The network functions platform company
Virtualized app delivery and security
Rodolf Schmit – RISK 2019 Event - Lasko
Array At-a-Glance

**Headquarters**  
Milpitas, CA

**Employees**  
250+

**Technology**  
30+ Patents

**Focus**  
Virtualized Application Delivery and Security

**Products**  
- Network Functions Platforms (NFV)
- Application Delivery Controllers (ADC)
- Secure Access Gateways (SSL VPN)

**Segments**  
Enterprise, Service Provider, Public Sector

**Markets**  
North America, China, Japan, India & EMEA

**Customers**  
5000+ Worldwide
Array Networks Product Portfolio

Hyper-converged networking, security and application delivery

Maximum performance and scalability in the enterprise data center

Hyperconverged and virtualized networking and security solutions

Offer networking and security as a service on premises or hosted

On-demand utility consumption for AWS, Azure, VMware, etc.
Virtualized app delivery and security

Application Delivery (ADC)
- High availability
- Traffic management
- Performance
- Secure access
- Multi-tenancy and consolidation
- Agility with guaranteed performance
- Accelerated service provisioning
- Flexible service chaining

SSL VPN Remote Access

Network Functions Platform

3rd Party Ecosystem

Secure App Delivery
Providing a fast, always-on user experience

Evolving to Virtual Appliances
Solving performance and complexity challenges

Enterprise NFV
Creating a foundation for the future
Evolving towards virtualization

- Virtual ADC leases -MSP
- Virtual ADC
- ADC SLB
- ADC AP Mobile Data
- ADC Advanced Platform
Pros and cons of virtual appliances

**PROS**
- Flexibility and portability
- Orchestration friendly
- Pay-as-you-go/grow
- Avoids vendor lock-in
- Choice of hardware
- Space, power and cooling

**CONS**
- Performance penalty and scalability issues
- Organizational disruption
- Skills deficits
- Complex isolation and troubleshooting
- Hidden hardware and hypervisor costs
Eliminate the trade-off with Array!

Network Functions Platform

- Virtualized
- Multi-tenant environment
- Vendor neutral

- Simple
- Guaranteed performance
- Affordable
The Network Functions Platform

SHARED ENVIRONMENTS

Variable Size VMs
Mix and match 32 entry, 16 small, 8 medium or 4 large virtual appliances

Pay-As-You-Grow
Purchase and deploy virtual appliances in proportion to business requirements

Multiple Network Functions
Deploy ADC, WAF, SSL VPN, DDoS and other functions from Array or 3rd party vendors

Management Automation
Integrate with existing MNS and cloud management platforms via RESTful APIs

GUARANTEED PERFORMANCE

Simplified Configuration
Eliminates complexity by automatically assigning virtual appliance hardware resources

Hypervisor Management

Guaranteed Performance
Dedicated CPU, SSL, RAM and I/O per virtual appliance for guaranteed performance
Multi-tenancy and consolidation

Internal Customers (Enterprise)
IT acts as a provider of private cloud app delivery and security services supporting internal projects and departments.

IT must become more agile in its ability to offer robust, on-demand services.

External Customers (CSP & MSP)
CSP or MSP provides load balancing or SSL VPN as an infrastructure service supporting multiple customers.

Provider must accelerate service deployment while minimizing CapEx and OpEx.
Agility with guaranteed performance

SSL Accelerated Virtual Appliances

IT wants a multi-tenant ADC or a virtualized environment capable of significantly higher SSL performance and guaranteed SSL performance per instance.

Support production apps or customer SLAs.

Compute-Intensive vADC Functions

Use case requires multiple ADC functions such as SLB, SSL offload, SSL VPN, LLB, GSLB or WAF. One vADC cannot handle the combined load.

Distribute ADC functions across multiple virtual appliances, each with guaranteed performance.
SSL accelerated virtual appliances

- Network Functions Platforms are uniquely capable of running virtual ADCs with HW accelerated SSL

- For instance, a large vADC is allocated:
  - 8 vCPU
  - 16 GB vRAM
  - 4 IO VFs
  - 4 SSL VFs
Compute-intensive vADC functions

- Each compute-intensive vADC function deployed as an independent virtual appliance with dedicated HW resources

- Interconnect functions to gain:
  - Needed functionality
  - SW agility
  - HW performance
Why Array for virtualized appliances?

**Software-Centric Agility**
Gain the flexibility of virtual infrastructure, with flexible sizing, functions, management and pay-as-you-grow consumption.

**Simplified Deployment**
Eliminate complexity associated with virtual and physical port mapping, CPU pinning, NUMA boundary settings and SR-IOV.

**Cost Efficiency & Value**
Reduce costs associated with space, power and cooling, minimize hardware costs and drive efficiency via agile management.

**Guaranteed Performance**
Reserved CPU, memory, SSL and interfaces per VA deliver hardware-like performance and guaranteed performance.

**Array or 3rd-Party VAs**
Host Array application delivery and security virtual appliances, or virtual appliances from other networking and security vendors.
“NFV in a box”

Any Network Function
- Array or 3rd-party functions
- Certified Platform-Ready Program
- App delivery, security or networking
- Pay-as-you grow – purchase and deploy functions as needed

Guaranteed Performance
- Reserved HW resources per virtual network function (VNF) or virtual appliance (VA)
- Dedicated vCPU, vRAM, SSL VF and IO VF per VNF or VA

Plug & Play Simplicity
- Eliminates the need for specialized server or virtualization expertise
- Abstracts complex configuration tasks such as CPU pinning, NUMA boundary settings, SR-IOV and physical and virtual port mapping

Intuitive Orchestration
- Visually interconnect VNFs and VAs via an administrator-friendly WebUI
- Integrate with existing MNS and cloud management via RESTful APIs
- Deploy as a node within OpenStack
Deploy Array, 3rd party or Open Source Software

- Array Software:
  - ADC
  - SSL VPN
  - WAN

- 3rd Party Software:
  - WanOp
  - NGFW
  - ADC
  - FORTINET
  - Fortinet
  - FS
  - A10

- Open Source Software:
  - HAPROXY
  - ubuntu
  - LINUX
  - LINUX

ArrayOS

AVX Series Hardware
Intuitive orchestration

Platform Overview | Service Chaining | Create VNF | Configure

Network Functions

Virtual Networking

External Nodes

Policy-Based Service Chain Flows

1

2

3

Create New Service Chain
How can Array help you today?

**Application Delivery & Security**
- High-availability, performance and security for business-critical apps
- Secure remote, mobile and cloud access

**Multi-Tenancy & Consolidation**
- Gain the benefits of virtualization while avoiding the pitfalls of performance and complexity
- Achieve agility at scale

**Enabling NFV Adoption**
- Solve app delivery and virtualization challenges while laying a foundation for NFV
- “NFV in a Box”

Array provides an industry-leading combination of features, performance, ease-of-use, value and future-proof deployment models.

Array offers unique support for SSL accelerated virtual appliances and guaranteed performance in shared environments.

Array offers plug-and-play simplicity with support for any network function, intuitive orchestration and guaranteed performance.
AVX Platform Models

AVX x600 Series

AVX 3600

AVX 5800

AVX 7600

AVX 7800

AVX 9800

New AVX x800 Series
## AVX x800 Platforms: Performance & Scale

<table>
<thead>
<tr>
<th>Network Functions Platforms</th>
<th>AVX 5800</th>
<th>AVX 7800</th>
<th>AVX 9800</th>
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<tbody>
<tr>
<td>Number of Pre-defined VAs</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Number of Large Instances</td>
<td>1</td>
<td>2</td>
<td>4</td>
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<tr>
<td>Number of Medium Instances</td>
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<td>4</td>
<td>8</td>
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<tr>
<td>Number of Small Instances</td>
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<td>16</td>
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<tr>
<td>Number of Entry Instances</td>
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<td>16</td>
<td>32</td>
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<tr>
<td>Max System Performance &amp; Scale</td>
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<td></td>
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<tr>
<td>Max L4 CPS</td>
<td>750K</td>
<td>1.5M</td>
<td>3.0M</td>
</tr>
<tr>
<td>Max L4 Throughput</td>
<td>40 Gbps</td>
<td>80 Gbps</td>
<td>160 Gbps</td>
</tr>
<tr>
<td>Max SSL TPS (2K Key)</td>
<td>40K</td>
<td>80K</td>
<td>160K</td>
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<td>Max SSL Throughput</td>
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AVX Series Vs. The Competition

**Network Functions Platforms**
Open platform, purpose-built to run networking and security VAs; simple, high-performance and cost-effective.

- Eliminates the need for virtualization expertise; automates partitioning of system resources to deliver guaranteed HW-like performance SLAs.

**COTS Generic Servers**
Perceived as cheap and dispensable; however, they come with significant complexity and performance issues.

- Requires expertise in HW components, vendors and versions, open source SW, SR-IOV, DPDK, drivers, partitioning cores, sizing, resource allocation, etc.

**Similar Platforms**
Products similar in messaging and/or concept, such as Cisco ENCS 5000, Citrix SDX or EOL products like Crossbeam.

- Suffer from same deficiency as generic servers, typically support or emphasize proprietary vendor functions, come with a premium price tag.
Some Use Cases

The network functions platform company
EverBright Bank

4xAVX7600

Multi-tenancy and Consolidation
Due to load fluctuation, most hardware procured will be idle in non-peak hours
AVX and vAPV enable flexible ADC capacity for multiple apps
vAPV only

Guaranteed Performance
SSL performance is a must; therefore making all other VNF solutions unacceptable
Single platform enables multiple apps for ease of management and easy capacity planning

CAPEX and OPEX Savings
Less than half the cost of standalone HW
Dynamic Security Policies

Apply different security policies to different user groups

- Hillstone vNGFW; Array vAPV, vxAG and vWAF
- Internal users access via SSL VPN; external users filtered through WAF
- Software-defined security

Guaranteed Performance

- NGFW, SSL VPN, LLB, WAF functions all perform equal to a standalone hardware appliance
- Single platform enables multiple security functions for ease of management

CAPEX and OPEX Savings

- Less than half the cost of standalone HW
- Quickly and easily react to new or changing requirements
Network Functions Virtualization
Use VNFs to replace hardware VoIP gateways
Deployed Cisco CSR1000v and Silverpeak VX-1000
VoIP and video conferences for employees

Guaranteed Performance
With vSwitch, Cisco vRouter can reach 500Mbps throughput
SR-IOV will improve performance even better
Single platform enables multiple networking functions for ease of management

CAPEX and OPEX Savings
Significant CAPEX savings compared to hardware approach
Fits into company IT strategy
The network functions platform company
Thank you!