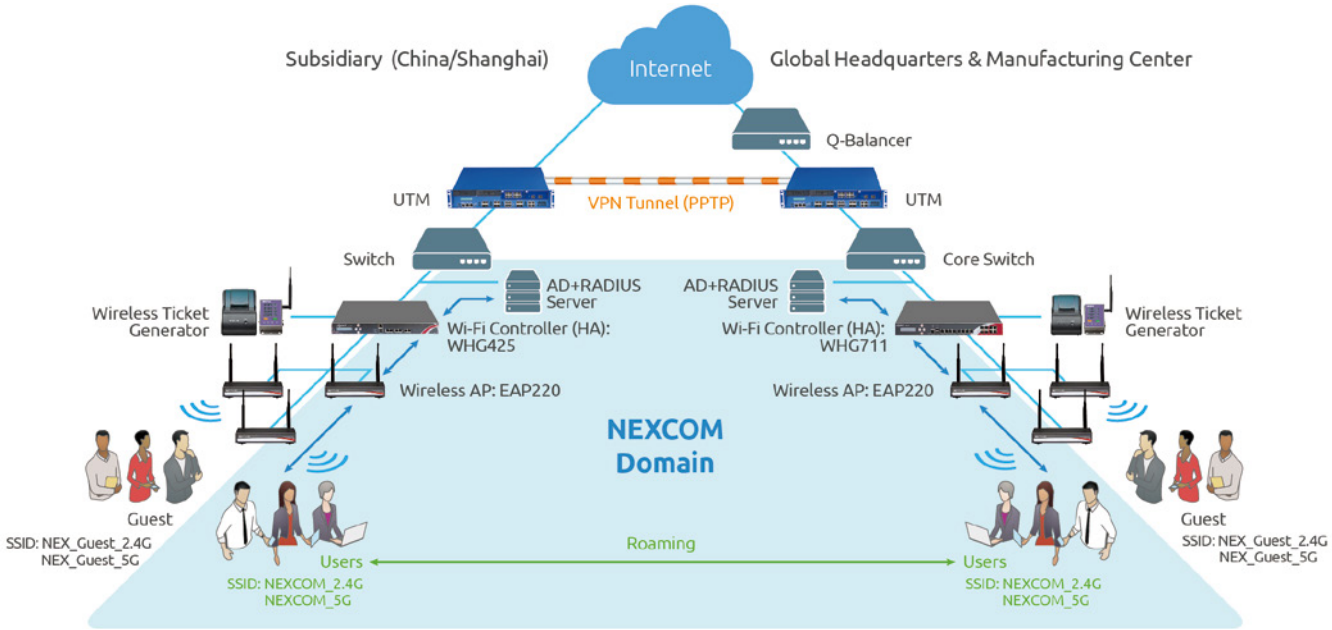


Figure 2. Redesigned Wi-Fi solution with wireless controllers and APs

to quickly react and debug wireless connectivity issues in a secure, encrypted tunnel.

Monitor and analyze traffic

In addition to AP monitoring, the WLAN controllers can keep track of event logs, detailed user and network traffic activities for MIS to easily analyze data behavior and measure network efficiency.

Allow visitors use social media login

Grant visiting guests free Wi-Fi access conveniently through social media login such as Facebook, Twitter and Google+.

Solution list

The controllers and APs used in NEXCOM's wireless network infrastructure are as below:

Model	Description
WHG425	WHG425 secure WLAN controller 19" 1U, Gigabit
EAP220	Light industrial AP, 802.11an+802.11b/g/n, dual RF, concurrent AP (0°C to +60°C)

Summary

By leveraging enterprise Wi-Fi controllers, NEXCOM's offices and factory sites are now operating under a trusted Wi-Fi infrastructure, integrating into the business operation wirelessly and seamlessly. The secure and robust remote management, monitoring and reporting capabilities offer MIS unparalleled flexibility and efficiency in maintenance, while the wide Wi-Fi coverage and speedy connection provide both staffs and guests a convenient and reliable internet access at anywhere and anytime. After a few months of trial run, the staffs and MIS team were satisfied not only with the convenience, but also the effectiveness of the wireless working environment.

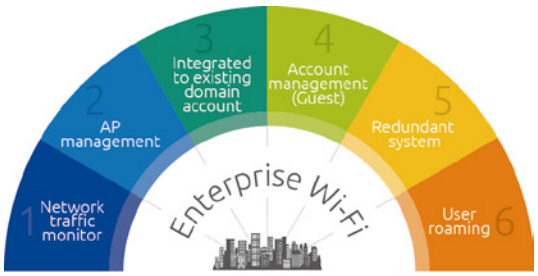


Figure 3. Manage enterprise Wi-Fi networks to meet surging demands

Upcoming New Products

Open EtherCAT Robot Package Grants Freedom to Self-developed Applications

NEXCOM's open EtherCAT robot package aims to grant robotics lab students and engineers freedom to develop and utilize their own control algorithm into best practice. The NexROBO Edu Package helps build robot control with high command accuracy, fast throughput, collective feedback, and I/O expandability. Such open platform enables coverage of robot kinematics and help cope with integration projects including machine automation, factory automation, and robot controls.

Each NexROBO Edu Package contains selected robot body and an open EtherCAT controller powered by Intel® Core™/Atom™ processor. To save time and efforts, all the hardware installation and circuit integration are complete. Supporting basic C/C++ APIs and point-to-point (PTP) function, the NexROBO Edu Package allows students and engineers to freely develop and execute their own command algorithms without proprietary hardware limitations.

Leveraging NEXCOM's NexECM EtherCAT master interface, the open EtherCAT controller sends and collects real-time parameter data such as position, velocity, and voltage in real-time extension (RTX) environment, which deliver accurate control over streamlined movements of the robot, instant feedback from servo motors, and ultimately human-machine collaboration. Better yet, to optimize the robot life expectancy from greenhorns, the controller has joint limits pre-defined for each axis for peace of mind.

With EtherCAT's support for daisy-chain topologies, the package brings high flexibility

to expand I/O and add-on devices. Various EtherCAT slave modules can be easily implemented for wider range of real-life automation applications, including conveyer tracking and controls of gripper and air compression. Engineers can freely develop their own robotic control and integrate robotic control into their automation projects, paving the way for Industry 4.0.

NexROBO Edu Package Selection List

Item	Robot Body	EtherCAT Controller	EtherCAT Drive	EtherCAT I/O	P/N
NexROBO 6R Edu Package	6-axis Articulated, 5kg payload	NET3600E-ECM	Panasonic Minus A5B x 6	AXE-9200 (16DI/16DO)	7900000115X00
NexROBO miniDelta Edu Package	3-axis Delta, 0.5kg payload	NET101-ECM	Yaskawa Sigma-5 x 3	AXE-9200 (16DI/16DO)	TBC
NexROBO SCARA Edu Package	4-axis SCARA, 6kg payload	NET3500-ECM	HIWIN D2 x 4	AXE-9200 (16DI/16DO)	7900000163X00

Empower Industry 4.0 by Cyber-physical Control Systems

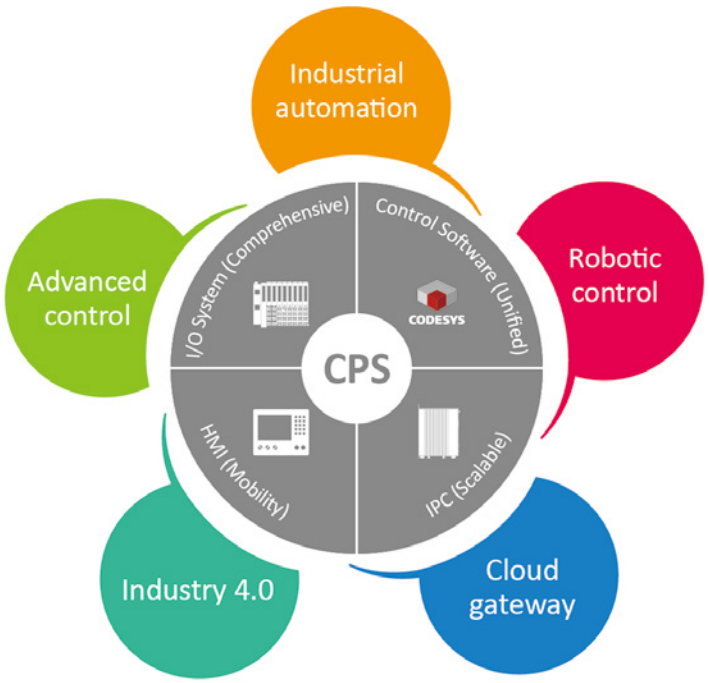


Figure 1. The cyber-physical automation controller fulfills versatile IoT automation applications

For a smarter manufacturing, Industry 4.0 is aimed to create innovative, proactive services and optimize the operation process by upgrading the industrial automation with mature cyber technologies. However, with traditional PLC systems lacking the flexibility for function integration, what's needed is an IPC-based control system which can meet the integrated and complex automation applications and cyber services. Take for example, an IPC-based machine with on-machine vision to reject parts with defects or for position alignment to increase quality output. An IPC-based machine can capture images with cameras, run vision software for image analysis, and execute the machining based on the analysis result. When exchanging data among control nodes, an IPC-based machine leveraging industrial Ethernet protocols can prevent data loss and reduce data latency to deliver high production rate and yield rate. Furthermore, implementing remote monitoring and management is easy.

To connect the physical world and the cyber world as one for seamless OT/IT operation, NEXCOM Automation Controller is a highly-integrated CPS (Cyber-physical System) comprising of four elements, the Unified Control Software, Scalable IPC Hardware, Comprehensive I/O Systems and Mobility HMI Software (Figure 1).

Unified Control Software

The CODESYS Runtime Engine is a professional automation core based on the PLCopen logic (IEC 61131-3) and PLCopen motion control with fieldbus and industrial Ethernet protocols. The CODESYS Runtime Engine on Windows defines the functionalities for SoftPLC and SoftMotion Controller and supports the following:

- Standard IEC 61131-3 languages, including LD, FBD, IL, ST, SFC, CFC.
- Fieldbus protocols, including PROFIBUS-DP and DeviceNet.
- Industrial Ethernet protocols, including EtherCAT, PROFINET, EtherNet/IP and Modbus TCP/IP.
- PLCopen motion control Part 1, 2 & 3.

CODESYS Control RTE can enable the IPC to function as a SoftPLC executing logic control through the distributed I/O with fieldbus and industrial Ethernet protocols. CODESYS SoftMotion RTE can enable the IPC to function as a SoftMotion Controller implemented in motion control systems through real-time EtherCAT drives and motors inside machines, or on conveyors stations.

Scalable IPC Hardware

NEXCOM's Scalable IPC Hardware includes the NIFE series, APPC series and IPPC series to meet the performance of different applications. The performance selection guide (Figure 2) provides a guideline to help users setup the automation controller accordingly to meet the performance of the target applications. The performance index defines the Cycle Time, I/O Points and Axes for the automation controllers.

Controller – NIFE Series: NIFE 300 is a high performance fanless box IPC based on Intel® Core™ i7-6700TE processor (i3 and i5 are available) for high computing applications. It features comprehensive PC peripherals, GB storage devices, GbE LAN

ports and expansion slots for SoftPLC and SoftMotion Controller functions. Additional third-party software, plug-in expansions and PC programs can be implemented to support various applications, such as visual inspection, 3D UI/HMI, CAD/CAM, remote maintenance, local recipe management, historian data logging, self-diagnosis, power management and virtual simulation. For applications requiring optimized cost and performance, NIFE 200 features Intel® Celeron® processor J1900 that is ideal for typical logic and motion control. For harsh environments with limited space, the compact NIFE 100/101 equip Intel® Atom™ processor E3826 and are rated for wide temperature operation.

Controller – APPC/IPPC Series: The IPPC and APPC series are controllers with touch panels for HMI operations and come in panel sizes from 8" to 17" with 4:3 or 16:9 aspect ratios. The available processor options include Intel® Atom™, Intel® Celeron®, 3rd generation Intel® Core™ i5 and 4th generation Intel® Core™ i5. The IPPC series features P-Cap multi-touch panel with aluminum front bezel and is designed for anti-corrosion and harsh environments. The APPC series comes with plastic front bezel and is optimized for industrial control applications and HMI projects requiring cost-effective performance.

Mobility HMI Software

JMobile Suite is a professional HMI software for automation controllers and offers the following:

- Software-based and web-enabling HMI solution with IDE and runtime engine
- Fast response and high resolution HMI scalable on different displays
- Intuitive UI and design tools
- Comprehensive industrial libraries with iconic visual components
- Support mainstream PLC drivers
- Advanced functionalities, including trends, report, alarm, events, scheduler, recipe, media player, IP camera and JavaScript.

Comprehensive I/O Systems

The VIPA SLIO series are distributed I/O systems with a modular design. To collect physical signals, the I/O modules support including DI, DO, Relay, AI, AO, TC, RTD, counter, encoder and serial interfaces, while the couplers support protocols including PROFIBUS-DP, DeviceNet, CANopen, EtherCAT, PROFINET-IO, EtherNet/IP and Modbus TCP/IP. With a comprehensive set of couplers and I/O models, the controller can deploy I/O points with customized combinations and optimized cost.

Using the CPS-ready automation controllers, machines in factories are no longer stand-alone or passive facilities, and can be implemented with intelligent services for optimized overall equipment effectiveness (OEE). NEXCOM's complete control solution provides unified automation architecture and worldwide leading technologies. Customers can experience a one-stop integration platform for the Unified Control Software, Scalable IPC Hardware, Comprehensive I/O Systems, Mobility HMI Software as well as consulting services to meet the complex integration among different control systems and advanced OT/IT operation. To experience the next generation of automation technologies, please contact your local NEXCOM representative for more information.

		PLC Control RTE			SMC SoftMotion RTE			Robot SoftMotion CNC RTE		
Function Specifications	Performance Index	P10	P20	P30	M10	M20	M60	R10	R20	R60
	IEC61131-3 Language	LD/FBD/IL/ST/SFC/CFC			LD/FBD/IL/ST/SFC/CFC			LD/FBD/IL/ST/SFC/CFC		
	Cycle Time (ms)	1	0.5	0.5	1	0.5	0.5	1	0.5	0.5
	Max. I/O Points	512	1024	1024+	512	1024	1024+	512	1024	1024+
	Max. Axes				12	24	64	12	24	64
	Control Group							1	2	6
	High-computing Applications			✓			✓			✓
	HMI (integrated options)	JMobile Suite			1. CODESYS TargetVisu 2. JMobile Suite			CODESYS TargetVisu		
Controller	NIFE 100	✓	✓		✓	✓				
	NIFE 101	✓	✓		✓	✓				
	NIFE 200		✓	✓		✓	✓	✓	✓	
	NIFE 200 P2E		✓	✓		✓	✓	✓	✓	
	NIFE 300, Core™ i3			✓			✓		✓	✓
	NIFE 300, Core™ i5			✓			✓			✓
	NIFE 300P2, Core™ i7									✓
Control PPC	APPC 0840T	✓								
	APPC 1245T	✓	✓		✓	✓				
	APPC 1540T		✓			✓		✓		
	IPPC 1560TP2E-DC						✓			✓
	IPPC 1570PP2E, Celeron®			✓		✓			✓	
	IPPC 1770PP2E, Core™ i5			✓			✓		✓	✓
	IPPC 1640P			✓		✓	✓		✓	
	IPPC1670PP2E, Core™ i5									✓

Figure 2. NEXCOM automation controller performance selection guide

NEXCOM NIFE Series: PC-Based Controllers Ready for Industry 4.0

Smart manufacturing depicted by Industry 4.0 underlines the tight coordination between the cyber world and physical manufacturing systems. To spur such coordination, NEXCOM PC-based IoT controller solution, the NIFE series, provides high level of interoperability for orchestrating factory machinery and production lines to reach beyond factory networks and into enterprise networks. The convergence of the two once separated domains can translate into streamlined manufacturing and business processes and shorter lead time. To accelerate the migration of automation systems to cyber-physical systems for smart manufacturing, NEXCOM has developed a series of IoT controller solutions—the Intel® Core™-based NIFE 300, the Intel® Celeron®-based NIFE 200, and the Intel® Atom®-based NIFE 100—to offer scalable computing performance to meet different demands.

The NIFE 300 controller is compliant to the PLCopen (IEC 61131-3) standard with real-time EtherCAT protocol support, and utilizes Intel's latest 14nm process and DDR4 technology to deliver high performance for graphics- and compute-intensive applications such as motion control, CNC, and machine vision. In addition, with 4K2K Ultra HD resolution support, NIFE 200 enables human machine interface (HMI) to handle highly detailed 3D simulation applications.

For applications requiring compact design and optimized-performance, NIFE 200 and NIFE 100 equip Intel® Atom™ processors and DDR3L memory, making them the perfect platform for basic PLC logic and motion control. NIFE 200 is suitable for general process control and soft motion applications, and offers flexible communication options for both IoT and fieldbus networks. NIFE 100, on the other hand, is designed for general process control applications in harsh or space constrained environments. Last but not least, all the NIFE series of IoT controllers are equipped with robust electromagnetic interference (EMI) protection for use in electrical noise-prone industrial environments.

With a rich selection of NIFE controllers targeted for different performance requirements, built-in software support for complete PLC functionality including CODESYS Control RTE, CODESYS SoftMotion + CNC, the NIFE series enables customers to achieve seamless IT/OT integration to improve bottom line and unlock new business efficiencies and opportunities.

Main Features

- PC-based controllers based on Intel® Core™ i3/i5/i7 or Intel® Atom™ processors
- Compliant with the PLCopen logic standard (IEC61131-3)
- Compliant with the industrial EMC standards
- Support EtherCAT, PROFINET, PROFIBUS, EtherNet/IP protocols
- Support CODESYS Control RTE and CODESYS SoftMotion
- Support multiple Gigabit Ethernet ports for IoT connectivity

	NIFE 100	NIFE 101	NIFE 200	NIFE 200 P2	NIFE 300	NIFE 300 P2E
						
CPU	Atom™ E3826	Atom™ E3826	Celeron® J1900	Celeron® J1900	6th Gen. Core™ i	6th Gen. Core™ i
SoftPLC	✓	✓	✓	✓		
SoftMotion			✓	✓		
SoftCNC					✓	✓
GbE LAN Port	2	2	2	2	3	3
Expasions (PCI/PCIe)				2x PCI		1x PCI, 1x PCIex16
CE/FCC Standards	EN55022 EN55024 EN60950	EN55022 EN55024 EN60950	IEC61000-6-2 IEC61000-6-4 EN60950	IEC61000-6-2 IEC61000-6-4 EN60950	IEC61000-6-2 IEC61000-6-4 EN60950	IEC61000-6-2 IEC61000-6-4 EN60950
FBI Fieldbus I/O (Optional)	✓		✓	✓	✓	✓
FAN Kit (Optional)			✓	✓	✓	✓

Widescreen Multi-touch Industrial Panel Series for Smart Factory

Today, more and more multi-touch and widescreen industrial touch monitors and Panel PCs are used in smart factories to enhance operational efficiency and safety. NEXCOM's industrial touch monitors, the IPPD 1600P/1800P/2100P series, and industrial panel PCs, the IPPC 1640P/1840P/2140P series, come in sizes of 15.6", 18.5" and 21.5" with wide 16:9 aspect ratio and 10-point P-Cap multi-touch. These IPPD and IPPC series are housed in metal enclosure with an aluminum zero front bezel rated for IP66 protection to deliver reliable performance in industrial environments.

Based on a P-Cap multi-touch panel, NEXCOM's industrial touch monitors and panel PCs provide factory floor staffs a smooth screen surface to work on and 10-point multi-touch to reduce risks of operating errors, accidental touches and machine starts. The IP66 rated zero front bezel offers protection from water and dust ingress, while keeping a refined and polished look that is easy to clean and maintain. In addition, to help floor staffs to flexibly install the touch monitors and panel PCs, the industrial touch monitors and panel PCs offer panel mounting and VESA mounting support.

The IPPD 1600P/1800P/2100P comply with industrial EMC standard certifications, including EN61000-6-1, EN61000-6-2, EN61000-6-3, and EN61000-6-4, and are intact from electrostatics and electric surges up to ±6kV for contact discharge, ±8kV (ESD) for air discharge, ±2.2kV (EFT), and ±1kV (Surge). Furthermore, these industrial touch monitors support VGA, DVI-D, and DisplayPort display input options to enhance the flexibility for installation and integration.

The IPPC 1640P/1840P/2140P run on the quad-core Intel® Celeron® processor J1900 and include Intel® HD Graphics 4000 that supports DirectX 11, OpenGL 3.X, and OpenCL 1.2 APIs. These industrial fanless panel PCs provide various I/O expansions including 1 x PS/2 KB & MS, 1 x line-out, 1 x remote power switch, 2 x GbE LAN, 2 x USB 2.0, 1 x USB 3.0, 2 x RS232/422/485 with 2.5KV isolation protection, 1 x semi-hidden reset button, 1 x 2nd display via VGA, 1 x 3-pin terminal block power input, 1 x power switch and 1 x external CFast.

Similarly, these panel PCs are also certified with EN61000-6-1, EN61000-6-2, EN61000-6-3, and EN61000-6-4 standards to withstand harsh conditions in heavy industrial environments. Integrated with CODESYS Control RTE, CODESYS SoftMotion and JMobile x86 runtime software, as well as industrial fieldbus protocol support including PROFINET, PROFIBUS, DeviceNet, EtherNet/IP and EtherCAT, these panel PCs can provide SoftPLC/SoftMotion and HMI functionality to enable a smart factory.

	IPPD 1600P	IPPD 1800P	IPPD 2100P	IPPC 1640P	IPPC 1840P	IPPC 2140P
						
Type	Display	Display	Display	Panel PC	Panel PC	Panel PC
Size	15.6"	18.5"	21.5"	15.6"	18.5"	21.5"
Resolution	1366x768	1366x768	1920x1080	1366x768	1366x768	1920x1080
Touch	10 points P-Cap	10 points P-Cap	10 points P-Cap	10 points P-Cap	10 points P-Cap	10 points P-Cap
CPU	-	-	-	Celeron® J1900	Celeron® J1900	Celeron® J1900
Video Input	VGA/DVI/DP	VGA/DVI/DP	VGA/DVI/DP	-	-	-
GbE LAN Port	-	-	-	2	2	2
Expansions	-	-	-	2x mini-PCIe	2x mini-PCIe	2x mini-PCIe
CE/FCC Standards	EN55022/EN55024 EN61000-6-1/2/3/4 FCC Class B	EN55022/EN55024 EN61000-6-1/2/3/4 FCC Class B	N55022/EN55024 EN61000-6-1/2/3/4 FCC Class B	N55022/EN55024 EN61000-6-1/2/3/4 FCC Class A	N55022/EN55024 EN61000-6-1/2/3/4 FCC Class A	N55022/EN55024 EN61000-6-1/2/3/4 FCC Class A
FBI Fieldbus I/O (Optional)	-	-	-	✓	✓	✓

1 NIO 101

Certified Intel® IoT Gateway Based on Intel® Quark X1021 Processor

NIO 101 is an industrial IoT (Internet of Things) gateway designed for cloud-based applications in the Industry 4.0 era. NIO 101 collects information and data from sensors in wired or wireless networks, and transmits the data to the cloud over multiple diverse WAN (Wide Area Network) connections such as 3G, Wi-Fi or Ethernet for big data analysis.

Furthermore, NIO 101 can be equipped with customized interfaces and customized fieldbus protocol support to interface with different industrial sensors and devices. To meet environmental challenges in industrial applications, NIO 101 has a 9V to 36V wide-range DC power input and comes with dual LAN and multiple I/Os. In addition, with dual internal mini-PCIe slot, NIO 101 provides auto configuration between Wi-Fi and 3G.

- Support both Wind River® Intelligent Device Platform XT 2.0 and Yocto OS
- Support package and built-in secure boot function
- Support Modbus TCP/IP or RTU
- Support 9V to 36V wide-range DC input through terminal block
- Wide operating temperature: -20°C to 70°C
- 2 x Fast Ethernet, 2 x USB 2.0 Type A, 1 x selectable RS232/422/485, 2 x mini-PCIe slot for Field bus, Wi-Fi or 3G radio module

NIO 101

2 NIO 50

1-port RS-232/422/485 WLAN Device Transmitter Based on STM32F407ZE

NIO 50 is an industrial device transmitter designed for applications requiring serial and Ethernet cable replacement and signal conversion. NIO 50 collects data from its serial and Ethernet interface, and bridges them to a wireless LAN transparently. The communication software can access the serial devices from anywhere over a Wi-Fi infrastructure. Moreover, when the Wi-Fi interface connect to a NEXCOM EZ Mesh Wi-Fi product (such as IWF 300), NIO 50 can dramatically reduce the effort in cable deployment. It is a perfect choice for applications with difficult wiring situations.

The MQTT agent inside NIO 50 can publish specific information that is of great concern for users and send it over to the cloud via NIO 100. NIO 50 has a 9V to 36V wide-range DC power input and comes with an Ethernet port and one DB9 connector. Furthermore, NIO 50 supports transparent transmission of Modbus TCP or Modbus RTU protocols over the Wi-Fi interface.

- Qualcomm Snapdragon 410 MSM8916 quad-core 1.2GHz, Android 4.4, 1GB DDR3, 8GB flash memory
- Wi-Fi/3G/LTE/BT GPS RF communication
- 1 x Micro USB OTG, 2 x micro SIM card, 1 x Micro SD
- Onboard gravity/magnetic /proximity/light sensors
- Front camera: 2M, rear camera: 8.0M (AF), LED flash light
- Support IP67 and 4 feet drop resistance

NIO 50

3 IWF 300

EZ Mesh Industrial IP30 AP, Dual RF, Dual Band, 1x 802.11-an+1x 802.11b/g/n 2x2 MIMO

IWF 300 is a QCA9344-based industrial-grade AP/CPE/Router/EZ Mesh AP designed with IEEE802.11a/n 2x2 MIMO and IEEE802.11b/g/n 2x2 MIMO technology. IWF 300 EZ Mesh AP can provide stable network access even after 4 mesh hops, with a coverage up to 400 x 400m on the 5GHz and 2.4GHz frequency range, making it ideal for mid-size facilities. In addition, the 2.4GHz RF (Radio Frequency) can support an output power of up to 27dBm for wider coverage range and wider service range. IWF 300 can also serve as a cost-effective solution for building Wi-Fi mesh networks with roaming for factory mobile devices.

- Support up to 27dBm high RF power
- AP/Router/EZ Mesh modes
- 12V DC input
- Wide operating temperature range of -40°C to 80°C
- 1 x WAN and 4 x LAN GbE ports

IWF 300

4 IWF 503

IP55 Outdoor AP/CPE, Single RF, 802.11ac/an/a 3x3 MIMO

IWF 503 is a cost-effective, IP55-rated outdoor AP/CPE router equipped with IEEE802.11ac/an/a 3x3 MIMO technology and high RF output power. IWF 503 can deliver a data rate of up to 1.3Gbps and is available with two SKUs, one with internal patch antenna (IWF 503) and the other with external antenna (IWF 503D), both of which provide high gain outputs for long distance transmissions.

IWF 503

- Up to 27dBm high RF power
- AP/Router/Client Router/WDS mode
- 24Vdc PoE input
- Wide temperature: -35°C to 75°C
- 1 WAN+1 LAN Ports GbE Ethernet RJ45

5 ICES 5100A

T6 COM Express Assists VR Applications in Healthcare

NEXCOM's type 6 COM Express compact ICES 5100 series upscales 3D and 4K graphics for virtual reality (VR) stimulators in medical education and training. Accelerated by 6th generation Intel® Core™ processor i5-6300U (codename Skylake-U), the ICES 5100 series boosts imaging performance with next-generation HEVC/H.265 codecs, DDR4, and high-speed I/O, thus helping build a more engaging, interactive, and accurate training context.

With latest Intel® HD Graphics and HEVC codecs, ICES 5100 series supports 3D imaging and 4K streaming in low latency so that surgical data can be synthesized into an immersive, 3D graphical environment. Designed for such memory-intensive VR applications, ICES 5100 series features dual channel DDR4 SO-DIMM memory sockets with up to 32GB at 2133MHz, which enhance the accuracy for eye-hand coordination and simulated surgical actions.

ICES 5100 series is also highly flexible in display outputs and I/O expansions. Triple independent displays support eDP, HDMI, DisplayPort, and DVI interfaces allowing integrations with touch screen monitors. Swift PCIe Gen3 and USB 3.0 ensure high quality video footage captured by cameras can be fast transmitted and further analyzed. Healthcare professionals and trainees can leverage these for close-up examination, remote monitoring, and diagnosis. ICES 5100 series supports Windows® OS including earlier Windows® 7, Windows® 8, to latest Windows® 10.

- Intel® Celeron® 3855U, Celeron® 3955U, and Core™ i5-6300U processors
- Dual SO-DIMMs for up to 32GB of DDR4 2133MHz and eMMC 5.0 up to 16GB
- Support three independent displays with eDP and 2x DDI (HDMI/DisplayPort/DVI)
- 5x PCIe x1, 4x USB 3.0, 8x USB 2.0, 3x SATA 3.0 and GbE
- Support Windows® 10

ICES 5100A

6 NCr-661-VHA

UHD Outdoor IP Camera based on H.256 Technology

NEXCOM's NCr-661-VHA is a brand new professional outdoor bullet network camera with H.265 compression that can save up to 50% of data bandwidth and storage over the previous H.264 technology. Equipped with SONY STARVIS progressive scan CMOS sensor and supporting up to 30fps @ 5-Megapixel resolution, NCr-661-VHA provides high sensitivity and high dynamic range to enable clear image quality in light and dark areas even for objects with high contrast.

The IP66/67 rated housing design also allows the camera to withstand rain and dust invasion and ensure reliable operation under harsh weather conditions. Additional IK10 rated housing provides protection against vandalism and impact. Moreover, NCr-661-VHA supports wide operating temperature range which further enhances the performance and the reliability of the camera in extremely cold and warm environments.

- H.265 saves up to 50% bit rate over previous generation technology
- 6M 1/1.8" Sony STARVIS progressive scan CMOS sensor
- Built-in IR illuminators, effective up to 30 meters
- Power over Ethernet: IEEE 802.3at (PoE+)
- Built-in heater, -50°C ~ 60°C wide temperature range for extreme weather conditions
- IP66/67 and IK10 rated bullet type housing

NCr-661-VHA

7 FMS 1000

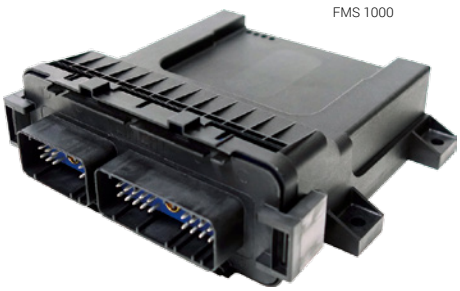
Vehicle Gateway Device

FMS 1000 is more than just a tracker or AVL (Automatic Vehicle Location) device, it is also a vehicle gateway device. Featuring CAN bus 2.0B, OBDII (SAE J1939), digital input/output, analog input, speed pulse input and G sensor, FMS 1000 can interface with various vehicle sensors and collect vital vehicle data. With added Wi-Fi and 3G WWAN connectivity, FMS 1000 can transfer these critical data and retrieve device coordinates remotely. Optional Dead Reckoning GPS modules are available for fast and precise location tracking of remote vehicles.

To prevent unauthorized access to vehicles, FMS 1000 features an interface to read RFID with RFID readers and a 1-wire interface for iButton ID key-in driver identification application. It also includes a backup battery to ensure ongoing operation in case of loss of vehicle power.

For off-highway, public or private fleet management applications where the service quality is the primary consideration, FMS 1000 can be used for advanced driver behavior monitoring to identify abnormal driving behaviors, minimize vehicle exploitation costs, increase company profits and enhance driver safety.

- 3G WWAN, 10/100 Mbps Ethernet and optional Wi-Fi support
- I-button and RFID support for driver identification
- 2 x CAN Bus 2.0B, 3 x DI, 3 x DO and 3 x Analog-In
- Optional USB storage as data logger
- Rugged IP67 protection



FMS 1000

8 MVS 5200/5210

8-CH PoE Premium Mobile Network Video Recorder

Featuring 5th generation Intel® Core™ processor i7-5650U/i3-5010U, the MVS 5200/5210 mobile network video recorders are professional security systems dedicated for public transportation applications, especially for video analytics. MVS 5200/5210 offer 8 Gigabit PoE ports compliant with the 802.3af standard.

Based on a dual-head design utilizing 5th generation Intel® Core™ processors and ARM-based processors, MVS 5200/5210 provide signal processing, machine vision, and video analytics capabilities required of ADAS, ANPR and video surveillance, giving abilities to sense and to think to fleet transport, public transport, police vehicles, ambulances and more. While the second ARM-based processor is dedicated for video playback and recording, offloading the workload of the main processor and allowing enhanced MNVR performance without trade-off or compromise.

MVS 5200/5210 can support GPS tracker and immobilizer functions with minimum power consumption, even when the power is off, allowing remote offline monitoring of critical information such as location positioning and vehicle status.

- 5th generation Intel® Core™ processor dual core i3-5010U, 2.1GHz (MVS 5200), i7-5650U, 2.2GHz (MVS 5210)
- 8 x video channel 720P real time live view while 1080P recording
- 8 x 10/100/1000 Mbps 802.3af PoE port
- Multitasking, no PC loading even 8 x channel real time live view and recording
- 24/7 GPS tracker and immobilizer functions support, even PC is off

MVS 5200/5210

9 VTC 7220-R

Robust Railway Computers Bolster Video Analytics and Passenger Infotainment

NEXCOM's robust railway computers, VTC 7220-R series, are compact yet powerful in enhancing passenger safety and amusement. The Intel® Core™ i7-4650U processor, maximum 4TB storage support, plus EN 50155 certification allow VTC 7220-R reliably to stream and store 24/7 surveillance footage or on-demand entertainment in HD. Rich I/O interfaces simplify onboard system integrations with video analytics so that transportation authorities can identify suspicious incidents or malfunctioning systems in time, keeping operations safe and sound.

VTC 7220-R provides superb performance for not only running video analytics, but also supporting surveillance and instant playbacks in full HD. Crystal clear surveillance footage and video analytics combined deliver wide coverage in great detail and accuracy of detecting suspicious activities, thus improving overall security. In addition to safeguard passenger safety, the VTC 7220-R series can be used to stream in-seat entertainment systems, thus enhancing passenger delight. It also supports two 2.5-inch hard disks with up to 4TB capacities in total. This large capacity helps store HD multimedia files or full HD surveillance recording for 7 days from up to 4 cameras at 30fps. Better still, the hot swap design enables fast replacement while the vibration-resistant mechanism delivers alternatives to SSD.

Equipped with lockable connectors, VTC 7220-R ensures uninterrupted power supply and I/O connectivity from vibrations. Rich I/O interfaces including GPIO, CAN Bus, LAN, and USB simplify integrations between surveillance and onboard systems including door systems, cockpit access control readers, passenger information displays, fire alarms, and emergency intercoms.

- Powerful Intel® Core™ processor i7-4650U
- Dual externally accessible SATA 3.0 SSD/HDD
- Built-in CAN 2.0B. Optional CAN/OBDII module
- EN 50155 compliant
- Rich expansion capability for 4 x mini-PCIe socket
- Voice communication via WWAN module

VTC 7220-R

10 VTC 6210-R

Triple SIM and Dual WWAN Rolling Stock Computer

Designed for rolling stock environments, VTC 6210-R is EN50155 certified for reliable operation and features quad-core Intel® Atom™ processor E3845 (1.91GHz) in a rugged, fanless and compact design.

VTC 6210-R equips a built-in CAN bus 2.0B interface to provide complete communication capability with automotive parts, and features PAN, WLAN and WWAN connectivity options to support a range of wireless applications. Furthermore, the WWAN connection supports dual 3G module with three SIM cards, which can be used to provide combined bandwidth for faster data transmission, or as a failover backup connection. In addition to data communication, VTC 6210-R also supports two-way voice communication.

Equipped with intelligent power management, VTC 6210-R can be waked on by ignition, RTC timer or SMS message remotely. By integrating a variety of I/O ports and 3 mini-PCIe sockets, VTC 6210-R offers the flexibility to meet the demands for different rolling stock applications, such as infotainment, dispatching system and video surveillance.

- Quad-core Intel® Atom™ processor E3845, 1.91GHz
- Dual WWAN module support with SIM switching & voice communication
- EN50155 certification
- 3 x mini-PCIe socket expansion
- Rich I/O with isolation (4 x GPIO + 3 x COM)

VTC 6210-R

11 NDiS A322

Robust All-in-one Passenger Information Signage

NDiS A322 is emerging as a useful tool in enhancing transportation experience from a passenger point of view, while making the process easier for transportation conductors. NDiS A322 can engage passengers with real-time messages, tourist guidance and public information, while companies can use NDiS A322 to deliver dynamic advertising to improve branding and exposure.

- Intel® Celeron® processor N2807
- Wide-range power input of 9V to 36V DC
- Front bezel compliant with IP54
- Tempered glass
- Support Wi-Fi, 3G and GPS modules

NDiS A322

12 NDiS B325

4K2K Digital Signage Player Based on Intel® Celeron® Processor N3150

Powered by Intel® Celeron® processor N3150, the NDiS B325 digital signage player integrates new Intel® HD Graphics that can support 4K x 2K resolution and Microsoft DirectX® 11.1. Taking advantage of the latest Intel technology, NDiS B325 can accelerate 3D rendering, image processing and video decoding to provide highly personalized information based on the result of audience measurement to deliver accurate marketing messages to target audiences. In addition, it is able to withstand operating temperatures from -20 to 60 degrees Celsius. NDiS B325 is ideal as an entry level digital signage player for advertising, hospitality and brand promotion application.

- Intel® Celeron® processor N3150
- HDMI (4K Resolution) and VGA independent displays
- USB 3.0 support
- WLAN support
- Compact and fanless design
- Wide temperature support from -20°C to 60°C

NDiS B325

13 NDiS B535

Create Resonating Experiences in Responsive Stores

NEXCOM fanless digital signage player NDiS B535 gives retail stores a technology makeover to help increase sales, build customer loyalty, and optimize floor design. Featuring 6th generation Intel® Core™ processor (codename Skylake), NDiS B535 is outfitted for responsive stores which can reach out to customers through personalized in-store offers, help monitor on-shelf availability, and track foot traffic among others.

The NDiS B535 provides profound intelligence with quad-core Intel® Core™ i7-6700TE or i5-6500TE processor, built-in Intel® HD Graphics, and support for 16GB of DDR4 2133 memory. Capable of parallel, intensive data- and graphic-processing, NDiS B535 can run in-store

promotions while pushing membership rewards to nearby mobile devices, detecting foot traffic and customer demographics, and conducting inventory counts in the background.

For in-store promotions, NDiS B535 supports creative, videogame-like, 4K2K contents with the unified display output of three HDMI 2.0 ports, accelerated media codecs including HEVC, and the latest API support such as Microsoft DirectX® 12. To interplay with its surroundings, NDiS B535 has a diverse set of interfaces to connect to IP cameras, product tags, and ambient detectors.

NDiS B535 also enables integration with retail systems. With network connectivity, in-store data put together by the digital signage player can be uploaded to retail systems, helping with day-to-day operations ranging from promotion result review and floor plan improvement to stock level management.

- 6th generation Intel® Core™ LGA socket type processor family, up to 35W, with integrated Intel® HD530 Graphics
- Smooth 4K2K content playback via 3x HDMI 2.0 outputs
- Diverse I/O set including 6x USB3.0, 4x RS-232, 2x GbE LAN
- Expansion supports with NFGG M.2 and mini-PCIe
- Fanless design for high system reliability

NDiS B535

14 NDiS M535

Easy-to-manage OPS Player Escalates Informative Travel Experiences

NEXCOM's high-performance OPS player brings clearer passenger information to large displays at airports and stations for enhanced viewing experiences and engagement. Powered by 6th generation Intel® Core™ processor i5-6440EQ (codename Skylake-H), the NDiS M535 delivers personalized, up-to-date information and 4K video while its remote manageability makes it easy to deploy, monitor, and manage.

With latest Intel® HD Graphics and HEVC codecs, the OPS player bolsters triple independent outputs supporting 4K display with 60Hz refreshing rates. Higher refreshing rate allows flight information display systems (FIDS) to play smooth and crystal clear flight information, which enhances a more pleasant, non-flickering viewing experience.

NDiS M535 accelerates active engagement, suitable for interactive kiosks. Dual channel DDR4 SO-DIMM memory sockets with up to 16GB at 2133MHz dash high-speed responsiveness while fast USB 3.0 ports facilitates interactive peripherals including touchscreen displays, cameras, and access control readers via RFID, NFC or fingerprints. Coupled with 3G, 4G, or Wi-Fi modules, the NDiS M535 can effectively guide passengers to their destination or duty-shop purchase with up-to-date and personalized information such as discounts, real-time flight/train information, wayfinding assistance, and weather forecast.

For large-scale deployment in airports and transportation terminals, the NDiS M535 features plug-in OPS design and shrinks installation lead-time. Upfront HDMI 2.0 and DisplayPort ports add compatibility with both old and new displays. With Intel® AMT, NDiS M535 can be remotely powered on and off while offering out-of-band system access, and remotely accessed and diagnosed. The software issues can be repaired wirelessly while failed hardware components can be identified in advance for preventive maintenance, thus lowering maintenance costs and onsite visits.

- High-performance Intel® Core™ processor i5-6440EQ and Intel® HD Graphics
- Support next-generation codecs HEVC
- Triple independent video outputs supporting 4K at 60 Hz
- Dual SO-DIMMs for up to 16GB of DDR4 2133MHz
- WWAN/WLAN/TV Tuner support

NDiS M535

15 DNA 1510

Secure Plant Operations with Strengthened Endpoint Protection

Industry firewall platform DNA 1510 helps manage security risks coming with the industrial internet of things (IIoT). In hostile industrial environments the industrially hardened DNA 1510 provides close and strict protection for industrial machinery and control systems,

reliably guarding industrial networks from both external intruders and internal threats.

To strengthen the implementation and enforcement of security policies, the DNA 1510 powered by Cavium OCTEON® III CN7010 processor is equipped with dedicated hardware acceleration engines handling networking and security workload. With enhancements in networking, load balancing, quality of service (QoS), deep packet inspection (DPI), and cryptography, the DNA 1510 can filter traffic based on granular rules.

Depend on application needs, the DNA 1510 can stop packets sent from illegitimate IP addresses from forwarding, restrict external accesses to demilitarized zones (DMZ), and detect and intercept suspicious messages encapsulated in common packets. The DNA 1510 can also connect remote workers with encrypted communication channels, reducing the risk of data eavesdropping and tampering during the transfer.

- 1.2GHz Cavium OCTEON III CN7010 processor with single cnMIPS64 core
- Onboard 1GB DDR3, up to 2GB and 4GB eMMC, up to 8GB
- Four GbE ports
- Combo copper/fiber connector on WAN and DMZ ports
- Flexible DC power inputs: 12V–72V DC or 12V DC
- Fanless design and extended temperature support (-40°C to 75°C)
- Compact size measuring 160 x 120 x 66

DNA 1510

NEXCOM's Latest Security Surveillance Won High Appraisal at IFSEC

At IFSEC, NEXCOM demonstrated its latest intelligent security surveillance innovations covering from next generation video compression standard H.265 products to ultra-low light and license plate recognition cameras, winning high interest and strong praise from visitors.

NEXCOM's latest HEVC/H.265 camera and large capacity NVR 1410 for security surveillance were among the most sought-after products at IFSEC. NEXCOM's H.265 camera, NCr-661-VHA, supports HEVC/H.265 video compression, which can provide better visual quality than H.264-based solutions on existing networks with increasing storage requirements, as NCr-661-VHA enables fluent transmission of 4K or HD surveillance videos over low network bandwidth with no image pauses. Equipped with a 6MP Sony STARVIS progressive scan CMOS sensor, NCr-661-VHA also brings improvements in noise levels and visual quality as well as enhanced dynamic range.

NEXCOM slim NVR NViS 1410 was also praised for its compact and high performance design along with a rich set of NVR features. Featuring the latest Intel® Pentium® Processor N3700 (formerly codenamed Braswell), 4K footage, smooth playback, latest HEVC decoding technology and up to 6TB surveillance-grade storage, NViS 1410 delivers smooth 4K recording and efficient storage at an economical price for retailers and SMB owners.

Furthermore, NEXCOM ANPR camera NCk-251 also garnered widespread interest at IFSEC. NCK-251 showcased how it can automate license plate reading to identify driver's identity to increase security surveillance. Equipped with built-in recording and analytic functionality, the IP-camera-and-NVR combo camera NCk-251 can process complex image and analyze captured video, providing accurate and timely information to operators to improve business operations. Its installation-friendly design makes installation in parking lots easy.

NEXCOM IoT Automation Solutions Expedite Transformation

NEXCOM demonstrated its Industry 4.0-enabled IoT Automation Solutions at 2015 TAIROS (Taiwan Automation Intelligence and Robot Show) and came out as one of the brightest stars at the event. Amid the various IP-based IoT automation solutions presented, the automated system for wet wipe packing line and interactive robot solution won high appraisals from visitors. In addition, NEXCOM had signed a collaboration memorandum with HIWIN Technology and Fuburg Industrial in co-developing robot solutions for paper-based industry to help the industry transform into smart manufacturing.

To embrace Industrial Internet of Things (IIoT), from traditional to electronics manufacturing, many companies are eager to introduce robots to lower labor demand which may drastically shift based on orders, to secure productivity and to increase production efficiency.

A company's packaging lines for wet wipe, for instance, may require 12 to 15 workers each while eight are deployed to perform detail-oriented resealable packing tasks. To release manpower from reseable packing tasks, NEXCOM has designed an automated system comprising delta robots and EtherCAT master stations to coordinate PLCs, conveyers, sensors, gluing, and labeling equipment all together. The automated system is expected to reduce manpower requirement by about thirty percent.

To demonstrate the possibility of human-robot collaboration in the near future, the interactive robot solution paired a machine vision and 6R robot arm to showcase how robots can follow audiences' instructions to pick up their preferred facial masks via color recognition. The solution is aimed to be applied in packaging inspection or components classification.

In addition, NEXCOM's EtherCAT master solution also attracted tremendous attentions. To ride the trend of distributed motion control, NEXCOM's EtherCAT master solution features a high performance PC-based controller and NEXCOM NexECM software pack to provide industrial real-time EtherCAT motion control and application programming interface to help implement user-customized control algorithms. The solution is designed to offer developers unprecedented flexibility in building a machine tool that moves as it is intended.

With NEXCOM Industry 4.0-ready IoT Automation Solutions enabling data exchange among field devices and the cloud, manufacturers now can apply Data-driven decision making (DDDM) to increase competitiveness, improve the bottom line, or anticipate trends.

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