A10 Networks
Application Delivery Controllers (ADCs)

A10

Reliable Security Always™

Technical Innovation Trends

UBIQUITOUS HYBRID CLOUD INFRASTRUCTURES

RAPID ADOPTION OF DEVOP TOOLS AND METHODOLGIES

MACHINE INTELLIGENCE WITH PER APP ANALYTICS

APP LAYER SECURITY AND ADVANCED CIPHERS

IT DEPARTMENT

GLOBAL CENTRALIZED MANAGEMENT SOLUTIONS

SCALABLE HARDWARE AND VIRTUAL PLATFORMS
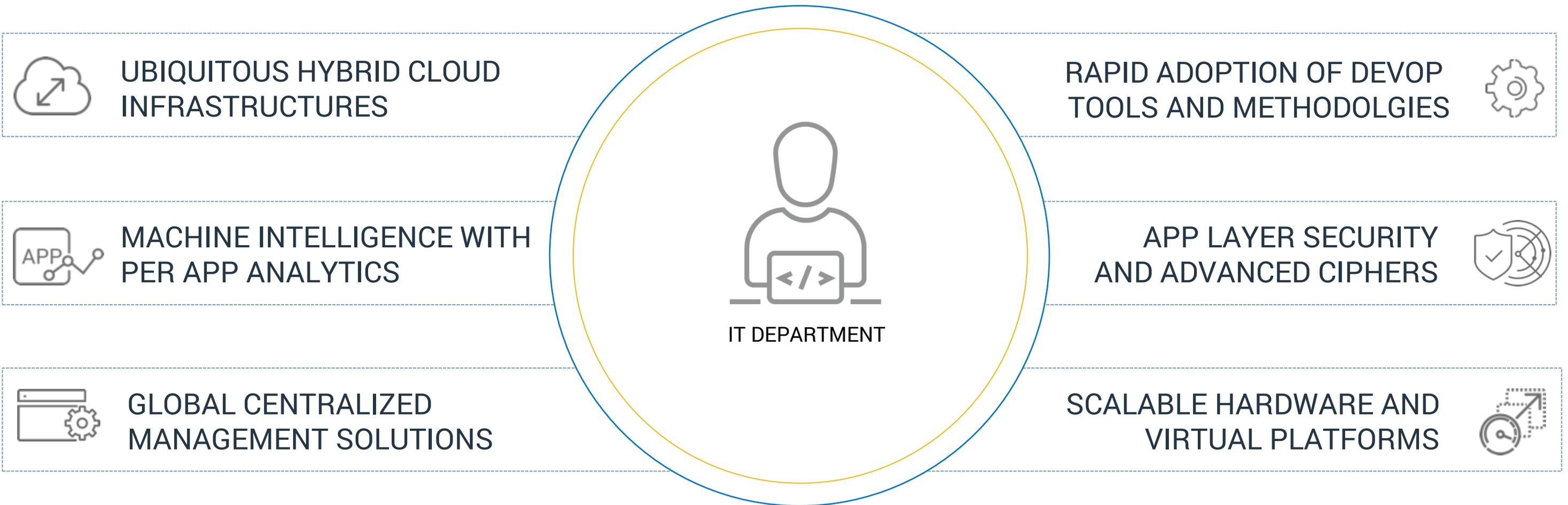
Changing Fundamental Market Dynamics

30+ billion connected devices by 2020

185 billion mobile app downloads by 2020

APP

Internet Traffic Exceeds 120K Exabyte by 2017

50 Fold Growth in Digital Content in 10 year span

More delivery mechanisms

More users and more choices

More challenges impacting IT infrastructure

Cloud Applications Proliferating

APP

4.5 *Million Apps*
on Apple and Google Stores

86% *of Workloads*
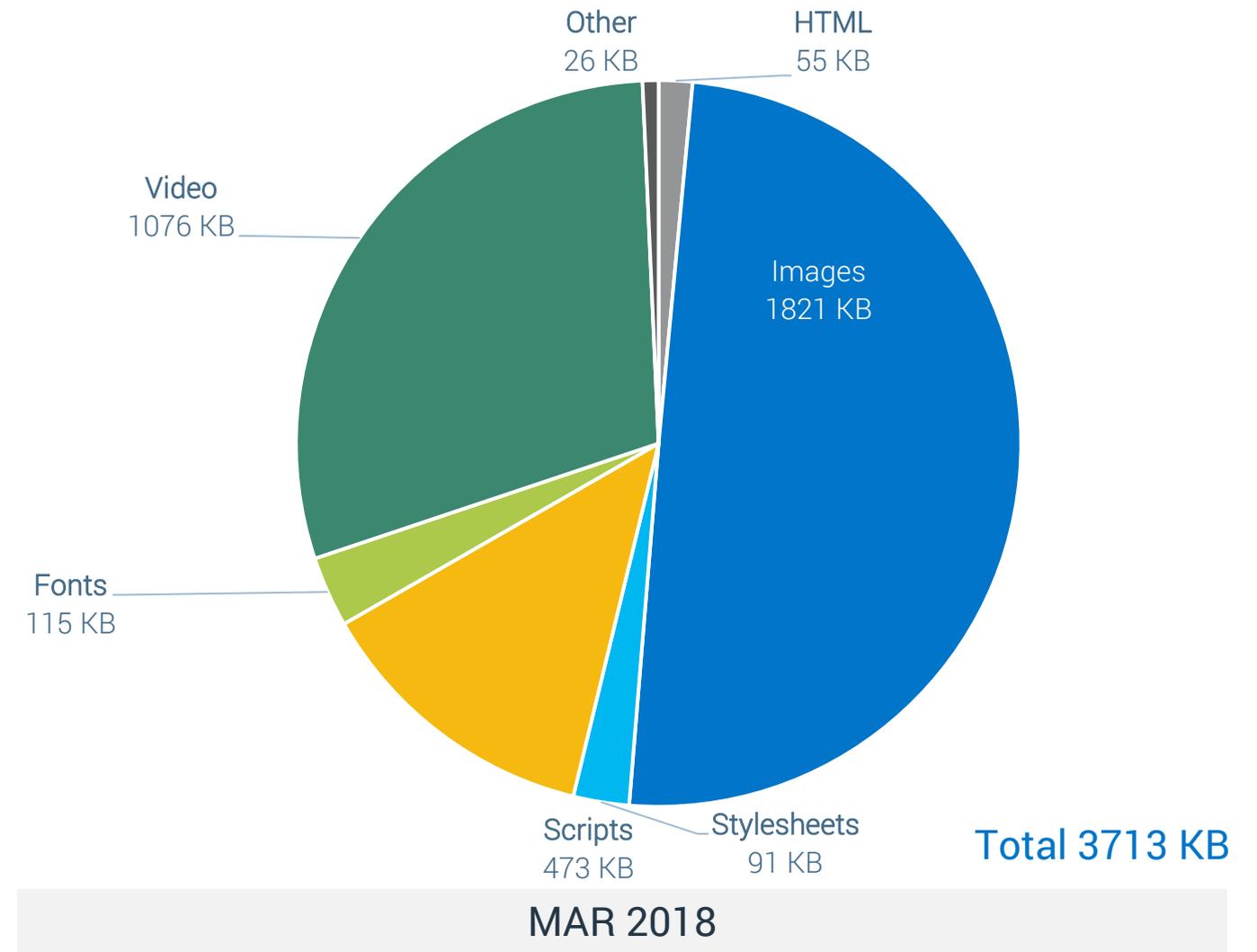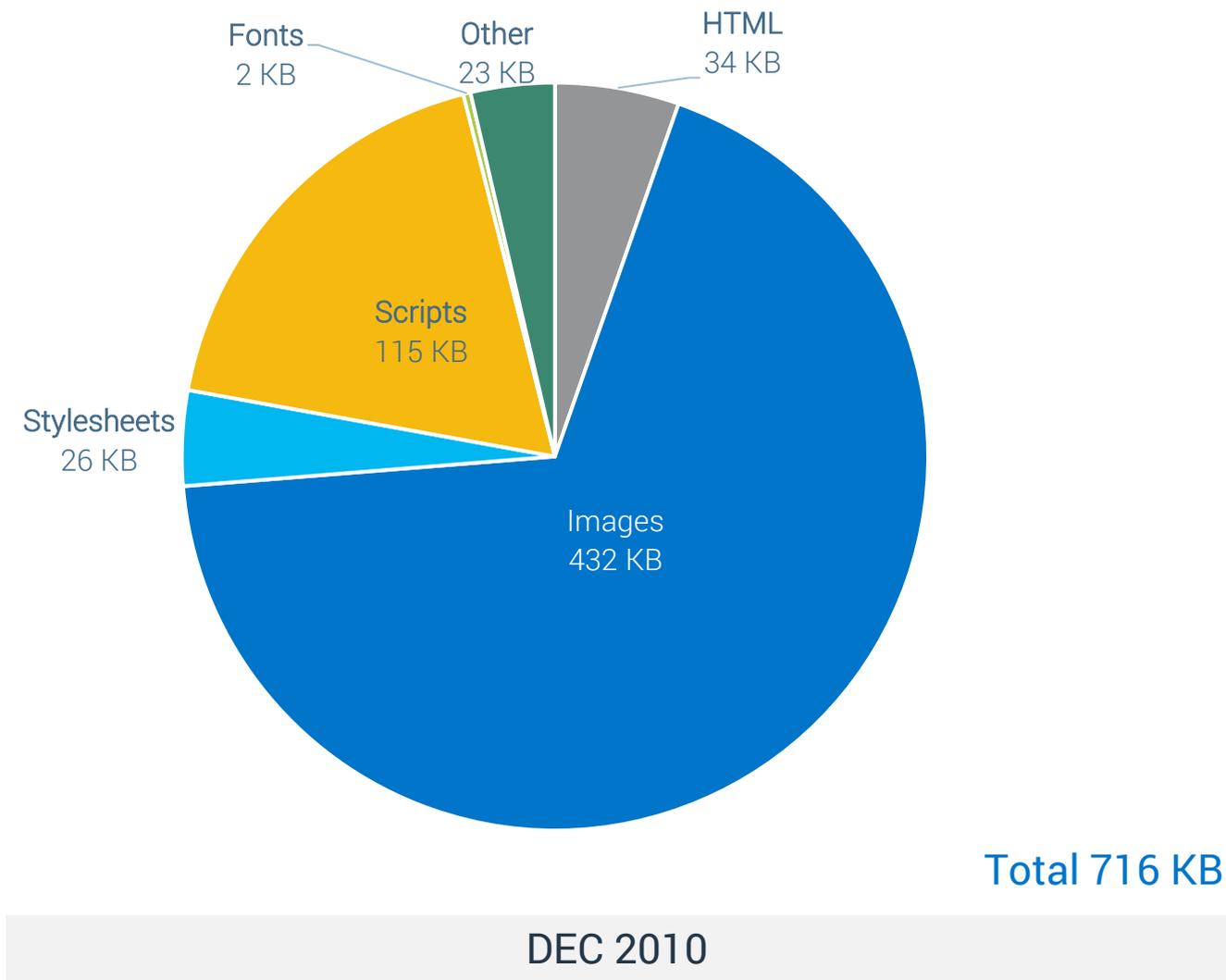will be cloud based by 2019

6.1 *Billion*
Smartphone Users by 2020

71% *of Enterprises*
Have Implemented Hybrid Clouds

A10

More Website Content: Increased 5x in Seven Years

Average Bytes per Page by Content Type

DEC 2010

- Fonts 2 KB
- Other 23 KB
- HTML 34 KB
- Scripts 115 KB
- Stylesheets 26 KB
- Images 432 KB

Total 716 KB

MAR 2018

- Other 26 KB
- HTML 55 KB
- Video 1076 KB
- Images 1821 KB
- Fonts 115 KB
- Scripts 473 KB
- Stylesheets 91 KB

Total 3713 KB

Source: www.httparchive.org

A10

Multi-Cloud / Hybrid Cloud Adoption is Ramping

86%
of workloads
will be cloud based
by 2019

71%
of enterprises
have implemented
hybrid clouds

Websites Performance Degradation

Have you lost money or visitors due to poor performance or stability on your website during the last year?

Legend: Other (blue) | e-Commerce (green)

Category	Other	e-Commerce
Lost money or visitors	53%	48%
Didn't lose money or customers	15%	28%
Don't know	33%	25%

State of Web Readiness: e-commerce

Shift to Advanced Encryption

Legacy Solution Limits

o Processing complexity rises exponentially
o Increased storage and transmission overhead
o RSA: No PFS support
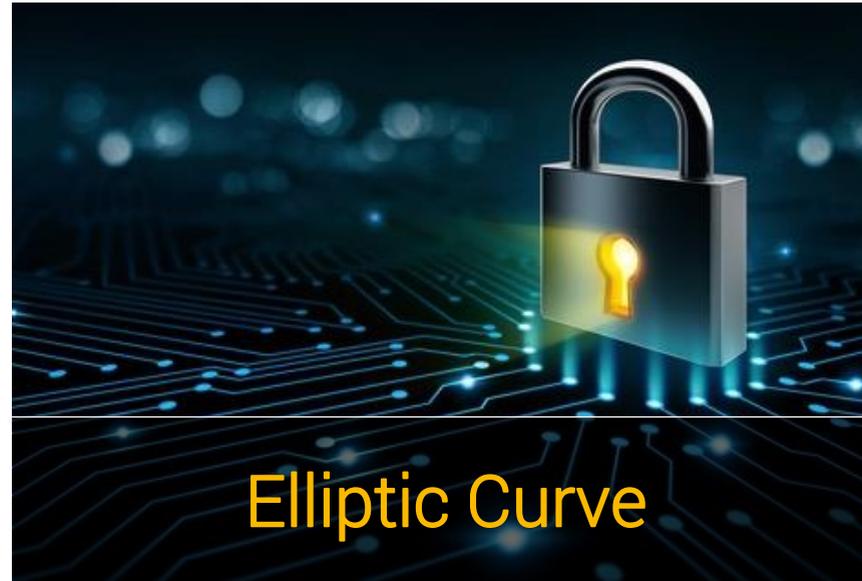
Elliptic Curve

o Superior security with minimal key lengths
o PFS fully supported
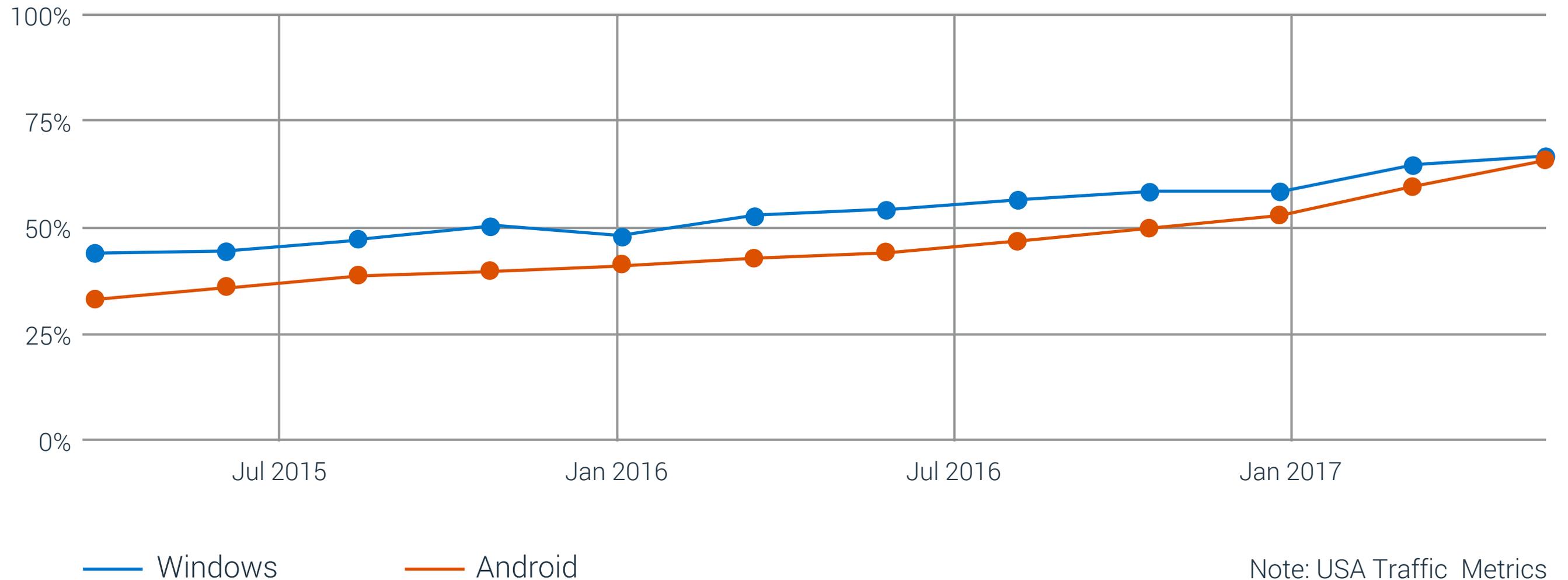o Accelerated signature generation/smaller certs

Rapid Adoption

o Most encrypted traffic is PFS with ECC
o Apple encourages ATS, US NIST recommended
o Google search ranking preference
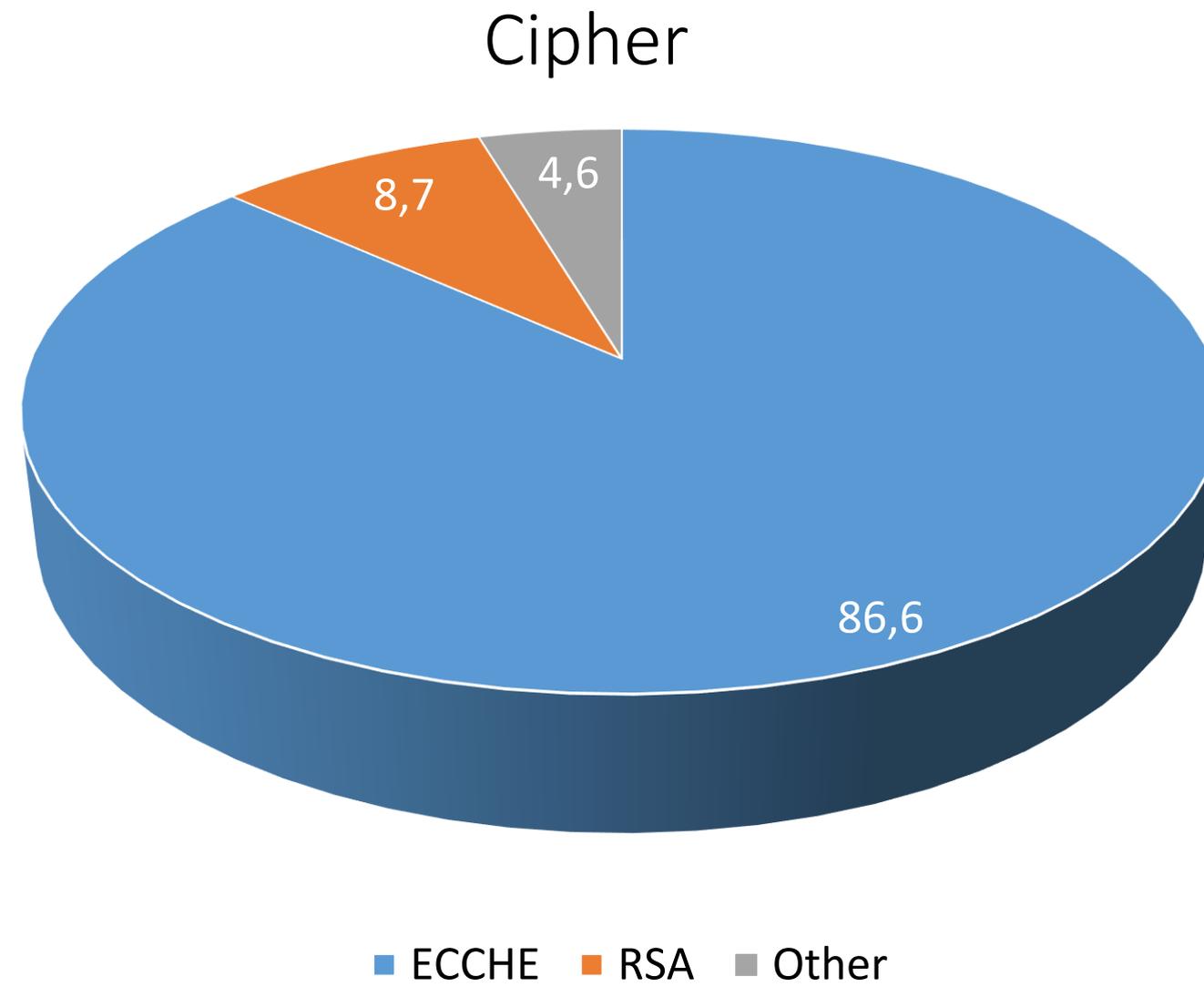
Accelerating Use of SSL Traffic
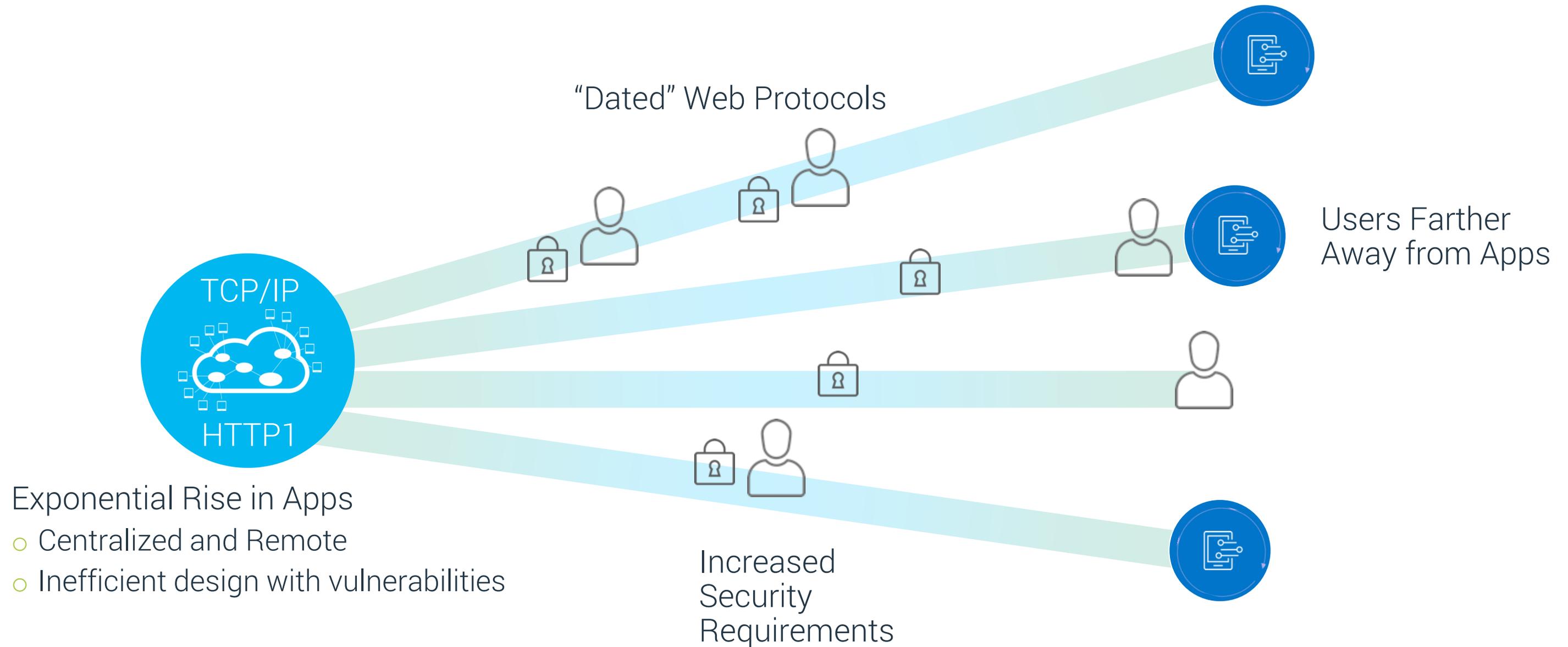
Percentage of pages loaded over HTTPS

— Windows — Android

Note: USA Traffic Metrics
Source: Google

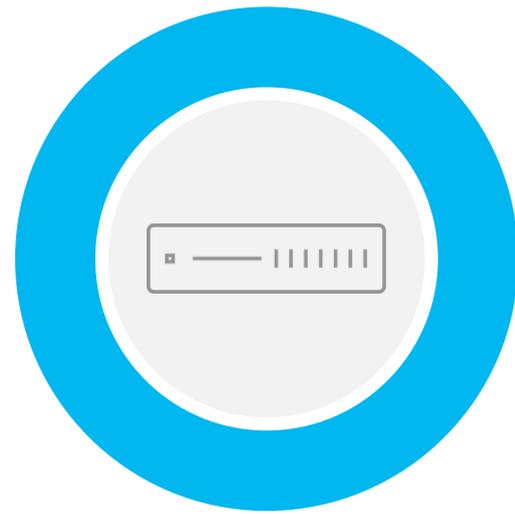# Authentication Ciphers in Use: 86% are Elliptic Curve Based

Cipher

86,6

8,7

4,6

■ ECCHE ■ RSA ■ Other

Traditional Application Delivery Challenges

"Dated" Web Protocols

TCP/IP

HTTP1

Users Farther
Away from Apps

Exponential Rise in Apps
- Centralized and Remote
- Inefficient design with vulnerabilities

Increased
Security
Requirements

A10

Modern App Delivery Challenges: External and Internal

Users

Cloud/Agility/Self Service

Visibility/Analytics

New Ciphers/Compliance

DevOps Support/APIs

Availability/Scale

Flexible Deployment

Internet

SaaS

Public Cloud

Custom App

Data Center / Private Cloud
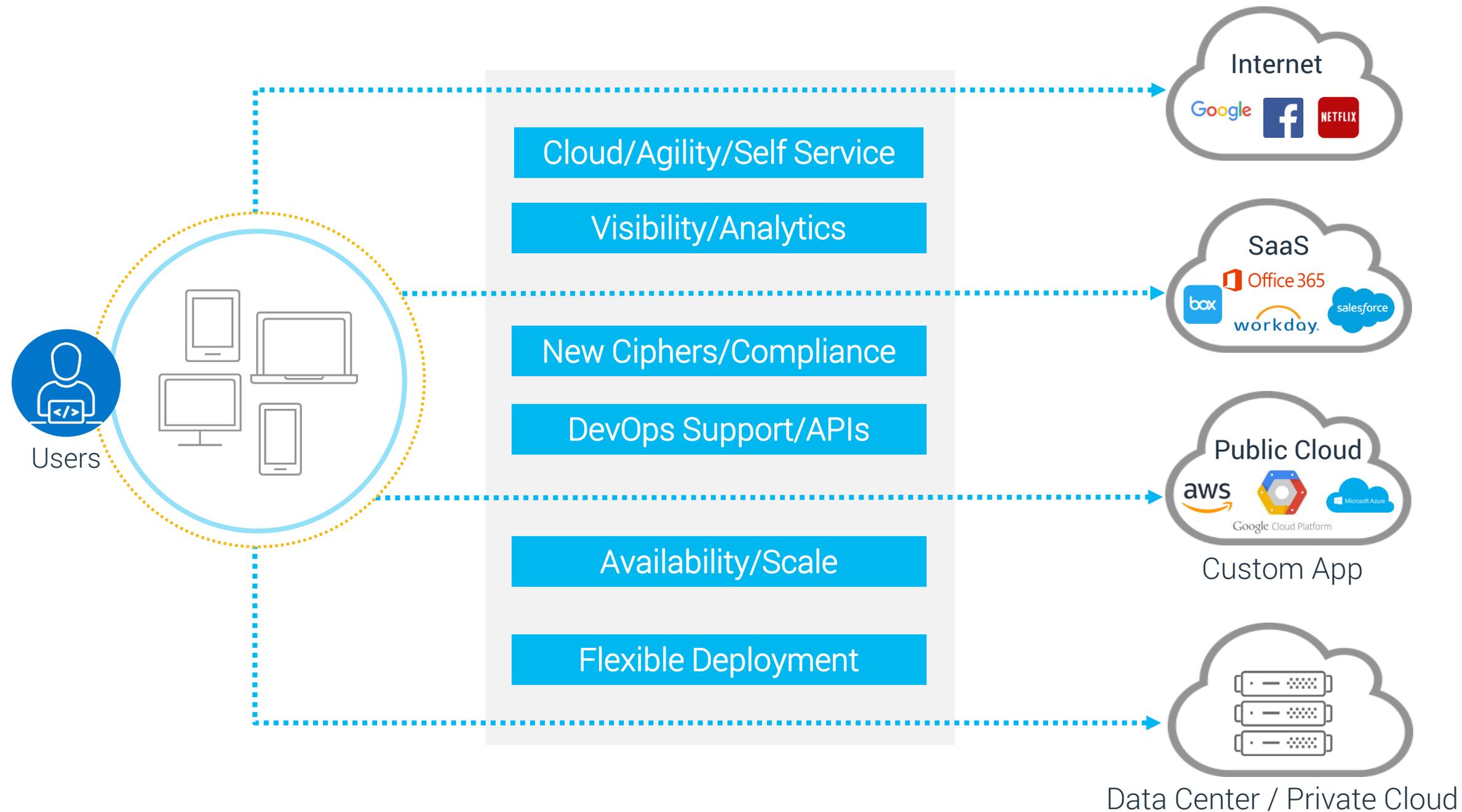
Transformation to 'Mode 2'

On-Premise
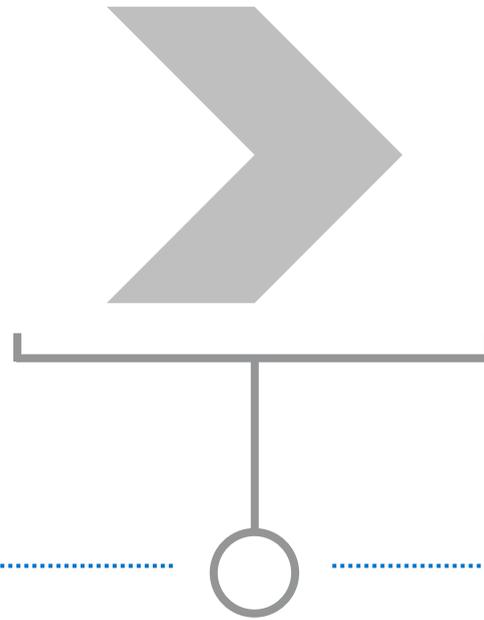
Cloud

On-Premise		Cloud
Monolithic 3-Tier	DEVELOPMENT	Micro-Services. Containers
Data Center	DEPLOYMENT	Public. Private. Hybrid.
IT Led Process	OPERATIONS	DevOps. Self-Service. Agile
Perpetual Instance-based	BUSINESS MODEL	Subscription / Usage

Problems with Current App Delivery Solutions

o Lack of Centralized Control

o Poor Traffic Visibility

o Low Multi-tenant Density

o No Support for SaaS for Added Agility

o Limited Software Options and No Upgradability

o Minimal DevOps processes support

o Absence of complete APIs/Full Programmability

o Reduced Ability to Process Advanced SSL Ciphers

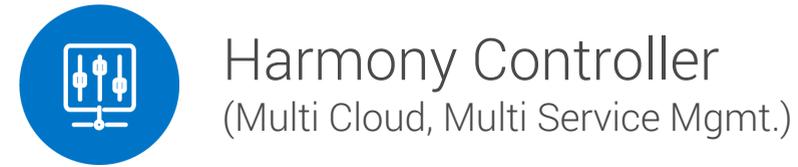# *A10 Solution Overview*

A10 Uniquely Bridges Two Worlds

On-Premise

Cloud

A10 Portfolio: An Overview

aGalaxy
(TPS Mgmt.)

Harmony Controller
(Multi Cloud, Multi Service Mgmt.)

SECURITY
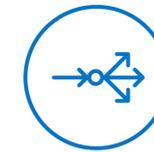
APPLICATION DELIVERY

| TPS | SSLi | CFW | ADC | CGN |

Automation   Policy   Detection

Automation   Self Service   Analytics

Multi-faceted Benefits of Application Delivery Controllers

AVAILABILITY

- Safeguard server uptime
- Scale Web and key infrastructure
- Ensure business continuity
- Minimize server sprawl

ACCELERATION

- Provide fast and responsive services
- Achieve mandated SLAs
- Offload overtaxed servers
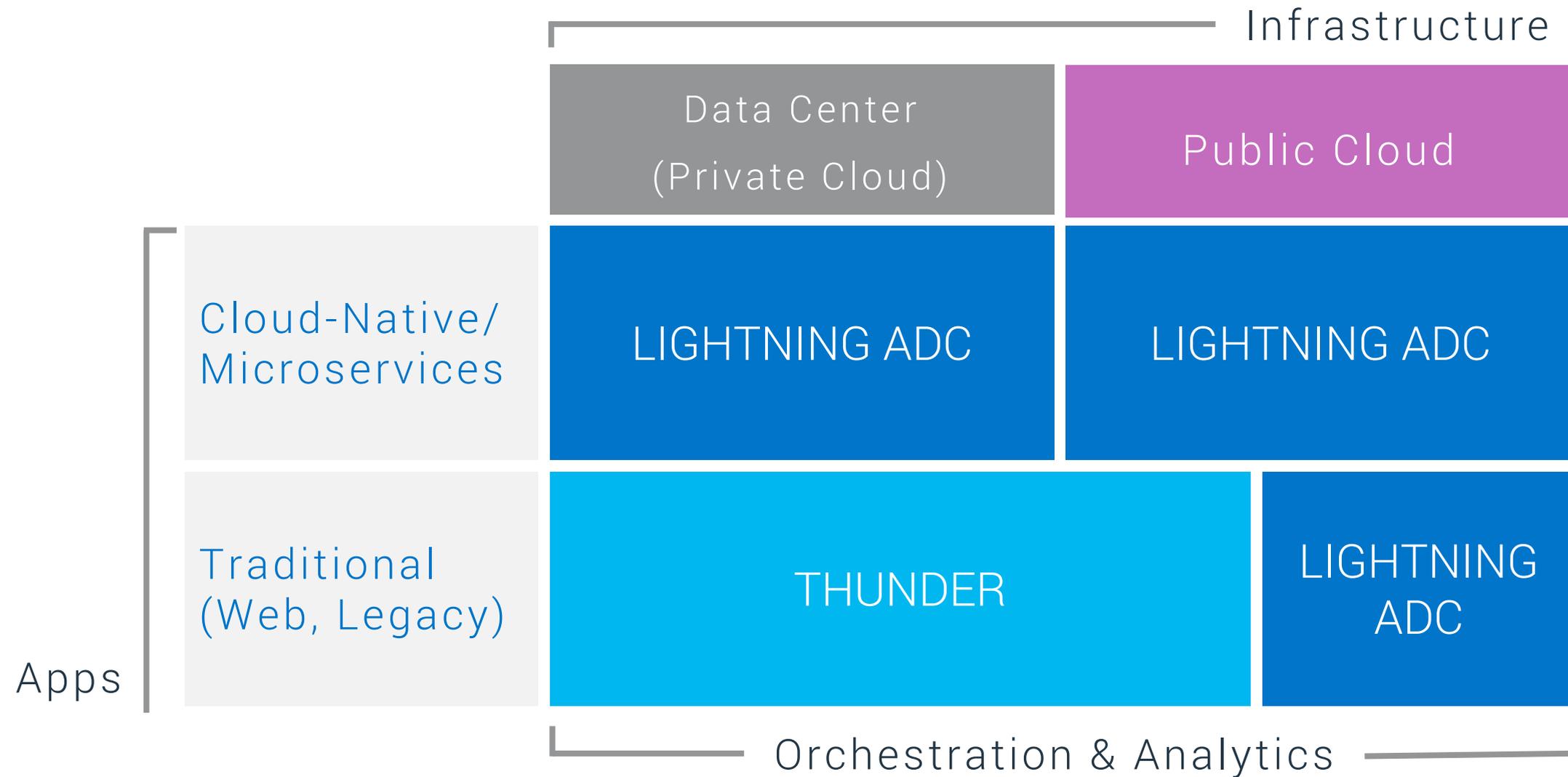- Drive down WAN bandwidth expense

SECURITY

- Process SSL traffic with latest ciphers and upgradability
- Shield against 'day zero' attacks
- Block volumetric DDoS floods
- Exceed compliance standards

MANAGEMENT

- Centralized control with auto scalability
- App profile visibility with analytics and reporting
- Comprehensive DPI & Traffic Management
- Fully programmable with third-party tool integration
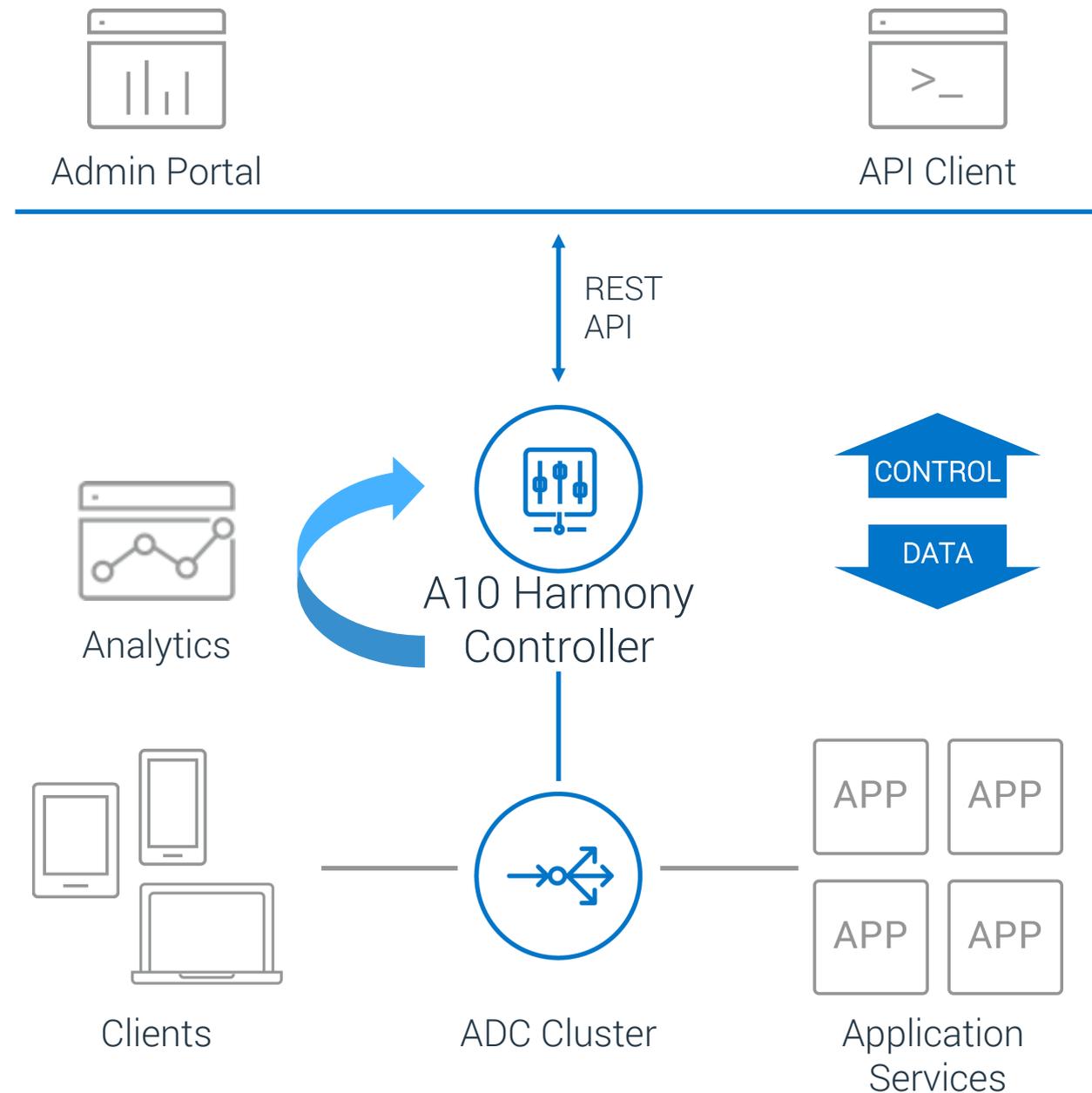
A10: ADCs Deliver Secure Application Services

Infrastructure

	Data Center (Private Cloud)	Public Cloud
Cloud-Native/ Microservices	LIGHTNING ADC	LIGHTNING ADC
Traditional (Web, Legacy)	THUNDER	LIGHTNING ADC

Apps

Orchestration & Analytics

Lightning Application Delivery Services Overview

Harmony Controller

- Offered from A10's SaaS or as self-managed
- Centralized provisioning and configuration
- Full Visibility, Analytics and Reporting
- Multi-tenant portal
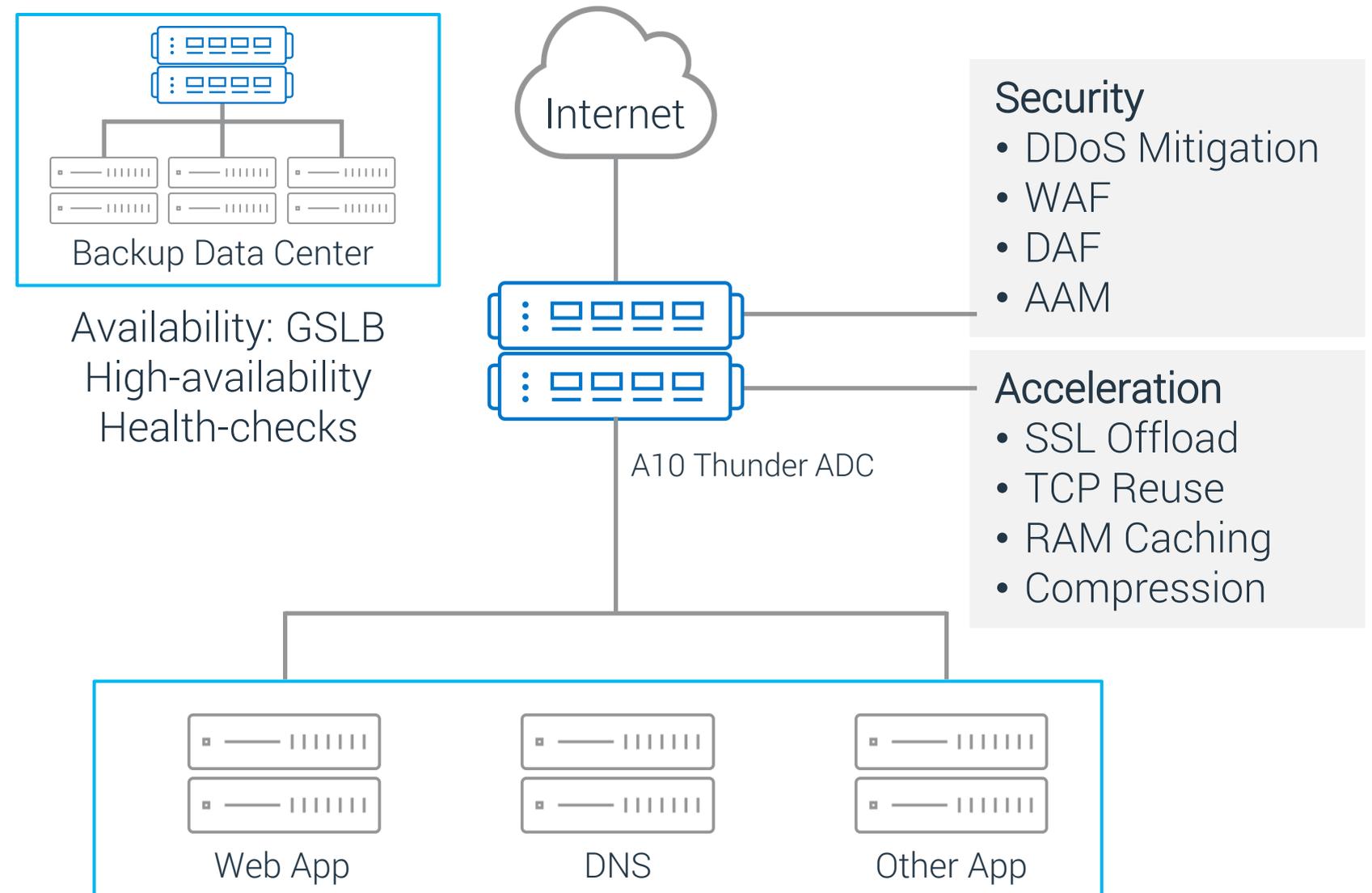- Programmability with REST APIs

Lightning/Thunder ADC

- Public clouds: AWS, Azure, Google
- Scale-out
- Traffic Management
- App Security

Admin Portal

API Client

REST API

Analytics

A10 Harmony Controller

CONTROL

DATA

Clients

ADC Cluster

APP APP APP APP

Application Services

Thunder ADC Product Overview

- Run all features simultaneously
  - Regardless of platform
  - Availability, acceleration and security
- Per-app analytics and visibility
  - With Harmony Controller
- All inclusive license including CGN
- Best performance to price
- Ultra high density partitioning
  - 32 to 1023
- Superior hardware model designs
  - Most CPU cores
  - Factory upgradable SSL option
  - Advanced cipher support
  - SSD for added reliability
- Feature parity
 - Hardware, software and hybrid

Backup Data Center

Availability: GSLB
High-availability
Health-checks

Internet

A10 Thunder ADC

Web App   DNS   Other App

Security
- DDoS Mitigation
- WAF
- DAF
- AAM

Acceleration
- SSL Offload
- TCP Reuse
- RAM Caching
- Compression

ACOS: Best-in-Class Performance Scalability

Efficient & Accurate Memory Architecture

Shared Memory Architecture

64-Bit Multi-Core Optimized

CPU 1   CPU 2   CPU 3   ...   CPU *N*
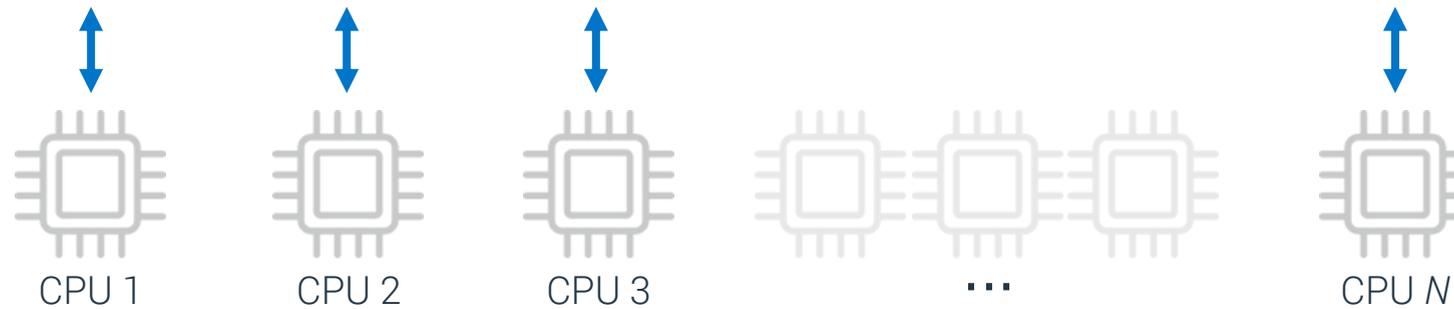
Optimized Flow Distribution

Flexible Traffic Accelerator

Switching and Routing

- o Efficient and Flexible Form Factors
- o High Performance
- o Comprehensive Feature Set

App Delivery Solutions Must Be Multi-layer Fluent

SAP   **ORACLE.**   **Microsoft**®   **IBM.**   **bea**®

XML...SOAP...HTTP...WSDL...JSON...REST...RSS...AJAX...end-user experience...
Mashup...RelTag...SOA...Application Availability...Data theft...RIA...Wiki...Enterprise 2.0

A10 Networks Application Delivery Controllers

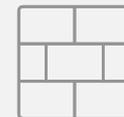**Any User. Any Device Any Location**

Any User. Any Device Any Location

Router   Switch   Firewall

MAC address...Source IP...Destination IP...Source port...Destination port...Ping...
OSPF...RIP...BGP...ACL...DNS...Subnet...802.XX...ARP...ICMP...RTT...SYN...ACK...
Keepalive...SNMP...SSH...SSL...MTBF...Latency...

# Deployment Scenarios

Multi-tenancy Environments

o Web Hosting, Cloud, Service Provider, Enterprise

o Hundreds of apps, clients and services present

o Enables customized services tailored to apps, services and users

o Application Delivery Partitions (ADPs)

- Thunder Hardware up to 1023/appliance

- Bare Metal offers up to 32 partitions/server

- vThunder supports up to 32 partitions/VM

- Two orders of magnitude greater density than alternatives

o Clustering via aVCS scales capacity 8x
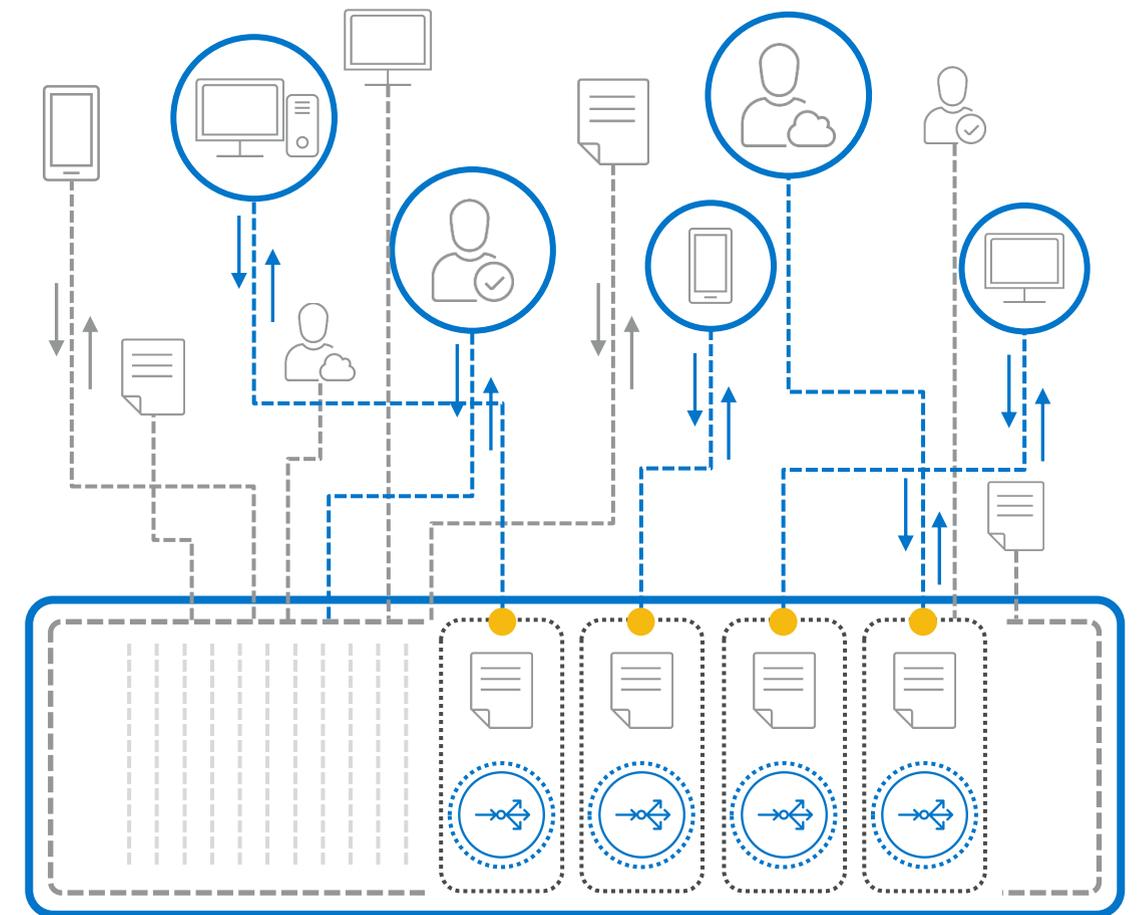
Expand one ADC into HUNDREDS
At No Extra Charge
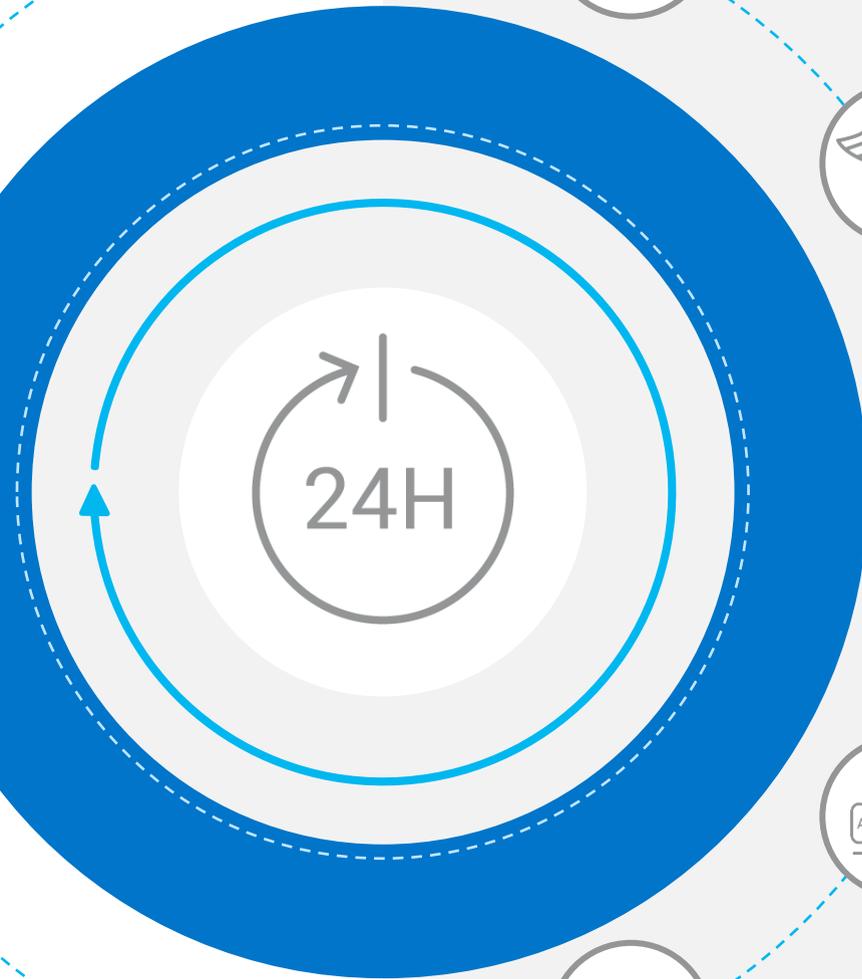
APPLICATION ACCELERATION

For a faster user experience and optimized utilization: ensure service level agreements

TCP Optimization:
Improve application performance

SSL Acceleration:
Secure applications

RAM Caching:
Faster page loads equal more revenue

Compression:
Optimize any bandwidth level

HTTP2.0:
Speeds delivery of apps and data

APPLICATION SECURITY

Enhance existing security infrastructure, and protect against the latest threats

Web application firewall (WAF):
Eliminate common Web attacks

Application Access Management (AAM):
Add authentication seamlessly

SSL Offload:
Superior cipher support

DNS Application Firewall:
Protect critical infrastructure

DDoS and Protocol Anomaly Protection:
Multi-dimensional attack protection

Comprehensive Management Options

Drive operational simplicity and reduce management cost

- HARMONY CONTROLLER
  Analytics/visibility with report generation

- BUSINESS PORTAL
  Global License Manager

- CLI AND GUI
  Ease of Use and Management

- aFleX Scripting
  Comprehensive DPI and traffic management

- aXAPI
  Customizable options with 100% programmability

- aGalaxy
  Centralized and automated operations

- 3RD PARTY INTEGRATIONS
  SDN and Cloud orchestration

- DevOps SUPPORT
  Tool support for accelerated app deployment

- APPLICATION TEMPLATES
  Simplifies configuration

- OTHER MANAGEMENT OPTIONS
  - Application delivery partitions and L3 virtualization (ADP/L3V)
  - Virtual chassis system (aVCS)
  - Selectable number of dedicated CPU cores

A10 Harmony Controller

Simpler Operations and Increased Agility

HARMONY CONTROLLER

Datacenter

ADCs

APP   APP

Cloud

ADCs

APP   APP
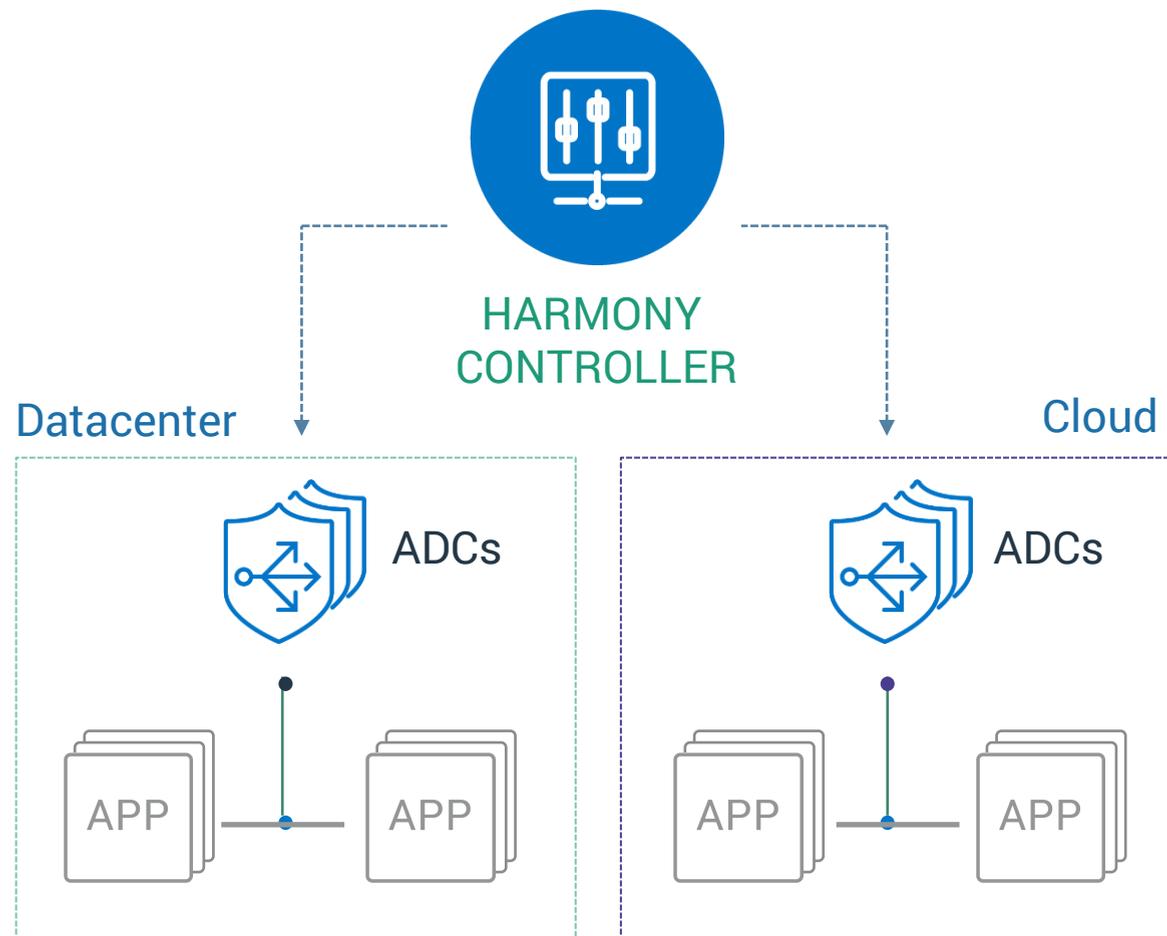
Centralized Management across on-prem and cloud

Automation and Self-Service for App owners

Analytics for Proactive Management and Troubleshooting

Harmony Controller Benefits

o Faster troubleshooting with more confidence

- Visibility and analytics for the application traffic and infrastructure

o Simplified and low effort operations

- Central configuration and policy management for applications and Thunder devices

o Self service and team agility

- Provider Tenant model

o Scalable and platform agnostic installation
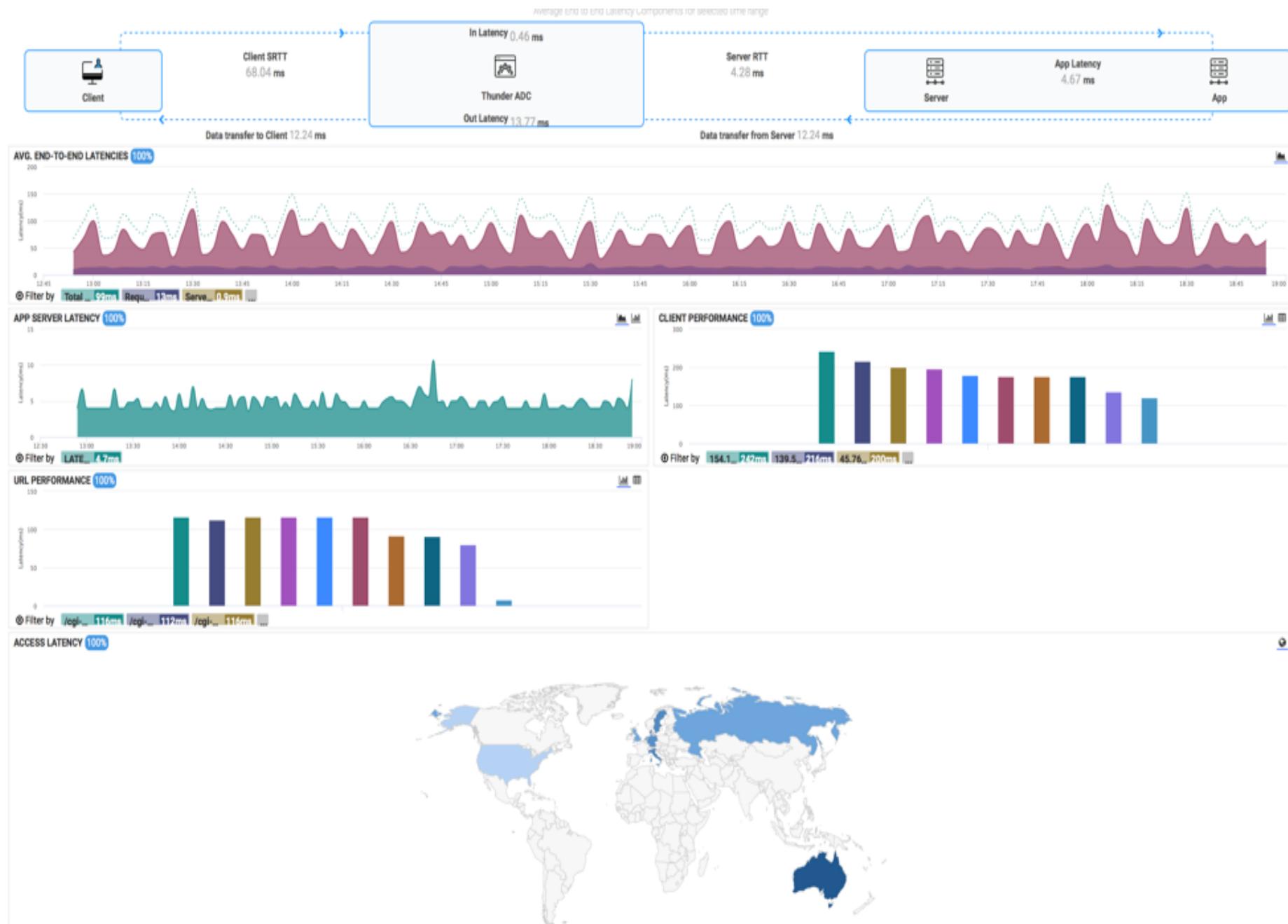
o API driven automation

Per Application Visibility, Analytics & Reporting
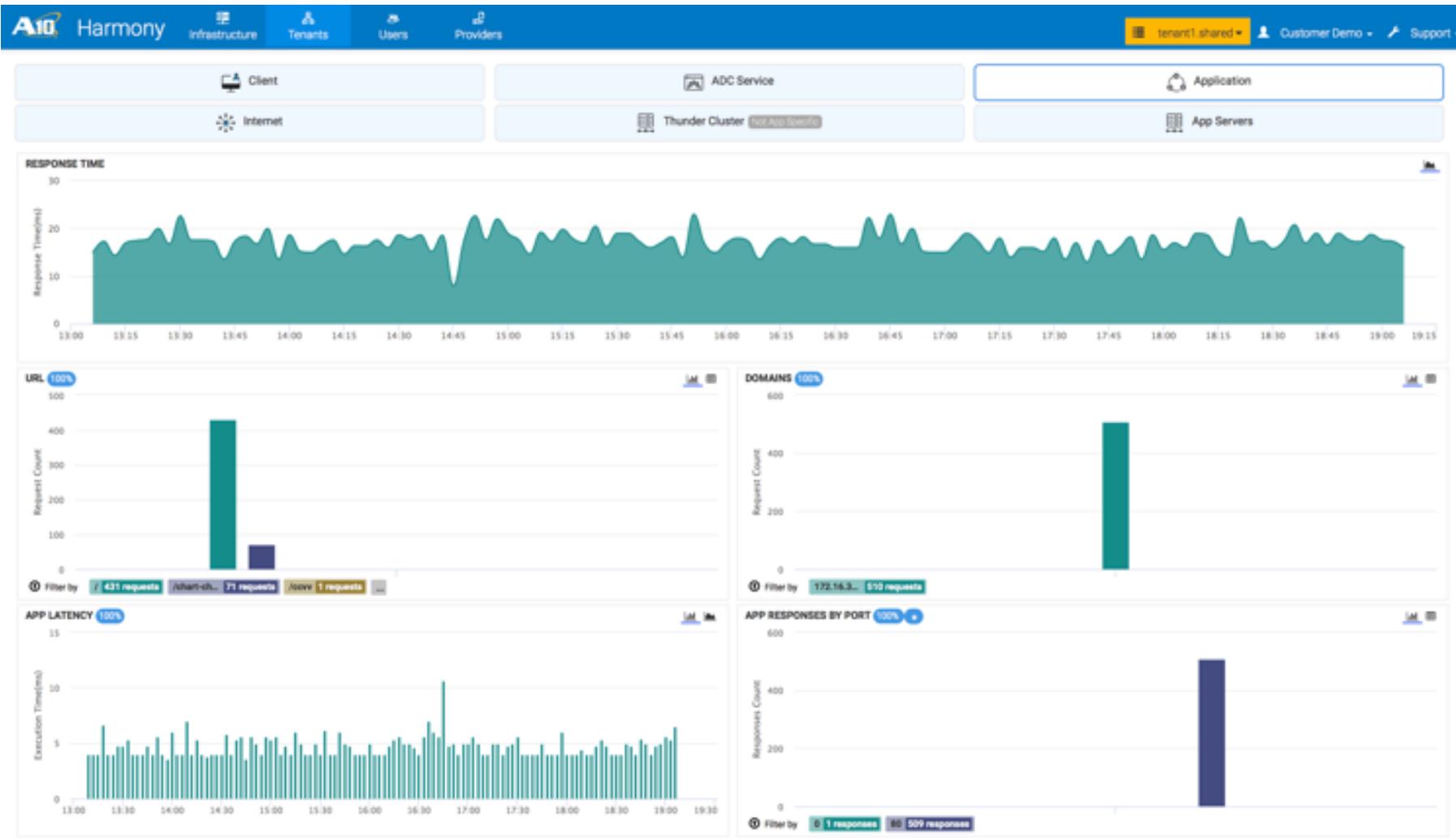

o Comprehensive metrics and logs

o View, monitor and analyze application services, groups, servers

o Rich trouble shooting capabilities

o Generate custom reports

Per-app Visibility : End-to-End Latency

o Distinguish between application, client and infrastructure issues

o Quickly identify consistent or one-off glitch

o Pinpoint concerns and take corrective action

Analytics for TCP Applications
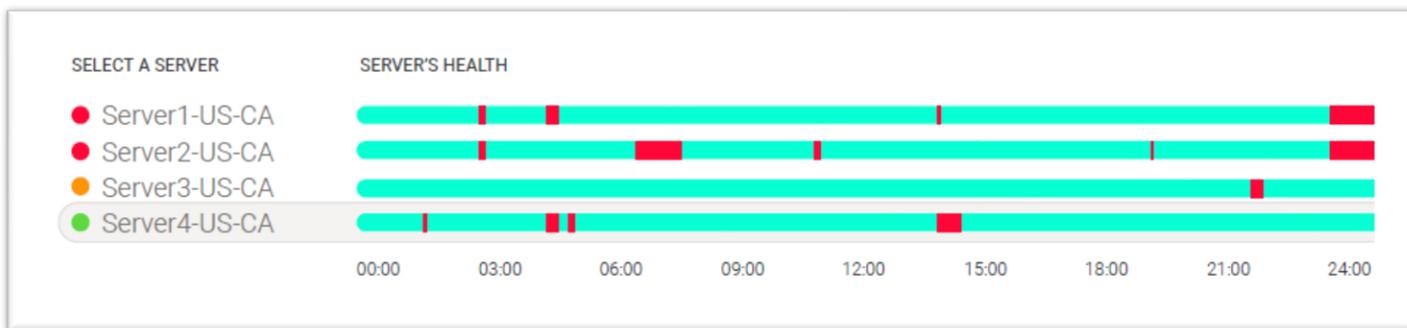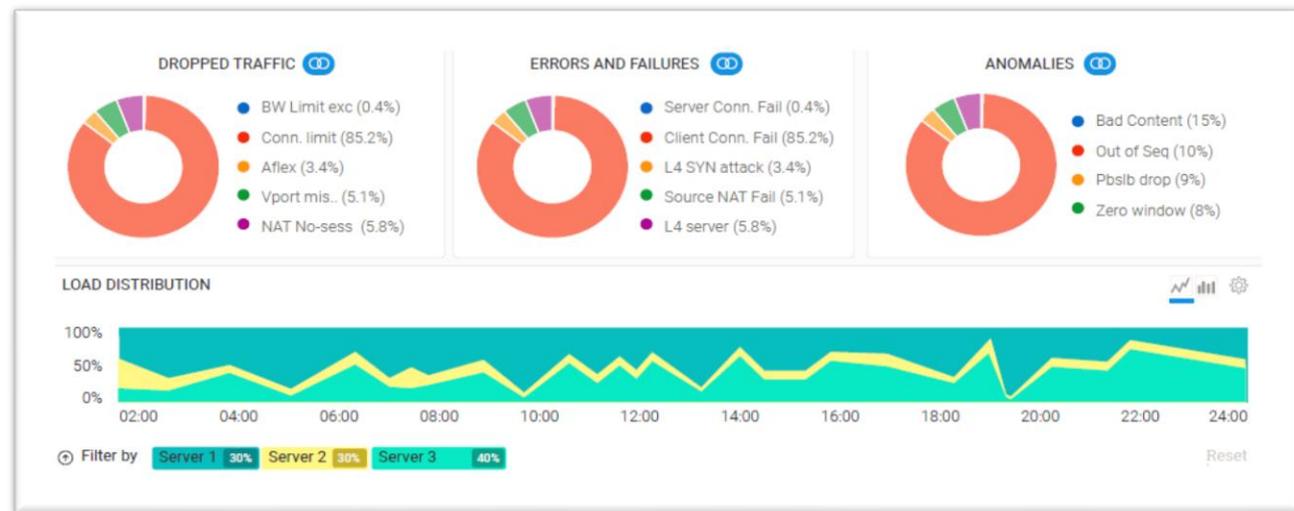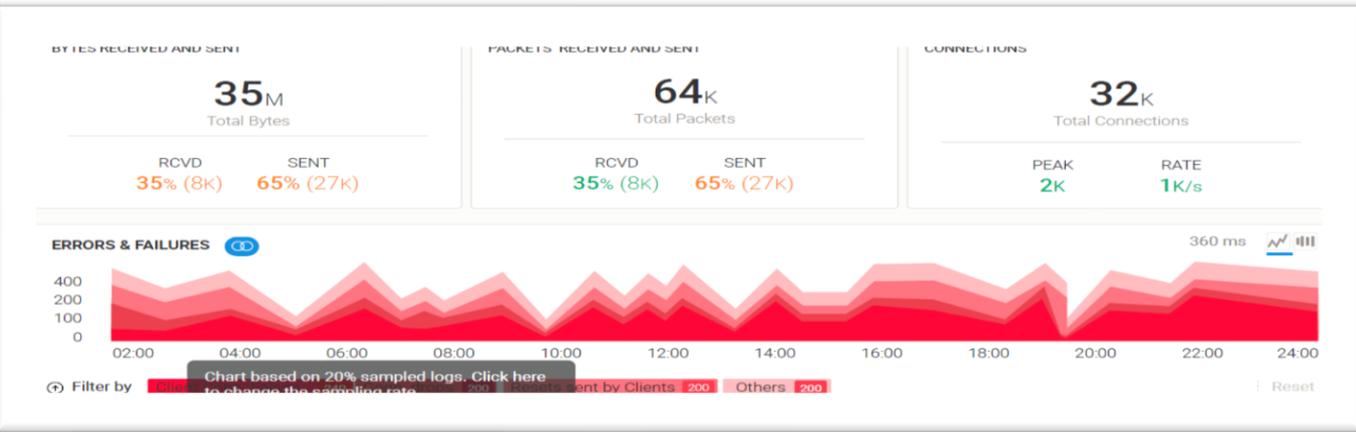
Client Information

- o Bytes and packets sent/received; Connections

- o Errors and failures

- o Top clients by: Bandwidth, Connections, Throughput

ADC Information

- o Dropped traffic, errors/failures, anomalies

- o Load distribution by server

- o TCP SYN: received, rates

Server Information

- o Traffic by server: Connections, rates, throughput, bytes and packets received/sent

• Preliminary Screen captures..
Final Available in Q3 2018

Simpler and Efficient Operations with Harmony Controller

Example Activity	Without Controller	Efficiency Improvement	With Controller
Configuring 5 devices to block traffic from a client IP	1 hour / 15 steps / Tedious work	83%	10 Min. / 5 Clicks / Smart work
Troubleshooting High Response Time in 3 web servers app	3 hours / Low Confidence Results	92%	15 min / High Confidence Results

Investment Benefits of Harmony Controller

o Solid ROI

    • Achieve returns of 3-6x
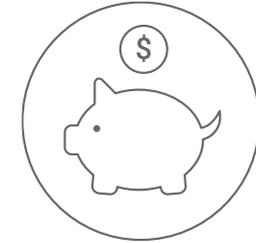
o Consolidate multi-cloud IT teams

    • Leverage one controller across all sites
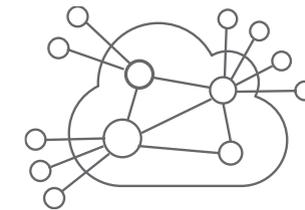
o Manage thousands of appliances/partitions

    • Centrally configure customizable policies per app
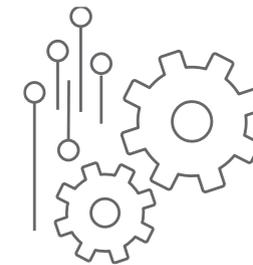
Product Portfolio, ACOS and ADC Form Factors

A10 Portfolio: An Overview
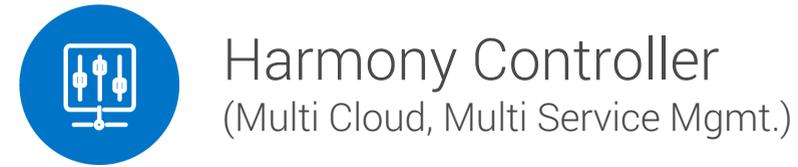
aGalaxy
(TPS Mgmt.)

Harmony Controller
(Multi Cloud, Multi Service Mgmt.)

SECURITY

APPLICATION DELIVERY

TPS

SSLi

CFW

ADC

CGN
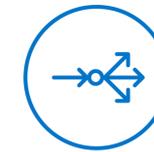
Automation

Policy

Detection

Automation

Self Service

Analytics

Thunder ADC

Leading Edge Efficiency
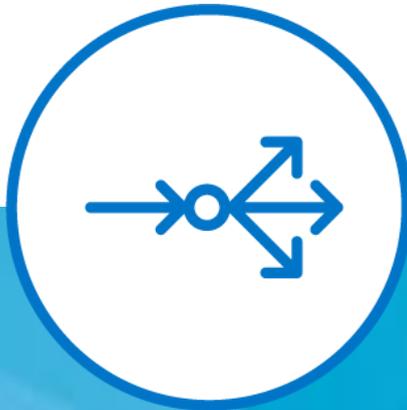
Hardware

- o Most Compact Designs
  1 RU versus 7 RU
- o Consolidate with Virtual
  Up to 1024 Instances
- o Performance = Less Units Required
  2-5x Performance
- o Hybrid HVA
  Up to 40 Partitions
- o Most Efficient Power Supplies
  Platinum Efficiency
- o Low Power Draw
  Lowest Watts

Software

- o Virtual
  Licenses to 100 Gbps
- o Bare Metal
  Licenses to 60 Gbps
- o IaaS Option
  Amazon AWS and Microsoft Azure
- o FlexPool Capacity Pooling

Case Studies

Large New York Financial Institution

Low Latency Trading

CHALLENGES

o Legacy Cisco ASRs = slow L3 performance

o F5 latency not acceptable while dropping packets (competitive disadvantage)

o F5 2 years late on delivering low latency VIPRIONs expensive = big footprint!

RESULTS

o A10 delivered single digit microsecond latency for SNAT/DNAT with FIX as the next phase

o Very large midrange appliance deal with ACOS 4.0

WHY A10?

o "... A10 provided layer 4-7 latencies half that of F5, and faster than Cisco at layer 3, while helping customer to lower costs and partner on next generation trading architecture"

o Customer continues to replace legacy F5 and Cisco in global refresh cycles, saving +50% on CAPEX and +75% on support costs

Large Website/eCommerce Design Provider

Service Millions of small business clients

CHALLENGES

o Simplify configuration

o High appliance reliability

o All inclusive license across all ADC appliances

o Powerful and scalable solutions

RESULTS

o Combination of multiple entry level and higher end Thunder appliances

o SSL hardware acceleration

WHY A10?

o A10 excellent technical support; assist in converting configurations to AFleX, onsite training

o A10 design: more CPU cores, shared memory, superior traffic processing, 1RU units

o A10's Cisco-like CLIs and programmability

o Testing reveals A10 superior at L7

Leading North American Sports Organization

$Billions in revenue with wide fan following

CHALLENGES

○ Needed a high-performance solution that would optimize Microsoft Exchange and internal apps

○ Improve server response times

○ Competitors: F5, Citrix and Open Source

RESULTS

○ Thunder ADC appliances with multi-tenancy

○ Programmability with aXAPIs

○ Replaced Cisco ACE

WHY A10?

○ Tremendous Value: A10 could combine multiple features in one appliance

○ Multi-tenancy: Required high density partitioning

○ 100% feature programmability

A10

Leading Worldwide Pharmaceutical

Revenues in the $Billions

CHALLENGES

- Needed high-performance solution including SSL
- Integration with Cisco ACI deployment
- Rapidly meet demand for new services
- Support multiple tenants

RESULTS

- Thunder ADC appliances with multi-tenancy
- Hardware and software appliances
- Centralized management
- A10/Cisco ACI integration

WHY A10?

- Faster and automated rollout of new applications
- Hardware and software solutions with equivalent feature set
- Proven integration with Cisco ACI
- Improved resource utilization

Large Data Storage/Server Vendor

Technology 'Conglomerate'

CHALLENGES

- Needed high-performance solution
- Needed NAT/Port address translation
- Competitors: F5

RESULTS

- Replaced F5
- Thunder ADC appliances with multi-tenancy
- ADC and CGN licensing

WHY A10?

- All inclusive license including CGN functionality
- Multi-tenancy an advantage and appreciated potential for scalability
- Cisco-like CLIs
- Support: hours of excellent SE support

A10

Online Diversified Services

CHALLENGES

- Support multiple diverse apps
- Scalable capacity including bursting
- Load balance small packets
- Small instance sizes
- Competition: Citrix 'Zero Capacity Appliances'

RESULTS

- FlexPool: 1 and 3 year
- Advanced package
- Enterprise Level Agreement

WHY A10?

- Highly granular capacity allocation
- License portability to public clouds
- High performance with many small packets
- Converged firewall functionality

Summary and Competitive Advantages

A10 ADCs

Enabling Highly Available, Accelerated and Secure Applications
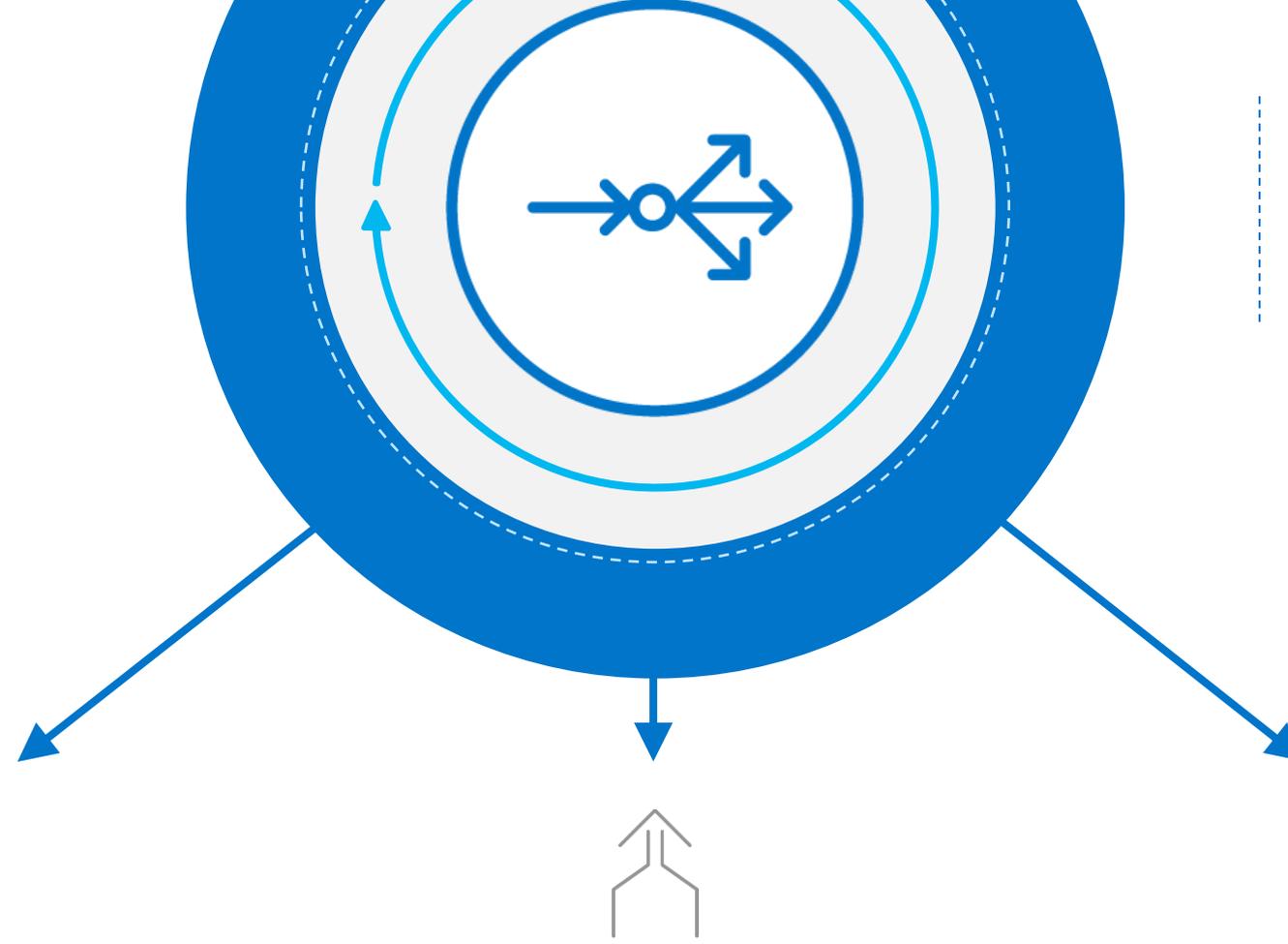
RICH FEATURES

- Server load balancing and application delivery
- Acceleration
- Security (WAF, SI, DAF, DDoS, more…)

FLEXIBLE DEPLOYMENT

- Broad array of form factors
  - Physical | Virtual Bare Metal | Hybrid
- For on premise, SaaS or IaaS cloud deployments

SMART DESIGN

- Designed for optimal performance
- Delivering maximum uptime
- Green, data center friendly design

Competitive Differentiators

	A10	Competitor	Competitor
L7 Performance/price with small footprint	To 200G/1U	To 80G/1U	To 200G/2U
Multi-tenant density	To 1023 ADPs	6-24	0-115
All inclusive license including CGN	✓	✗	✗
All platforms can run all modules simultaneously	✓	✗	✗
Flexible consumption model with portable licenses	✓	✗	✗
Diverse 'form factors' including Bare Metal	✓	✗	✗
Cloud native app support and SaaS option	✓	✗	✗
SSL: Advanced ciphers, performance, upgradability	✓	✗	✗
Multi-cloud management and analytics-Harmony	✓	✗	✗
Simplest Cisco Context to ADP migrations	✓	✗	✗
100 percent feature programmable via APIs	✓	✗	✗

Customer Satisfaction

> " How would you rate your Thunder Series on the following capabilities when compared to competitive products? "

CUSTOMERS WERE ASKED:

Features	95%
Performance/Scalability	96%
Usability/Deployment Speed	93%
Reliability	93%
Quality of Support	92%

■ Superior/ Much Better/ Better   ■ Same   ■ Not as Good
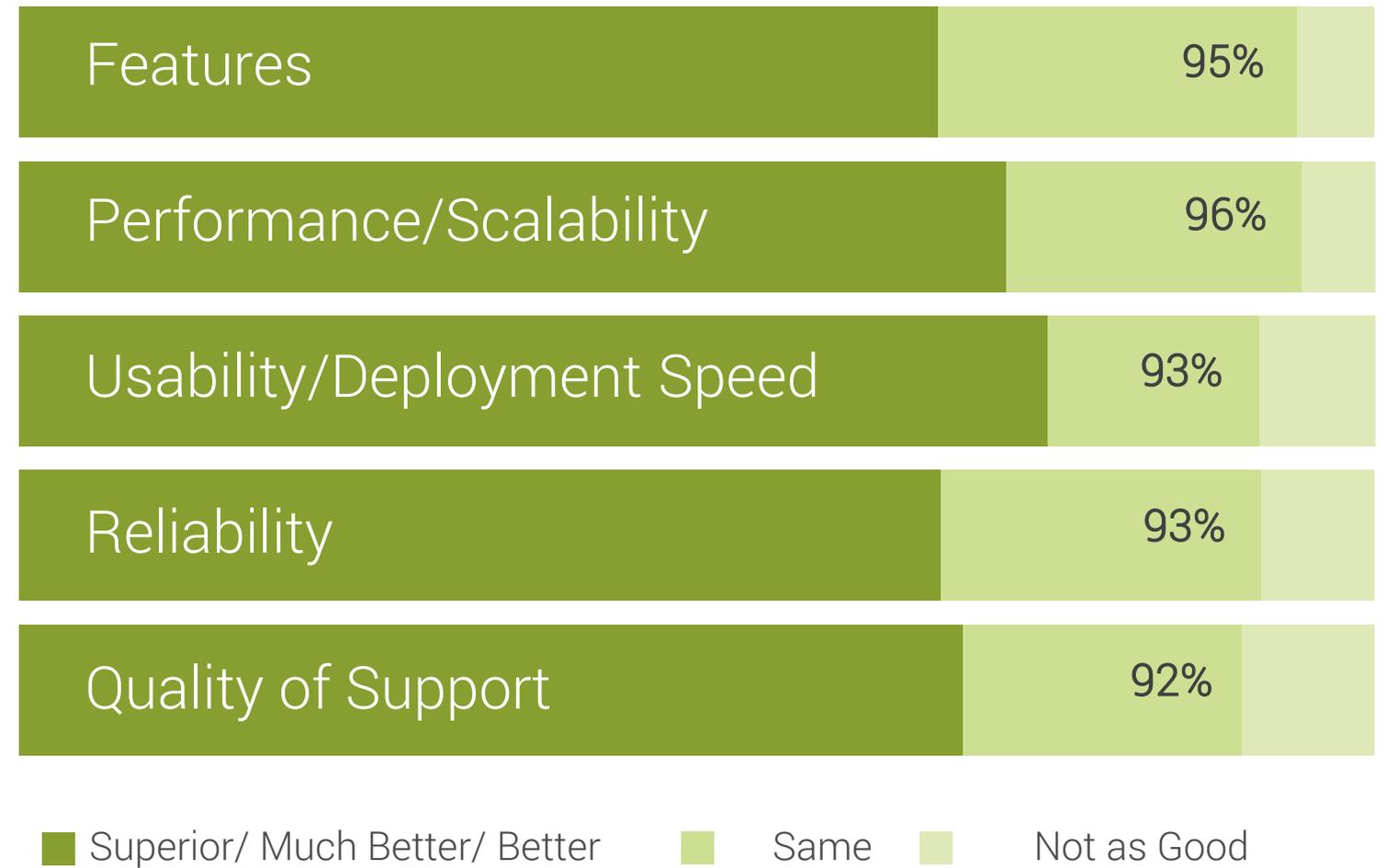
Source: *TechValidate*

Replacing the Competition

> " Which of the following vendors/solutions did you replace with Thunder Series products? "

CUSTOMERS WERE ASKED:

Vendor	Percentage
Cisco	34%
F5 Networks	33%
Brocade	9%
HAProxy	9%
Citrix Systems (Netscaler)	6%
KEMP Technologies	6%
NGINX	6%
Radware	6%
Barracuda Networks	6%
Coyote Point Systems	2%
Riverbed Technology	2%
Other	16%
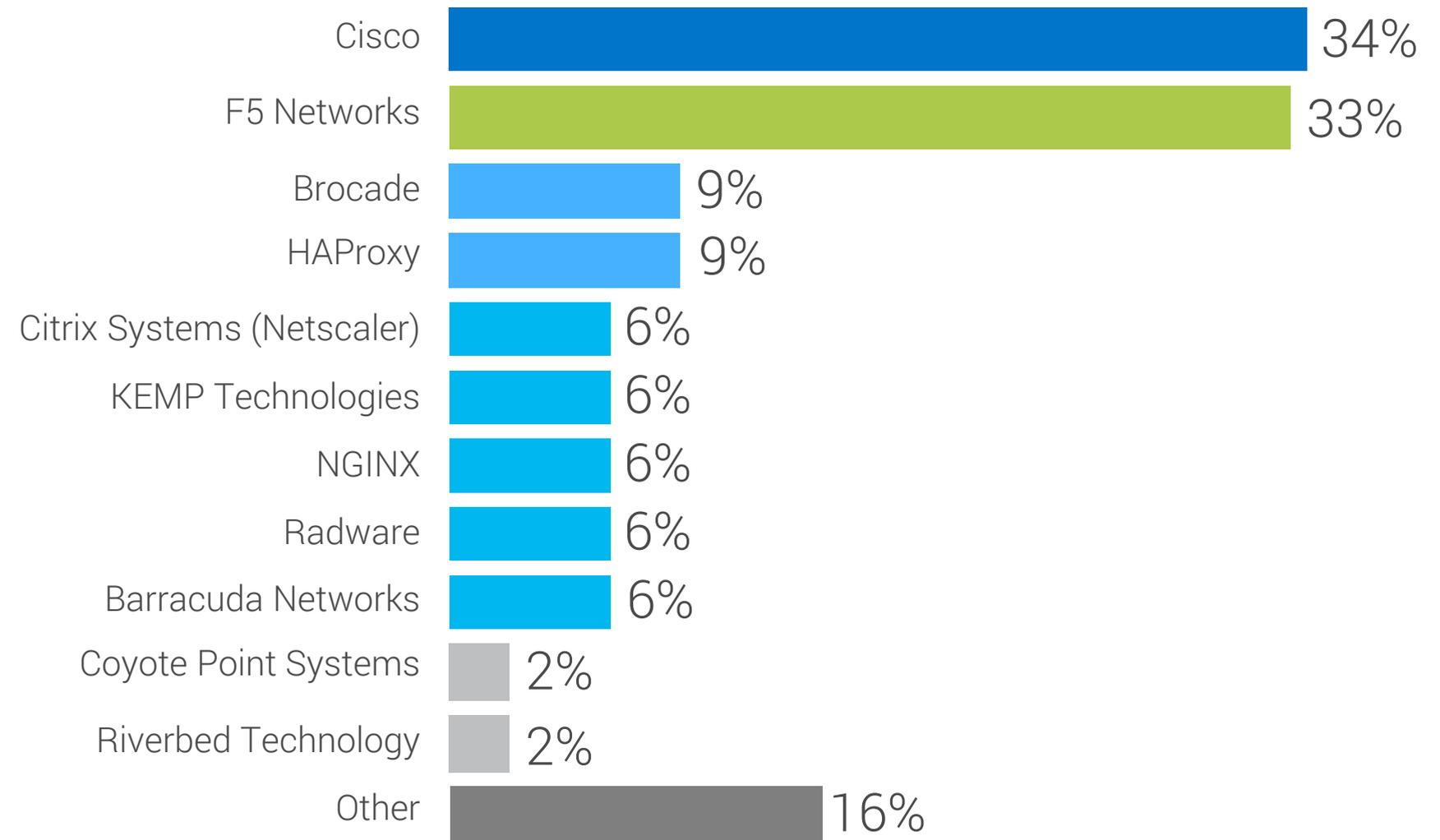
Source: *TechValidate*

85% of Organizations
Are Likely to Recommend
A10 Thunder Series

Source: *TechValidate*

WHY CUSTOMERS
Choose
Thunder ADC

Best-in Class Performance
with Lowest TCO

Advanced Networking
and Security Features

All-Inclusive
Licensing

Flexible Deployment
Options Including Cloud

High Multi-tenant
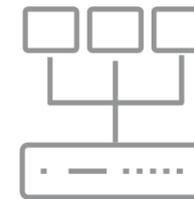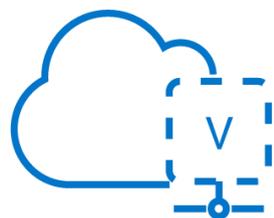Partition Density

Gold Standard for
Reliability and Support

vTHUNDER

FREE TRIAL **TRY TODAY**

Visit www.a10networks.com

30 days, 5 Mbps limit

Full features

For VMware, Hyper-V, KVM and Xen

A10

THANK YOU

Deployment Scenarios

Multi-tenancy Environments

o Web Hosting, Cloud, Service Provider, Enterprise

o Hundreds of apps, clients and services present

o Enables customized services tailored to apps, services and users

o Application Delivery Partitions (ADPs)

- Thunder Hardware up to 1023/appliance

- Bare Metal offers up to 1023 partitions/server

- vThunder supports up to 32 partitions/VM

- Two orders of magnitude greater density than alternatives

o Clustering via aVCS scales capacity 8x
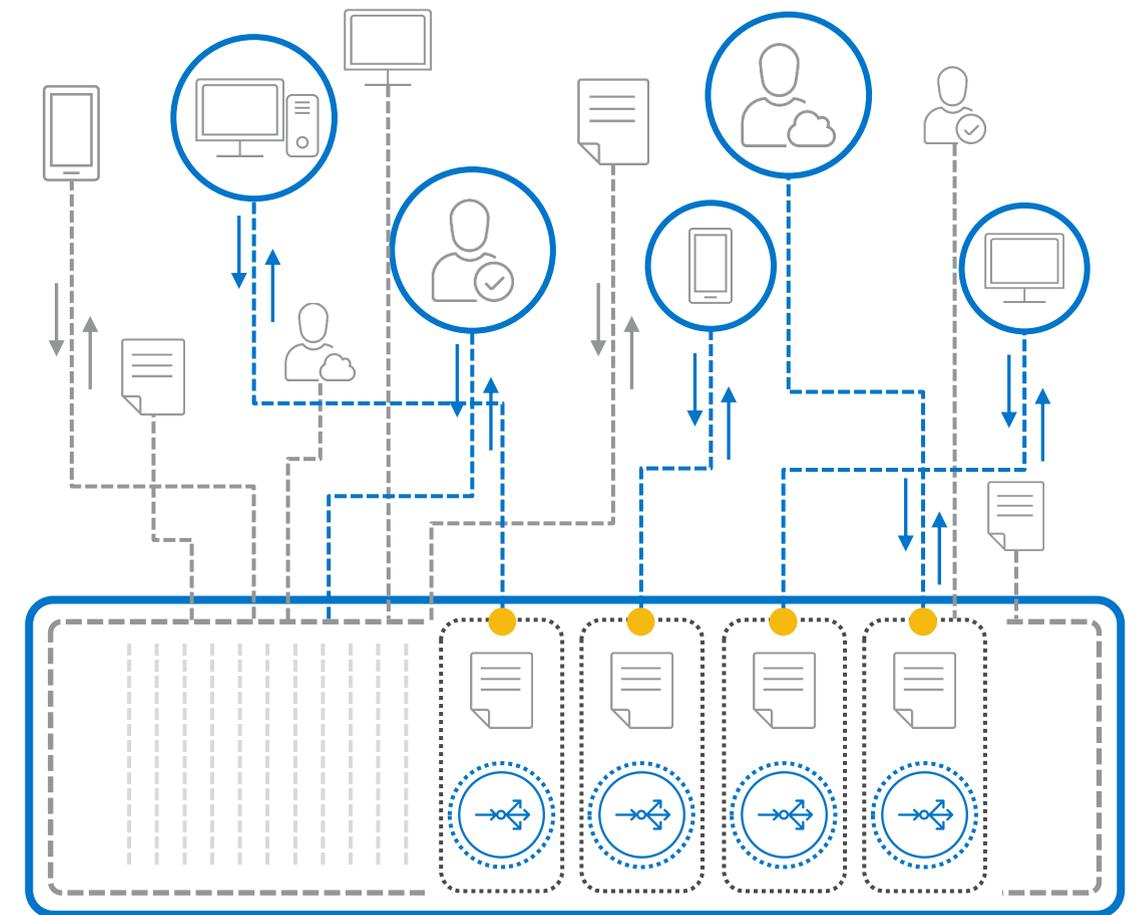
Expand one ADC into HUNDREDS
At No Extra Charge

Enterprise Data Center

- Run all features simultaneously
  - Regardless of platform
  - All inclusive license
- Application availability
  - To maintain uptime
  - SLB, GSLB, high-availability (HA), Health-checks
- Application acceleration
  - For equipment consolidation and faster user experience
  - Caching, compression, network optimization
- Application security services
  - For brand and asset protection while enhancing your existing security
  - WAF, DAF, SSL services

Backup Data Center

Internet

Availability: GSLB
High-availability
Health-checks

A10 Thunder ADC

Security
- DDoS Mitigation
- WAF
- DAF
- AAM

Acceleration
- SSL Offload
- TCP Reuse
- RAM Caching
- Compression

Web App   DNS   Other App
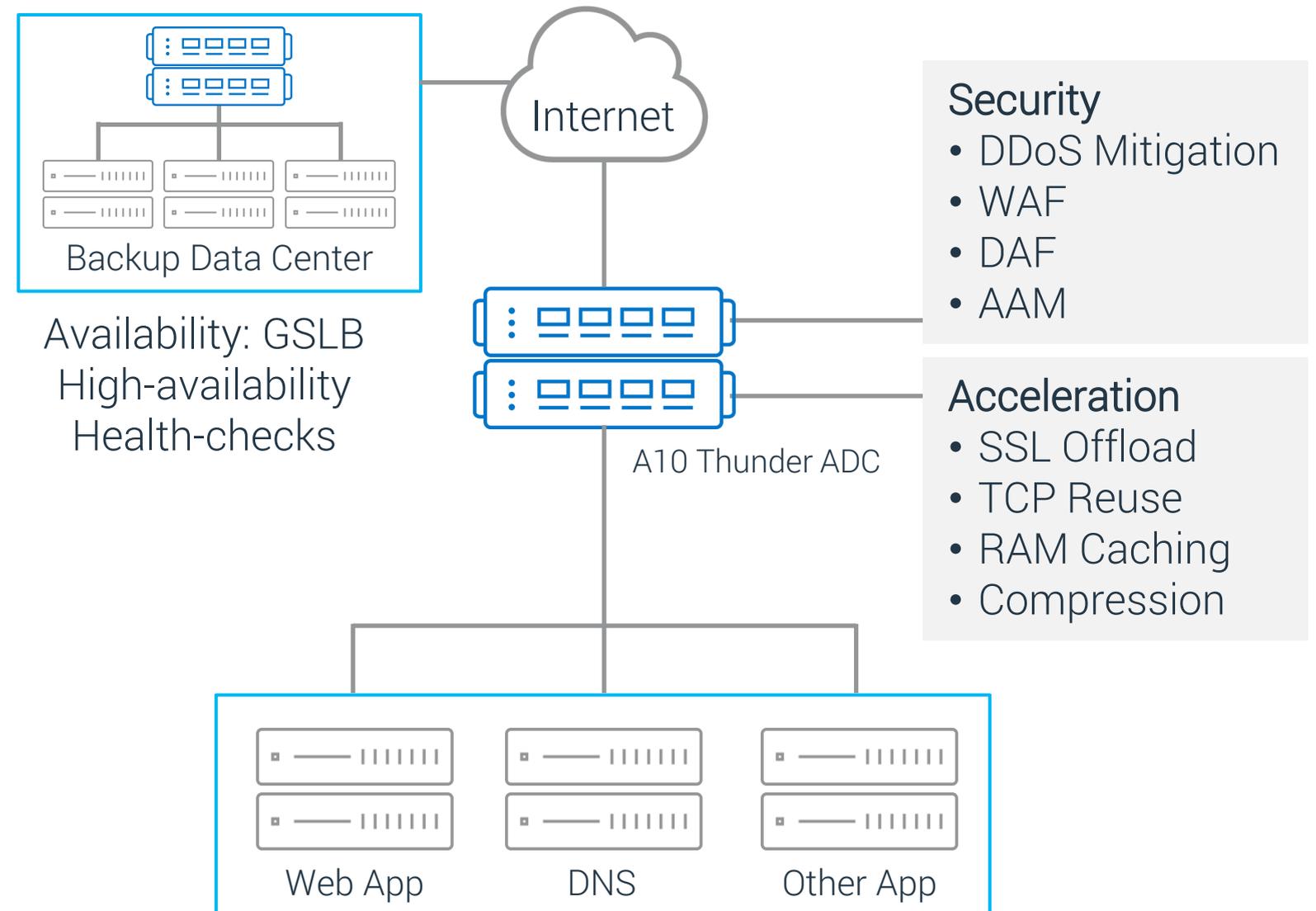
Service Provider Solutions

o Optimized network efficiency and services

 • Traffic steering and service chaining

o Enhanced service availability

 • Load balancing for Web, caches, Diameter, SIP, IPv4/IPv6 more…

o Carrier Grade Networking

 • Complete set of IPv6 migration methods

 • Comprehensive application layer gateways

 • Included with ADC license at no extra charge

INTERNET

A10 ADC

Video Optimization

Content Filtering

Content Caching

Service Provider Networks
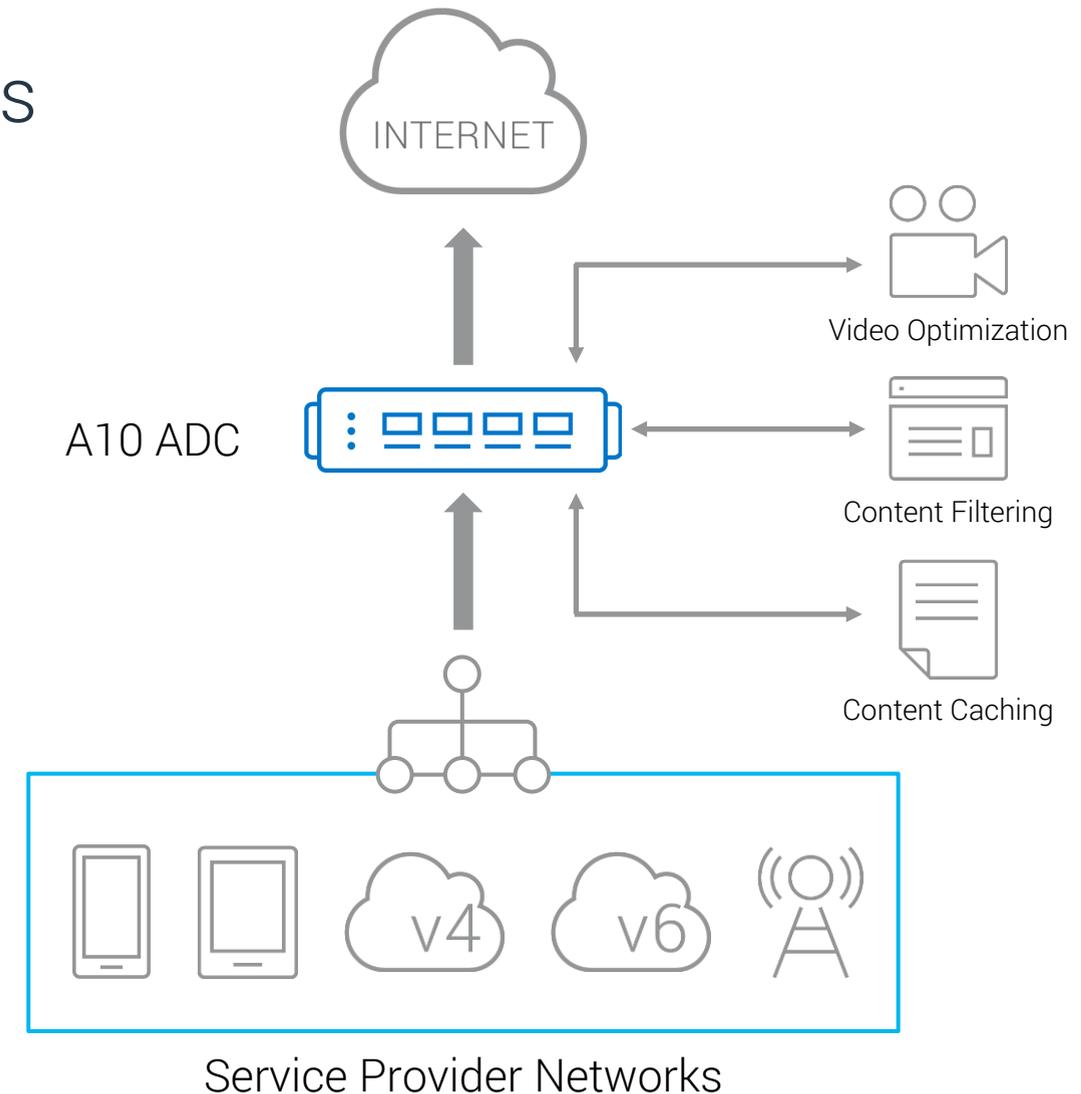
DMZ Security Solutions

o **Scaling security devices and encrypted communications**

- • FWLB and SSL offload, more…

- • Option to support inspection of outbound based traffic

o **Defend against emerging DDoS attacks**

- • Network and application protection

o **Selectively apply dynamic security chains**

- • Traffic steering and advanced ADC services

INTERNET

A10 ADC

A10 ADC

Data Center

Internal Users

Firewall Load Balancing
DDoS Mitigation
WAF
DAF
AAM
Traffic Steering
aFleX Scripting
SSL Offload

Firewalls
IDS/IPS
DLP
Other

Firewall
Load Balancing
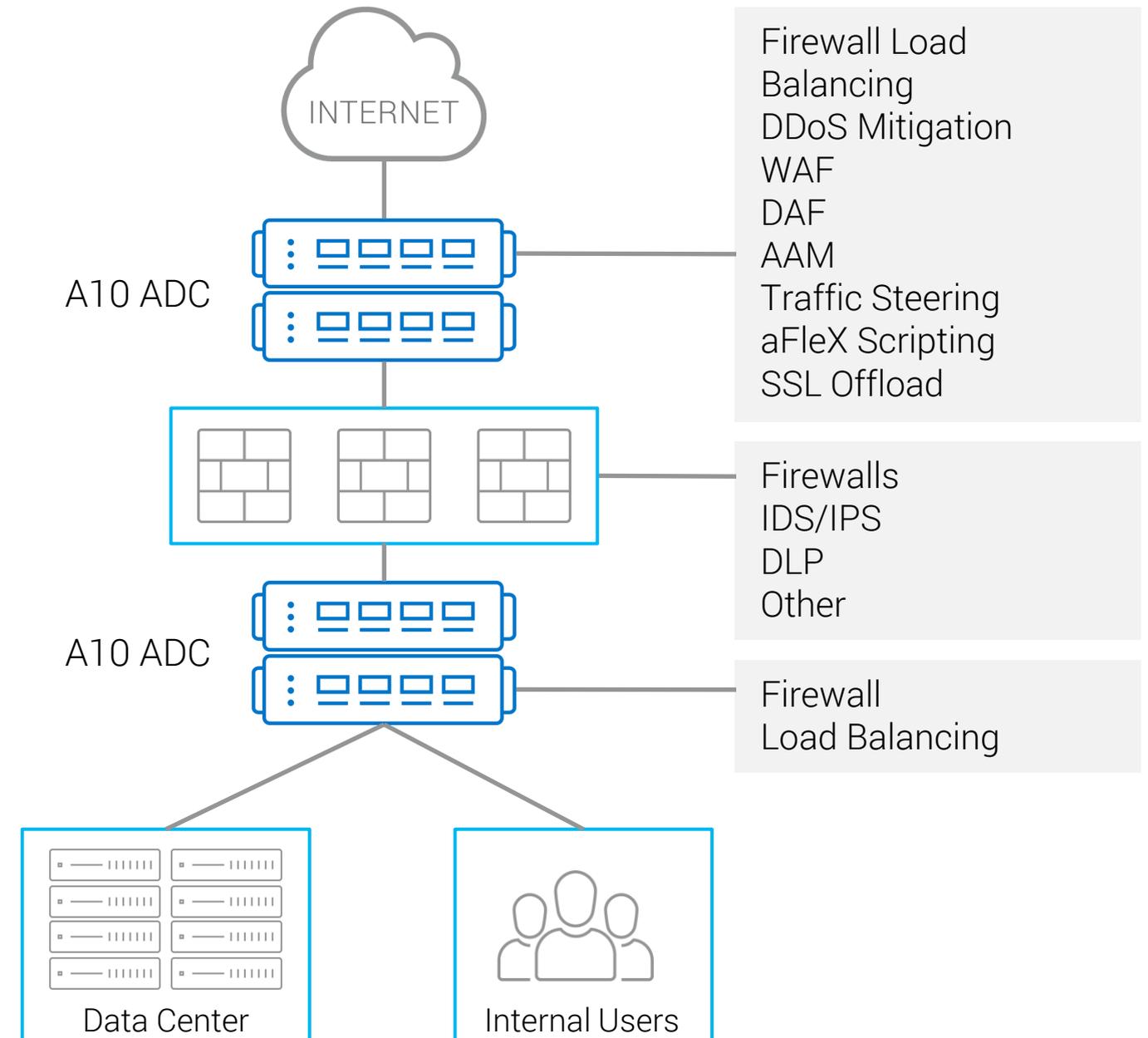
What are the business critical applications supported by vendor's ADC solution in your organization?

Application	Percentage
Internal web sites	69%
Custom internal applications	66%
Public web site (for Communication)	62%
Customer portal (to deliver services)	56%
E-commerce external web site(s)	42%
Partner portal (to deliver services)	31%
Microsoft Exchange	28%
Applications hosted in the public cloud	25%
Internal ERP systems	23%
Microsoft Lync or other real-time messaging / collaboration systems	21%
Microsoft Sharepoint	20%
CRM Application	15%
Other	7%

Source: Gartner Research-2016

Enhancing Key Applications

- ○ Microsoft
  - • Exchange and Lync certified, tested integrations include SharePoint, IIS & more…
- ○ Oracle
  - • Deployment guides for Application Server, E-business Suite, PeopleSoft Enterprise, Oracle Siebel CRM, WebLogic
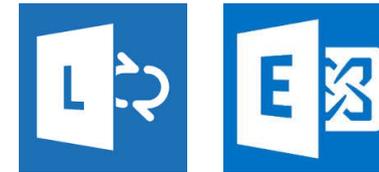- ○ SAP
  - • Reliability, security & performance certified for Business Objects Explorer (BOE), SAP Netweaver Portal & SAP CRM
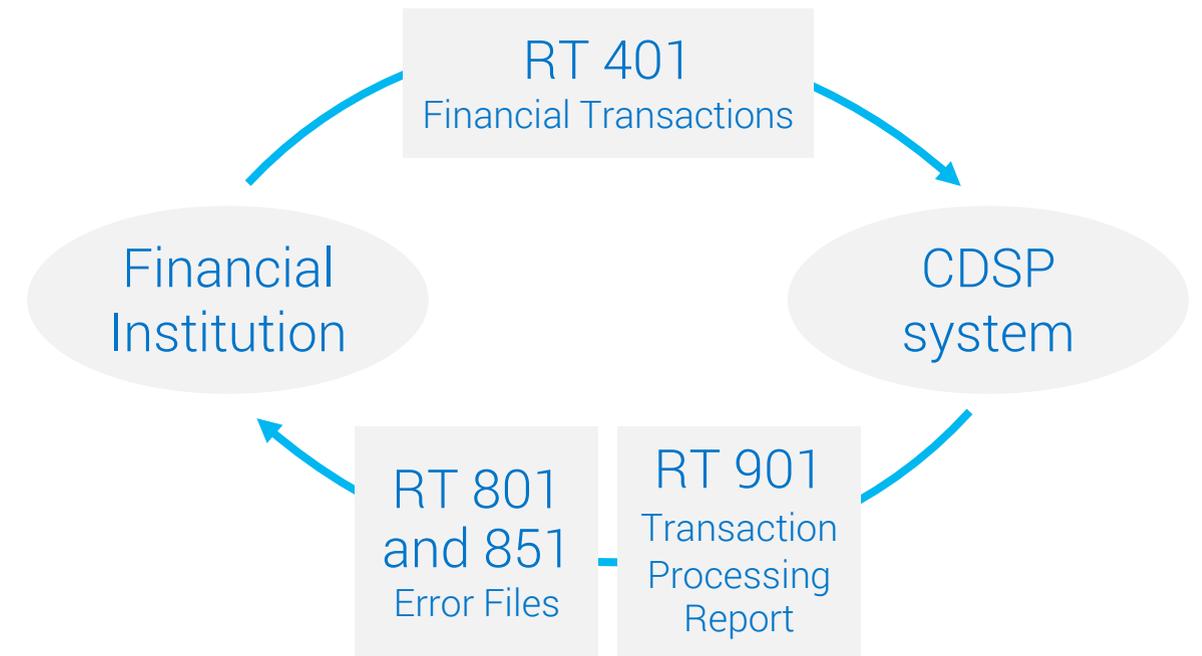- ○ VMware
  - • VMready certified, VMware View
- ○ Other – Blackboard, Apache & more…

Institutions Using Financial Information eXchange (FIX)

- o Low latency
  - A10 achieves substantially lower latency (~15 us)
- o Low bounded, consistent jitter
  - Competitors jitter up to 6x higher
- o Application fluency
  - DPI and policy-based forwarding specifically for FIX sessions – based on aFleX
- o Scripting languages and advanced server health monitoring capabilities
- o High quality support
  - Assist clients from proof of concept through to deployment
  - Consistently higher caliber support who understand the financial space

RT 401
Financial Transactions

Financial Institution

CDSP system

RT 801 and 851
Error Files

RT 901
Transaction Processing Report

FIX PROTOCOL
INDUSTRY-DRIVEN MESSAGING STANDARD℠

Seamless Authentication

Application Access Management (AAM)

BENEFIT

- Offloads authentication processing from web and application servers

- Consolidates multiple authentication points to simplify access management

- Enables Single Sign-on for multiple applications

ADVANTAGES

- Supports popular authentication methods and services such as SAML, RADIUS, LDAP and Kerberos

- No adjustment to web servers or infrastructure

AAM

Access
Granted
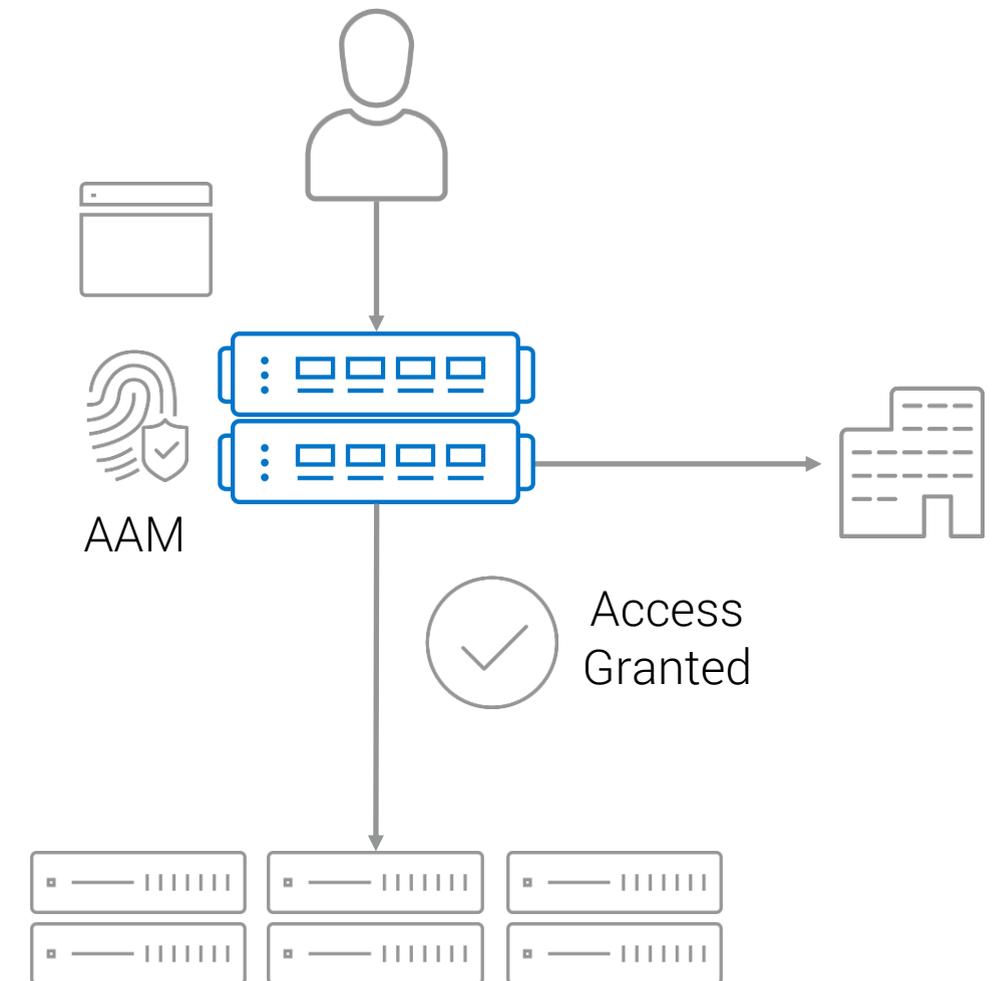
Thunder ADC Value

Ensure Local and Global Server Availability

Accelerate Content Delivery

Secure Applications and Data Centers from Attack

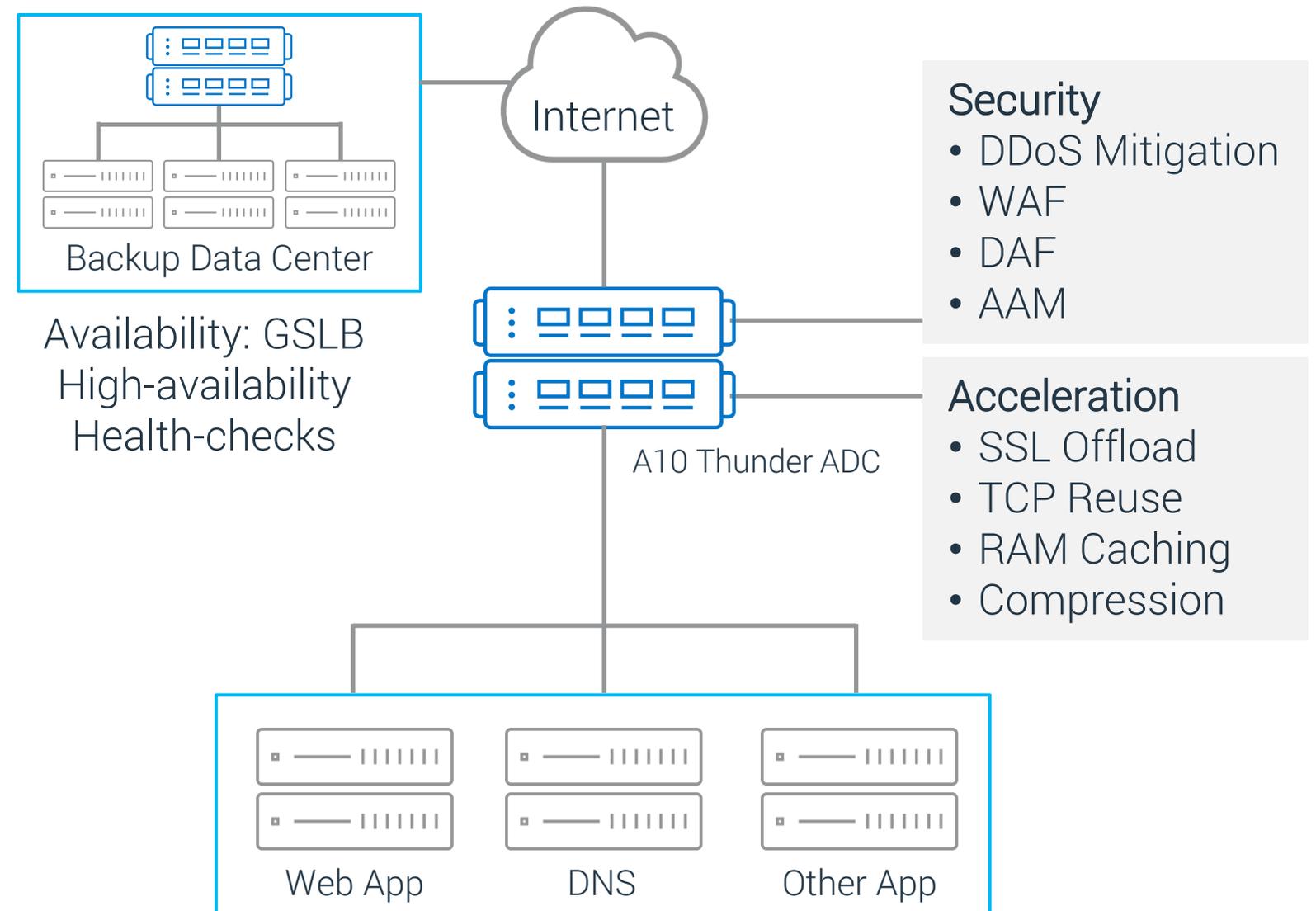Consolidate Infrastructure and Reduce Servers for Superior ROI

Thunder ADC: 1-Slide Overview

BENEFIT

- Integrate multiple networking and security solutions into one comprehensive and scalable solution

A10 ADVANTAGE

- Greatest L7 performance/lowest price, smallest foot print
- Highest multi-tenant density with 1000+ ADPs
- Simultaneously run all modules with no limits
- Broad solution offering: on premise and cloud
- Centralized control option with full visibility/analytics
- Superior SSL cipher support/performance; factory upgradable
- All inclusive license including CGN functionality
- Simplest to deploy with 'Cisco like' interface

Internet

Backup Data Center

Availability: GSLB
High-availability
Health-checks

A10 Thunder ADC

Security
- DDoS Mitigation
- WAF
- DAF
- AAM

Acceleration
- SSL Offload
- TCP Reuse
- RAM Caching
- Compression

Web App   DNS   Other App

WHY CUSTOMERS
Choose Thunder ADC

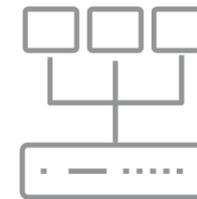Best-in Class Performance with Lowest TCO

Advanced Networking and Security Features
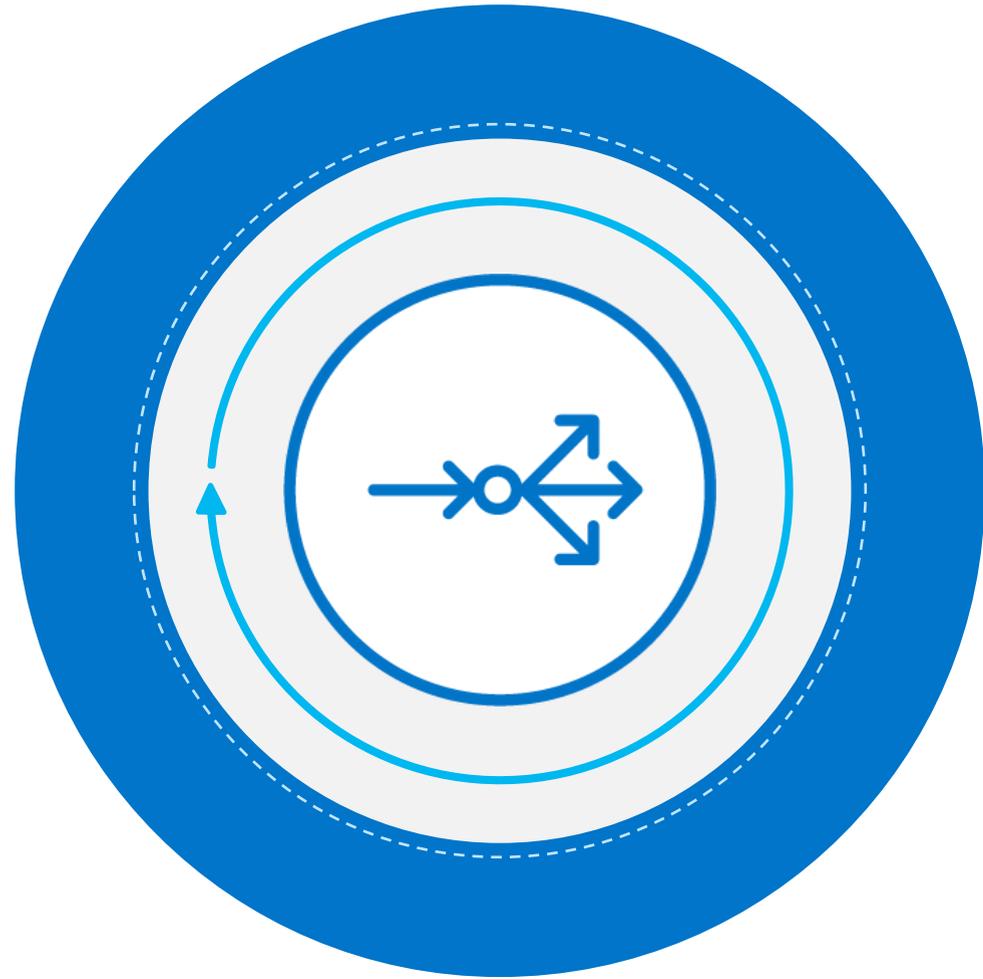
All-Inclusive Licensing

Flexible Deployment Options Including Cloud

High Multi-tenant Partition Density

Gold Standard for Reliability and Support

THUNDER ADC
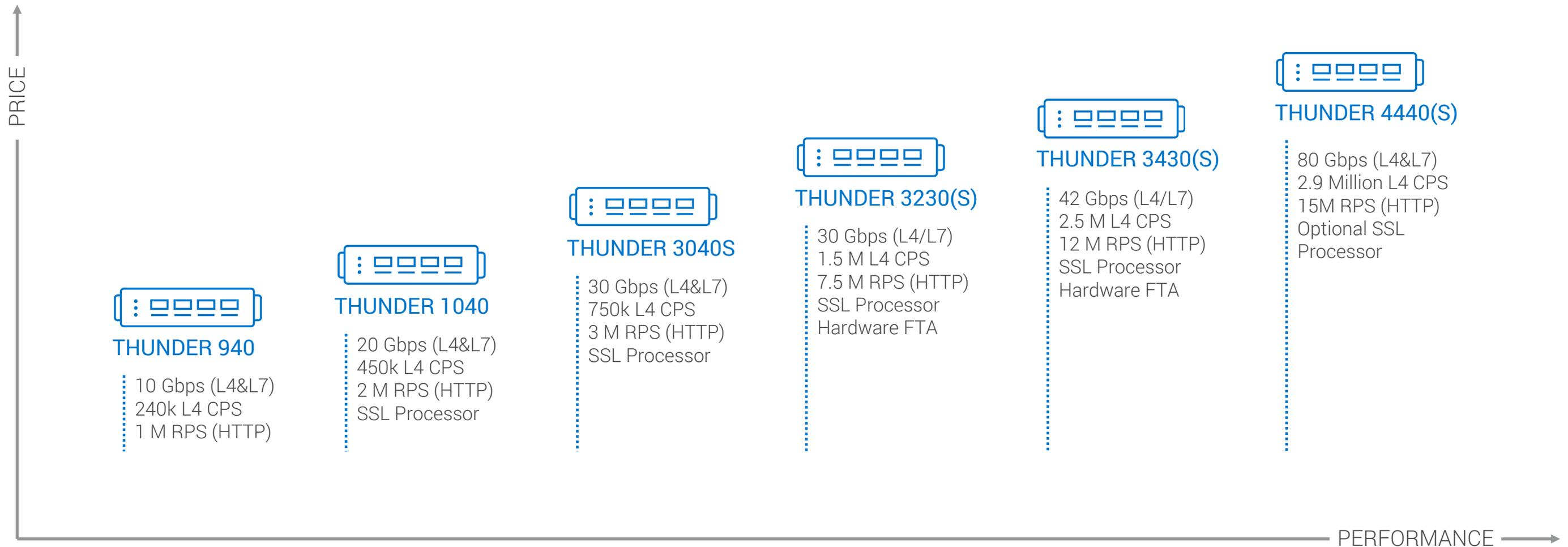## LEADING EDGE EFFICIENCY

Power Savings With Green ADCs

- Most Compact Designs
  1 RU versus 7 RU

- Consolidate with Virtual
  1 to 1024 Densities

- Performance = Less Units Required
  2-5x Performance

- Front-to-back Cooling
  For Hot Aisle/Cold Aisle

- Most Efficient Power Supplies
  Platinum Efficiency

- Low Power Draw
  Lowest Watts

Thunder ADC Hardware Appliances

Entry to Lower Mid Range

PRICE ↑

PERFORMANCE →

THUNDER 940

10 Gbps (L4&L7)
240k L4 CPS
1 M RPS (HTTP)

THUNDER 1040

20 Gbps (L4&L7)
450k L4 CPS
2 M RPS (HTTP)
SSL Processor

THUNDER 3040S

30 Gbps (L4&L7)
750k L4 CPS
3 M RPS (HTTP)
SSL Processor

THUNDER 3230(S)

30 Gbps (L4/L7)
1.5 M L4 CPS
7.5 M RPS (HTTP)
SSL Processor
Hardware FTA

THUNDER 3430(S)

42 Gbps (L4/L7)
2.5 M L4 CPS
12 M RPS (HTTP)
SSL Processor
Hardware FTA

THUNDER 4440(S)

80 Gbps (L4&L7)
2.9 Million L4 CPS
15M RPS (HTTP)
Optional SSL
Processor

Thunder ADC Hardware Appliances

Upper Mid Range to High-end

PRICE

THUNDER 7440(S)

220/200 Gbps (L4&L7)
10.5 Million L4 CPS
44 Million (HTTP)
SSL Processor

THUNDER 6630(S)

150/145 Gbps (L4/L7)
7.1 M L4 CPS
38 M RPS (HTTP)

THUNDER 6440(S)

160/150 Gbps (L4/L7)
5.5 M L4 CPS
31 M RPS (HTTP)
SSL Processor
Hardware FTA

THUNDER 5840(S)

115/113 Gbps (L4/L7)
6.2 M L4 CPS
31 M RPS (HTTP)
SSL Processor
Hardware FTA

THUNDER 5440(S)

100/100 Gbps (L4&L7)
4Million L4 CPS
22 M RPS (HTTP)
SSL Processor

THUNDER 5330(S)

78 Gbps (L4&L7)
3.1 Million L4 CPS
15 M RPS (HTTP)
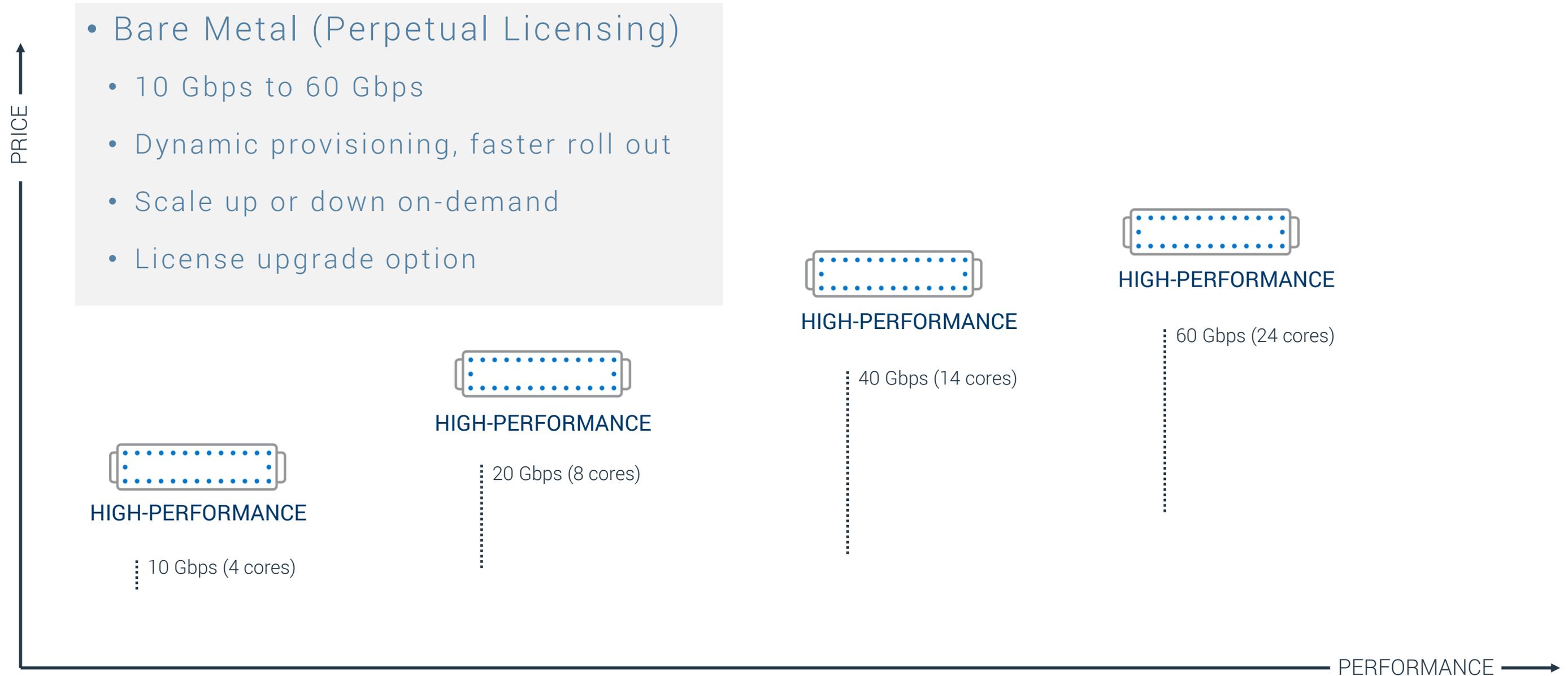
PERFORMANCE

vThunder Software Appliances

PRICE
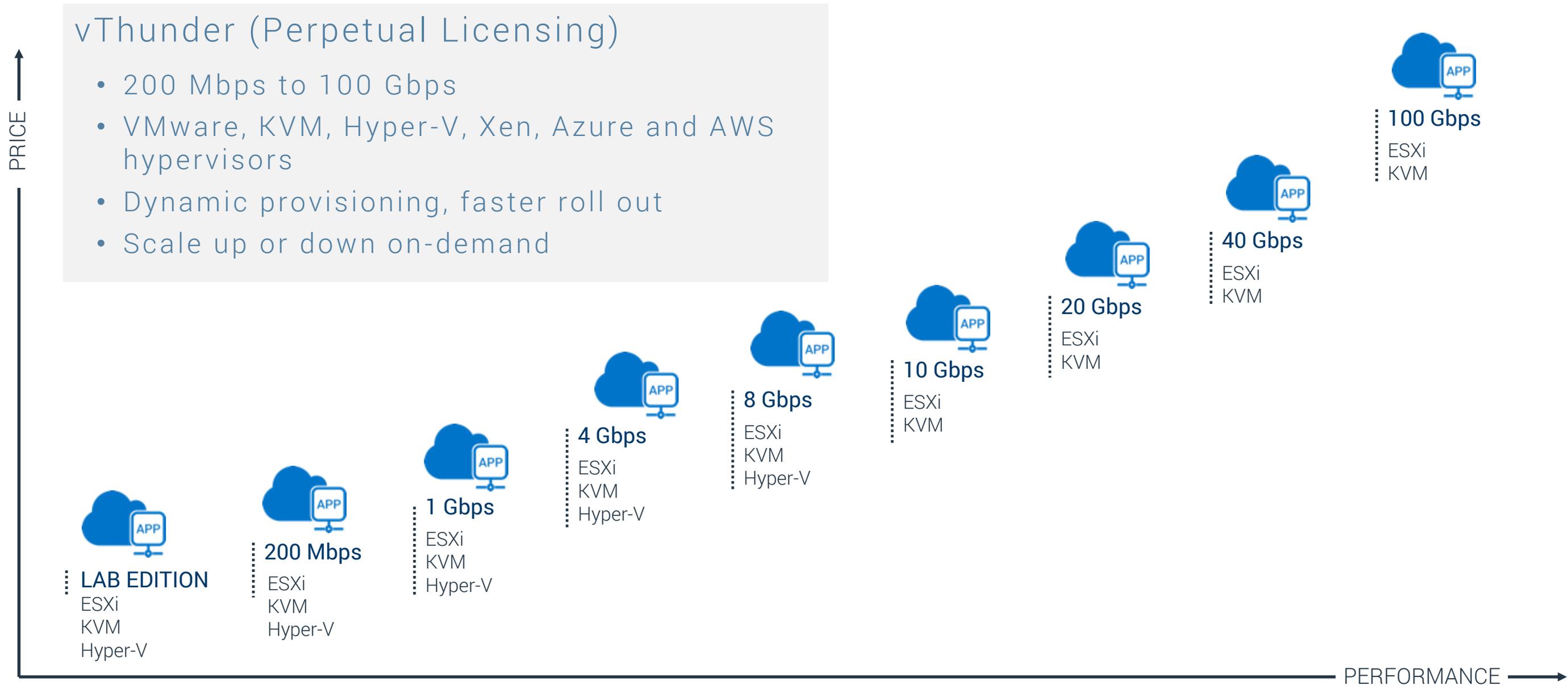
vThunder (Perpetual Licensing)

- 200 Mbps to 100 Gbps
- VMware, KVM, Hyper-V, Xen, Azure and AWS hypervisors
- Dynamic provisioning, faster roll out
- Scale up or down on-demand

100 Gbps
ESXi
KVM

40 Gbps
ESXi
KVM

20 Gbps
ESXi
KVM

10 Gbps
ESXi
KVM

8 Gbps
ESXi
KVM
Hyper-V

4 Gbps
ESXi
KVM
Hyper-V

1 Gbps
ESXi
KVM
Hyper-V

200 Mbps
ESXi
KVM
Hyper-V

LAB EDITION
ESXi
KVM
Hyper-V

PERFORMANCE

Thunder ADC for Bare Metal Software Appliances

PRICE

- Bare Metal (Perpetual Licensing)
  - 10 Gbps to 60 Gbps
  - Dynamic provisioning, faster roll out
  - Scale up or down on-demand
  - License upgrade option

HIGH-PERFORMANCE

60 Gbps (24 cores)

HIGH-PERFORMANCE

40 Gbps (14 cores)

HIGH-PERFORMANCE

20 Gbps (8 cores)

HIGH-PERFORMANCE

10 Gbps (4 cores)

PERFORMANCE

FlexPool Overview

Capacity Pool
- 1G, 10G, 50G, 100G, Custom
- Floating License pool

Subscription
- 1yr, 3yrs, 5 years
- Enterprise License Agreements (ELA)
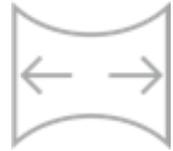
All Inclusive
- Gold support included
- Software upgrades included
- No feature licenses

Harmony Controller
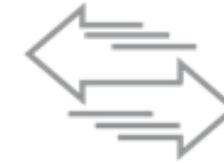- Via subscription for FlexPool
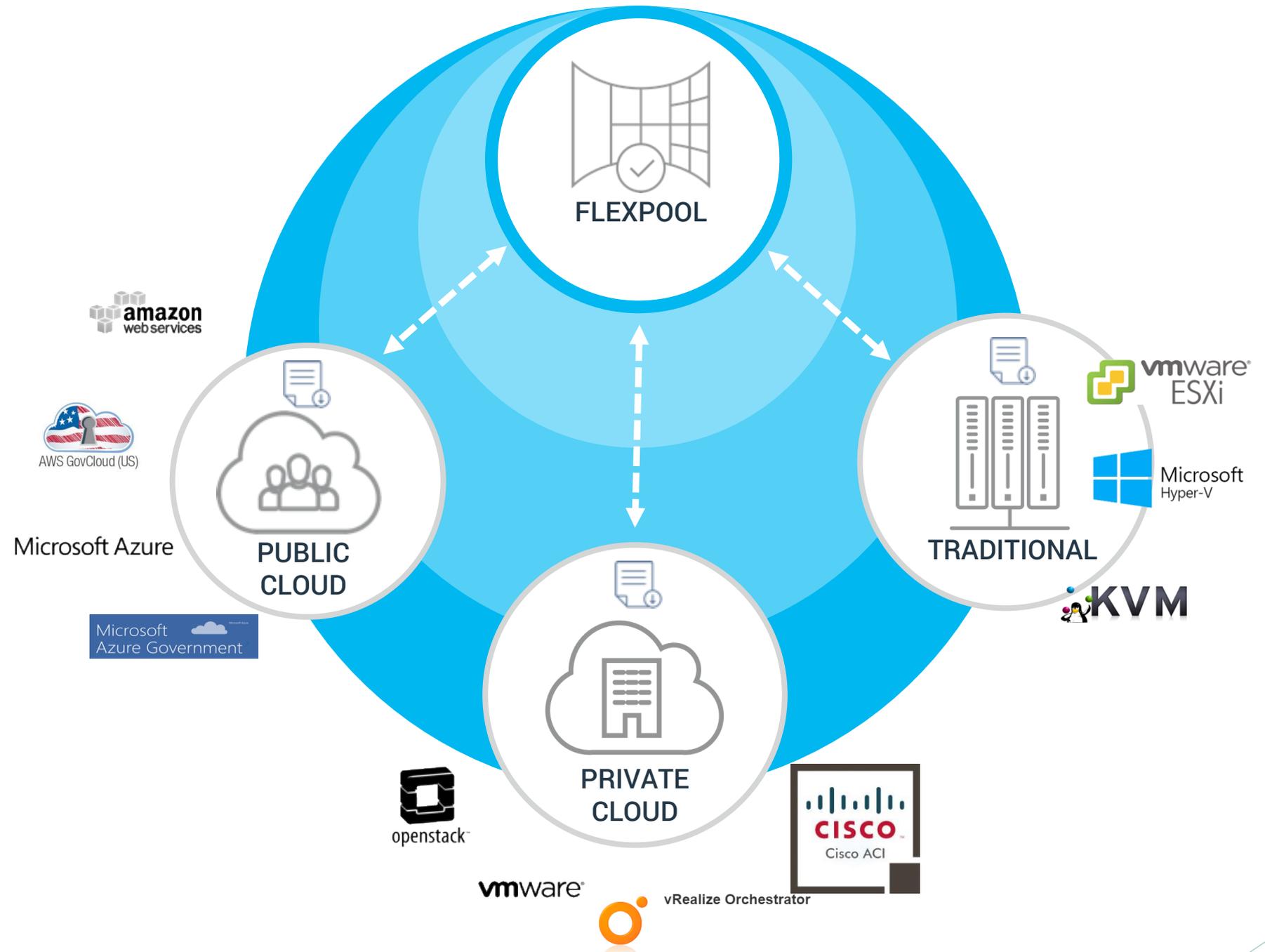
FlexPool Benefits

FLEXIBLE ALLOCATION

- Shared capacity pool
- Dynamically scale capacity (no reboot)
- User defined Instance sizes

INVESTMENT PROTECTION

- License portability
- Eliminate overprovisioning
- Software upgrades & maintenance included

OPERATIONAL SIMPLICITY

- Centralized license management
- Visibility and usage monitoring
- All inclusive, Multi Services

Aligns Consumption with Business Needs

Other vThunder Appliances and Flexible Billing Options

vThunder for AWS or Azure

- 10 Mbps to 1 Gbps licensing
- 1 click provisioning of 64-bit Amazon Machine Image (AMI)
- EC2 or VPC environments
- No feature limitations; licensed by bandwidth
- BYOL perpetual license or hourly based license

| RENT (RBM)	UTILITY (UBM)
License per Month	License per Byte

vThunder Pay-as-You-Go Licensing

- Elastic & adaptive
- "Pay-as-you-Go" metering
- Automated licensing
- For IaaS providers only

Application Availability

# *Performance and SLB: Scaling Capacity for Peak Loads*

○ Large capacity to handle high traffic volumes in 1RU

- Up to 220 Gbps throughput
- 10 M new sessions/sec
- 256 M concurrent sessions

○ Benefits

- Highest performance to price with smallest footprint
- Diverse form factors including highest capacity hardware, virtual and bare metal platforms
- Optimized for maximum performance with ACOS
- Hardware offload
- All-inclusive performance on hardware appliances

Internet

A10 Thunder ADC
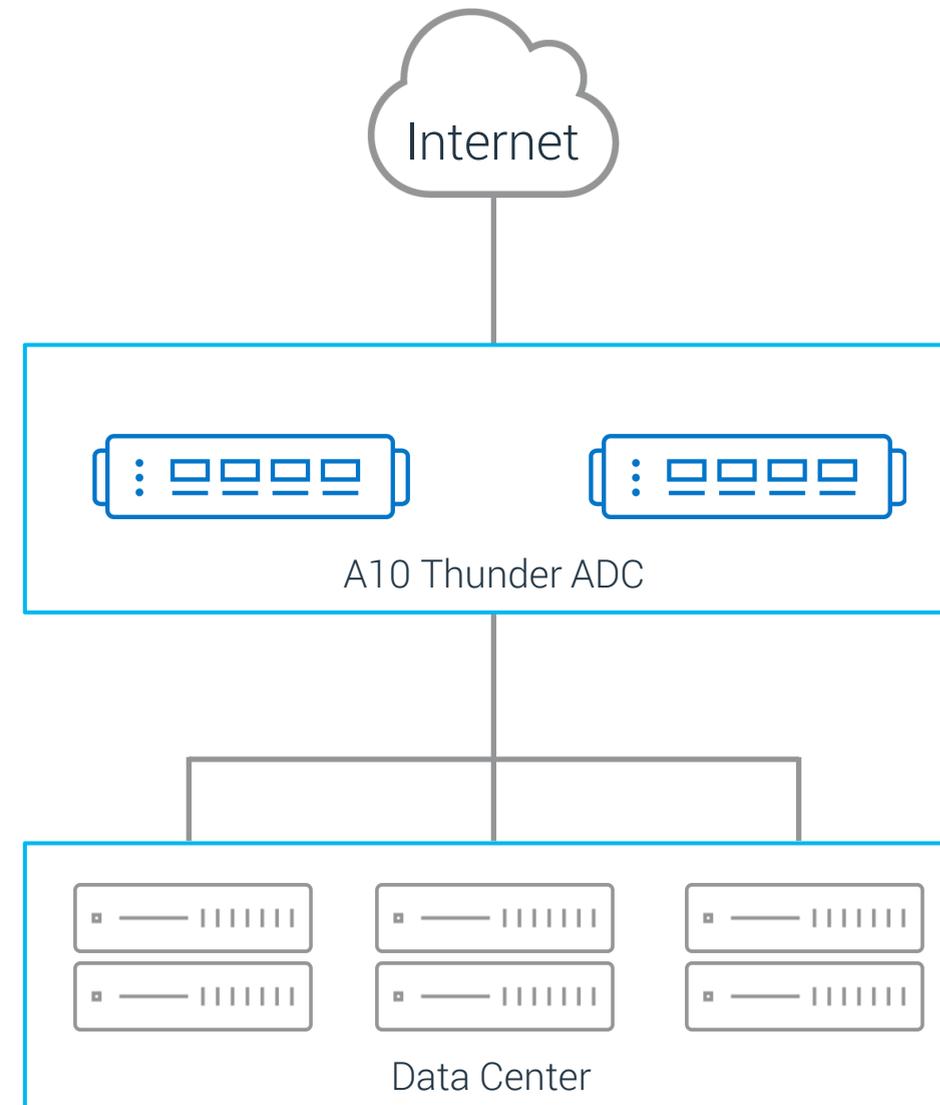
- ACOS performance
- No restrictions
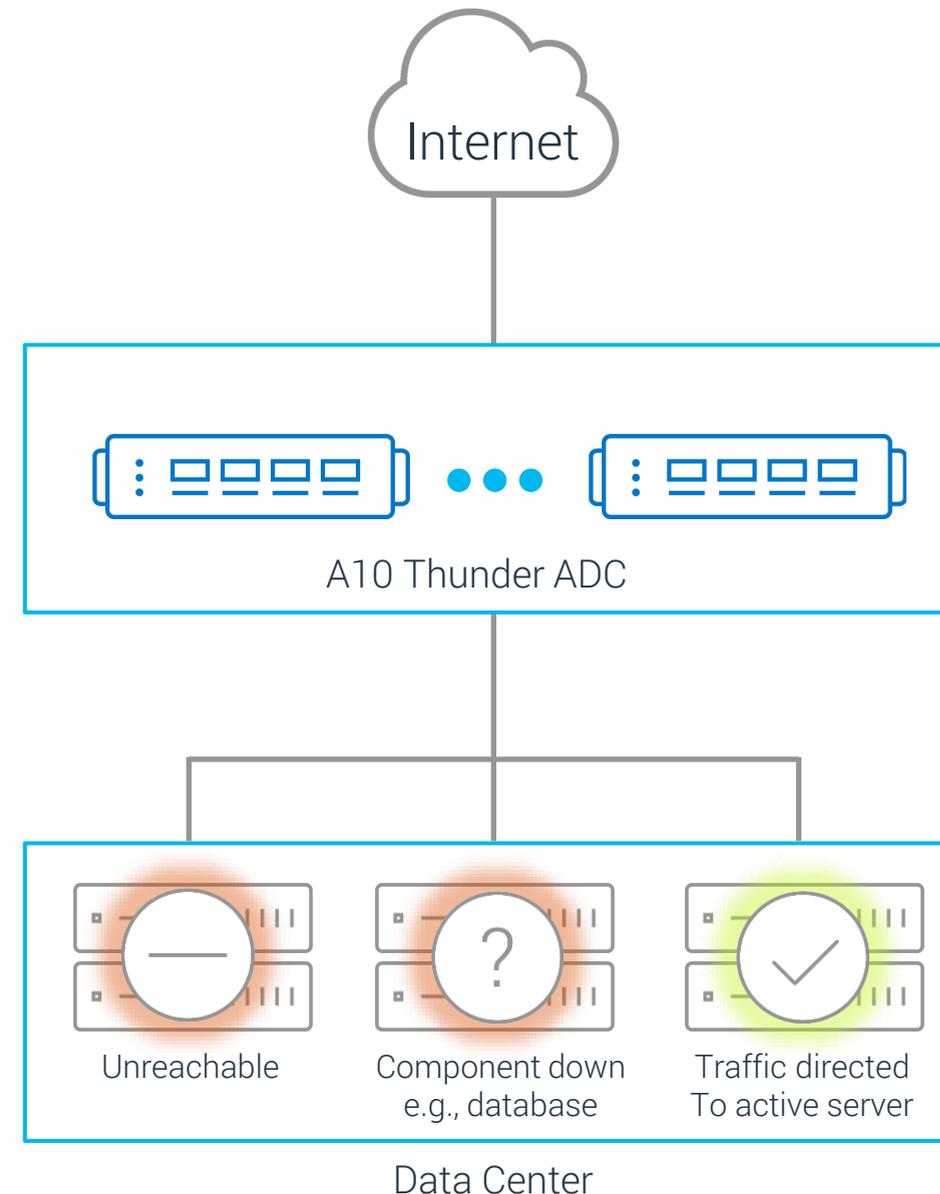- Hardware offload

Data Center

High Availability: For Uninterrupted Operation

o Eliminates the ADC as a point of failure

o Benefits

- Sub-second failover

- VRRP support

- Active-standby, active-active or N+1 options

- Stateful failover to preserve sessions

Internet

A10 Thunder ADC

Data Center
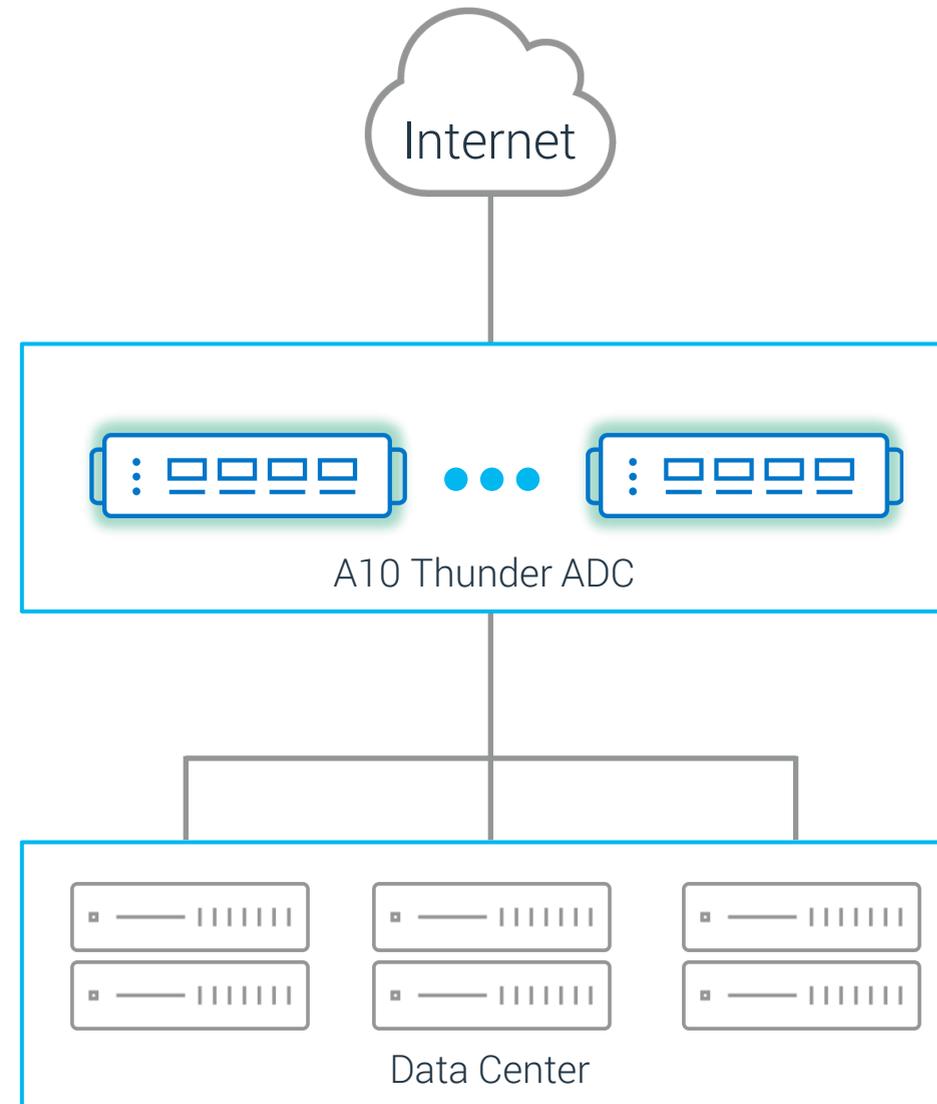
Health-checks: Complete Application Fault Detection

o Ensures servers are able to handle users as intended

o Benefits

- Users always receive the optimal experience

- Ensures all components needed are functioning

- Detects network or application errors using TCL, Bash, Python, or Perl scriptable health checks

Internet

A10 Thunder ADC

Unreachable

Component down
e.g., database

Traffic directed
To active server

Data Center

GSLB: Intelligence for Global Operations

o Provides multi-data center resiliency

o Benefits

- Enables disaster recovery on failure or active-active data centers

- Provides an amazing user experience by selecting the data center:

  - Closest in location to the user

  - With the fastest response time

  - Based on the browser agent, language or user settings of the client

Internet

Geo Site

A10 Thunder ADC

Data Center
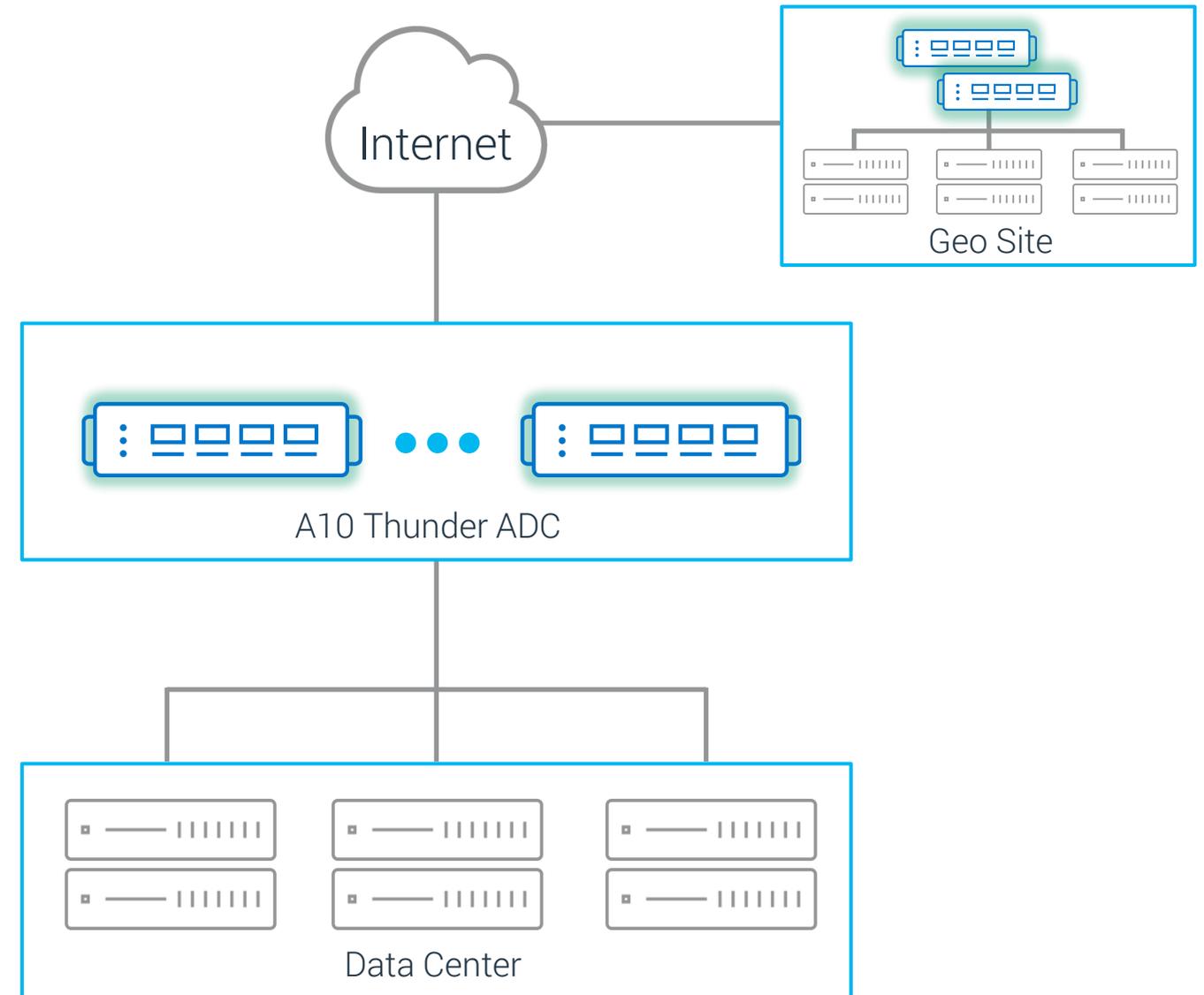
Application Acceleration

TCP Optimization: Improve Application Performance

o Reduces TCP connection management overhead

- • TCP reuse (multiplexing) to offload server connection setup and tear down

o Benefits

- • Increases overall server capacity
- • Reduction in connections
- • Improved response times less required servers

o Details

- • Server TCP stack offload
- • Persistent connection to servers

Internet

Many TCP Connections

A10 Thunder ADC

Reduced TCP Connections

Data Center
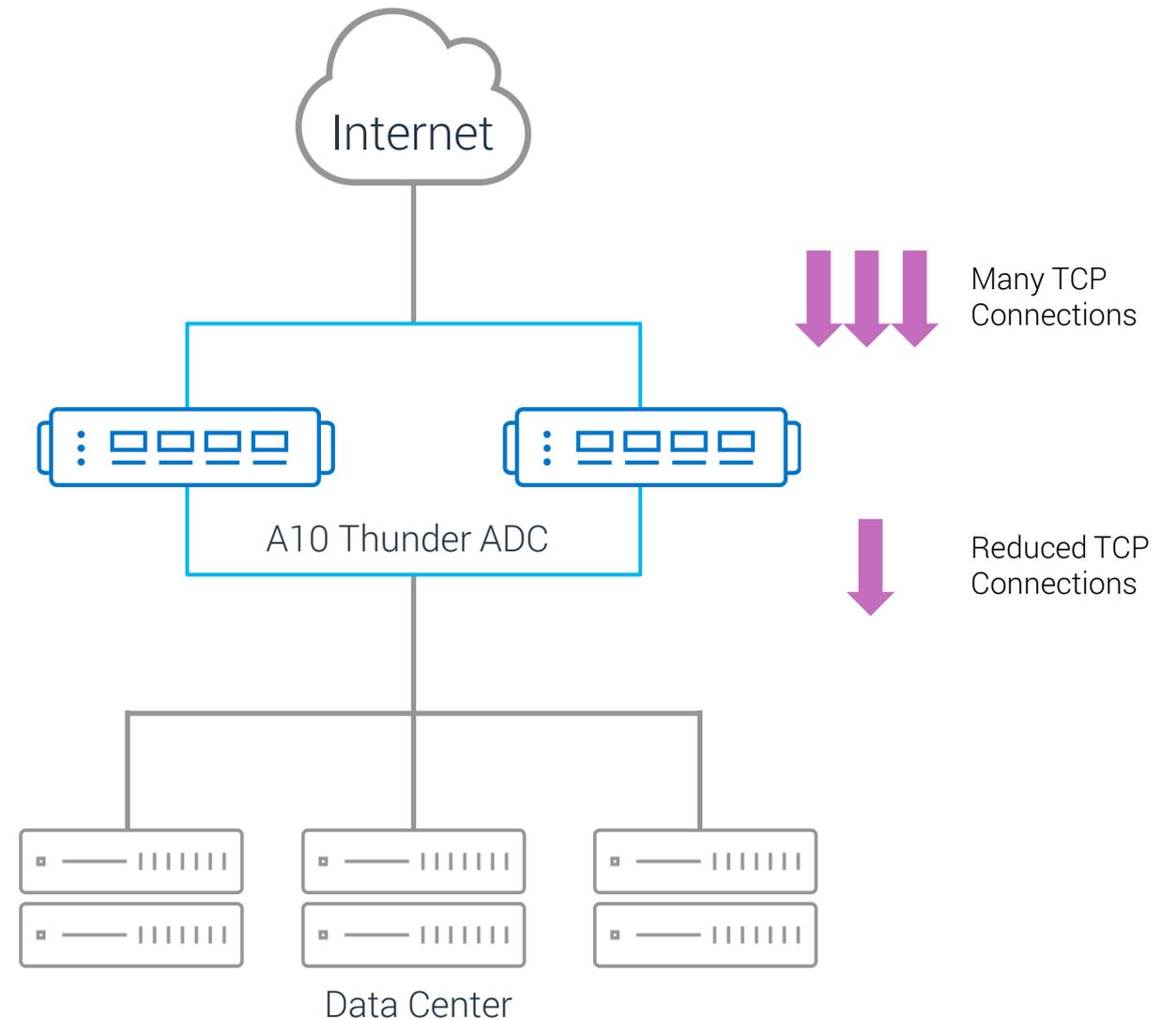
SSL Acceleration: Secure Applications

o Offloads compute intensive SSL traffic

- Hardware security processor assist

o Benefits

- Eliminates high SSL CPU overhead from servers
- Servers support many more transactions per second
- Simpler certificate management
- Option for factory upgrades to newer hardware

o Details

- Advanced ciphers: ECC, PFS, SHA3, TLS 1.3
- 8192, 4096-, 2048-, and 1024-bit keys
- 2x key size = 3x to 7x drop in legacy SLBs capacity

Internet

A10 Thunder ADC

Data Center

Secured HTTPS

Unsecured HTTP
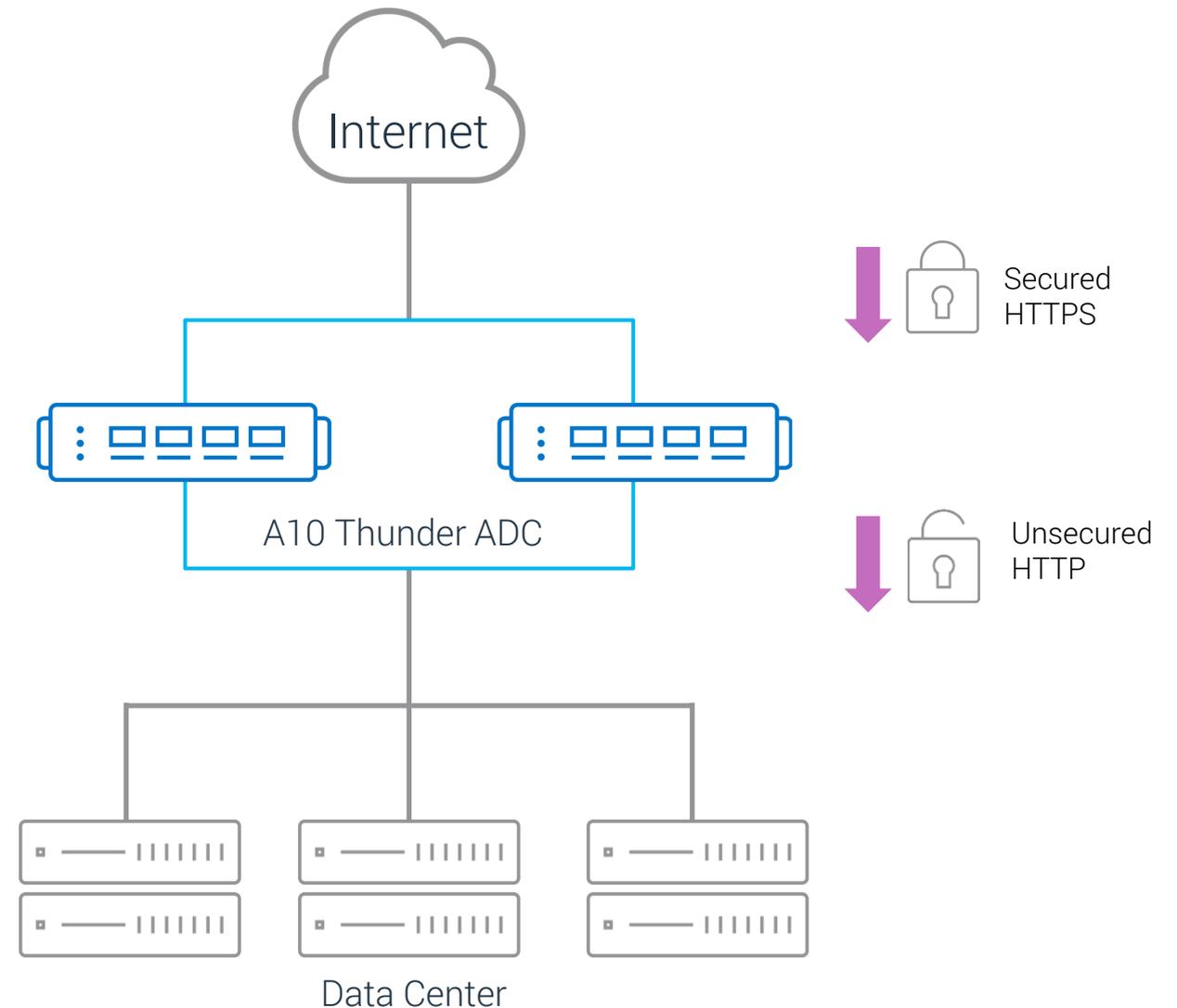
3rd Generation SSL Advanced Cipher Support

o Available with all Gen 4 hardware and bare metal software appliances

o Latest SSL/TLS ciphers for ECC/PFS

o 10x performance boost

|	Cipher
Cryptographic protocols	o TLS 1.1/TLS 1.2 o TLS 1.3*
Authentication - Prove the server identity	o RSA 2048/4096 o RSA 8192/ECDSA P192/P224 o ECDSA P256/P384 o ECDSA P521
Symmetric encryption - Confidentiality	o 3DES/AES
MAC: Message Authentication Code - Integrity	o MDS; SHA-1; SHA-2 o SHA-3*

*roadmap

RAM Caching: Faster Page Loads Equal More Revenue

o **RAM Cached objects served from the Thunder ADC**

- Eliminates repetitive fetches for frequently requested objects

o **Benefits**

- Faster response to the end user
- Reduce connections and server requests
- Reduce servers due to offloaded traffic

o **Details**

- Static or dynamic support
- Extensive object type support

Internet

A10 Thunder ADC

Repeated Requests
Served From Cache

Data Center
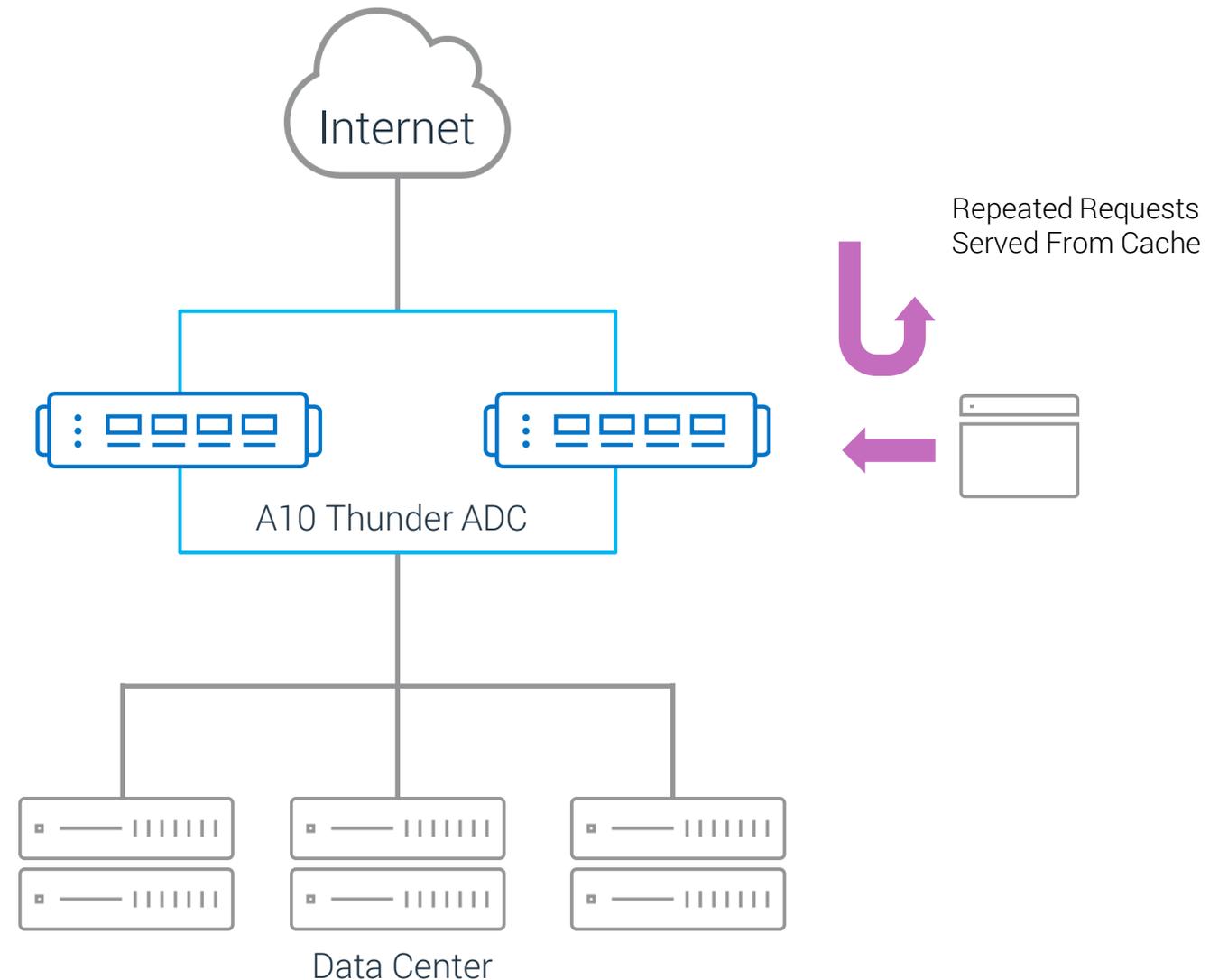
Compression: Optimize Any Bandwidth Level

o Reduces transmission size for HTTP
- Smaller payload to transfer to the end user

o Benefits
- Optimize traffic for international, mobile, legacy devices, etc.
- Faster delivery to end-user
- Offloads Web server CPU cycles

o Details
- Gzip and deflate encoding support
- Hardware or software options

Internet

A10 Thunder ADC

Compressed Traffic

Uncompressed Traffic

Data Center
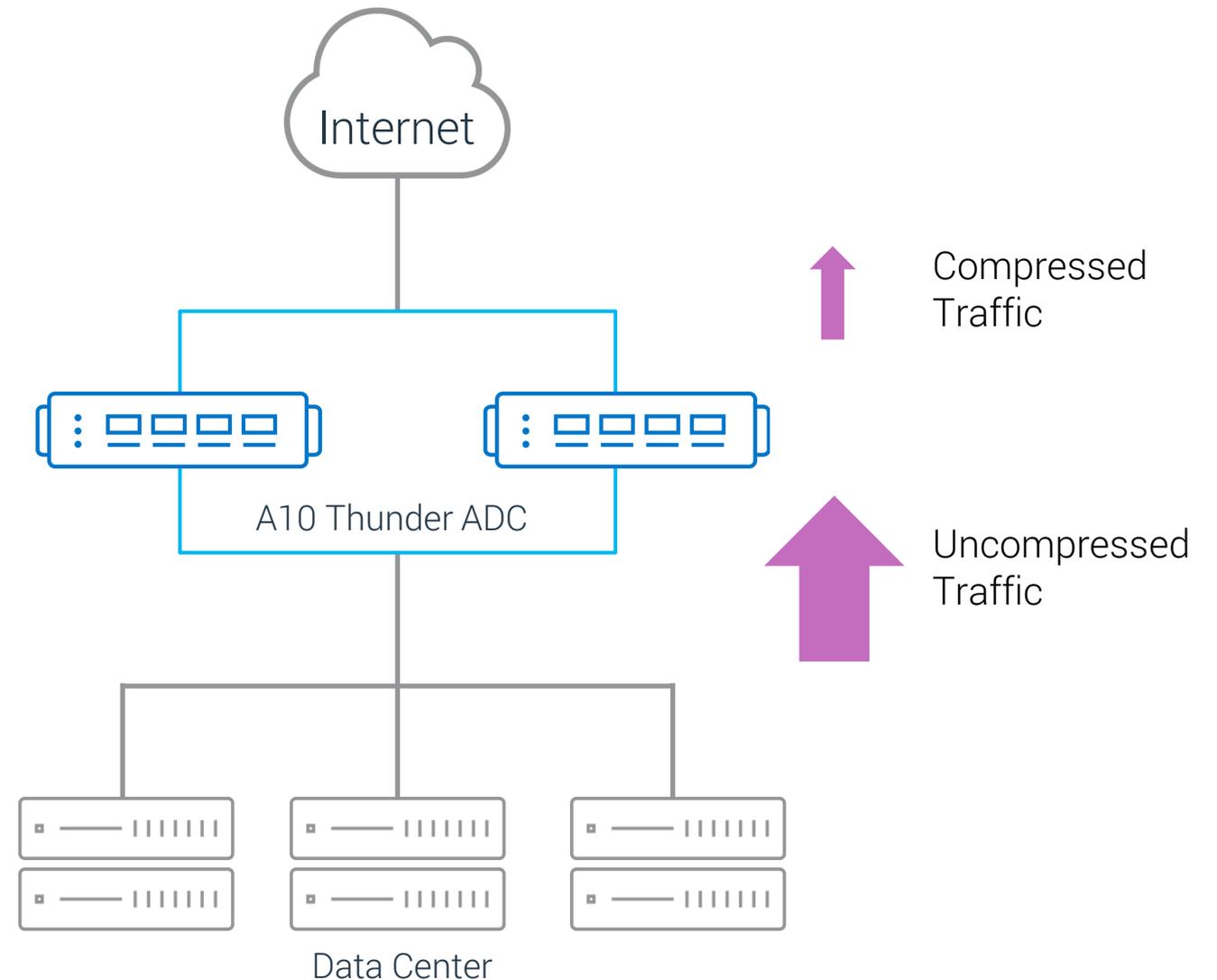
HTTP 2.0: Accelerated App Delivery

HTTP/2

- Download improvement over HTTP of 30-60%
- Fewer packet transfers with less TCP connections
- Reduced packet loss

- Superior Mobile/high-latency performance
- Wide browser support
- Gateway converts HTTP 1.1-based apps to HTTP 2.0

HTTP2://   HTTP://

Browsers

APP

* Requires v 4.1.4
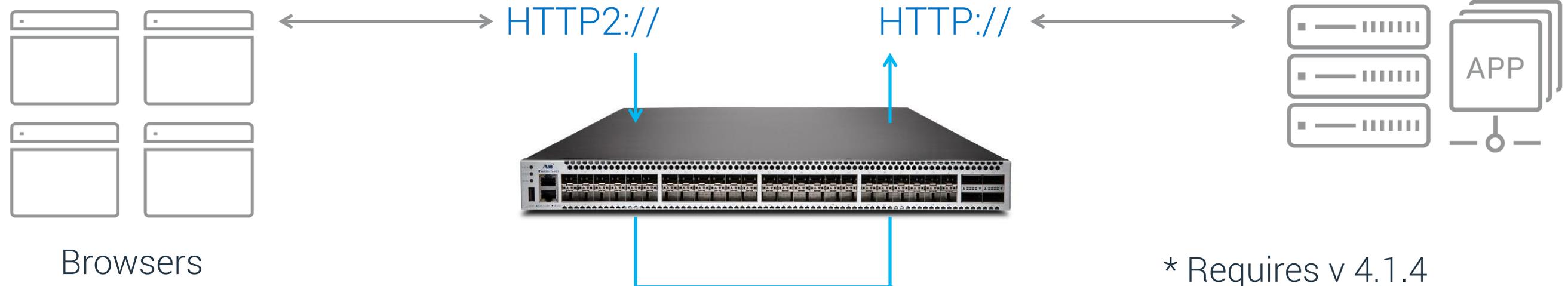
Application Security

Web Application Firewall (WAF)

Eliminate Common Web Attacks

BENEFIT

o   Protect web applications

o   Ensure against code vulnerabilities and assist PCI-DSS/HIPAA compliancy

o   Prevent damage to intellectual property, data and applications

ADVANTAGE

o   Fully integrated/designed for ACOS

o   No license; single device solution

o   Scalable and high performance

o   ICSA Certified

ICSAlabs
CERTIFIED WEB APPLICATION FIREWALL
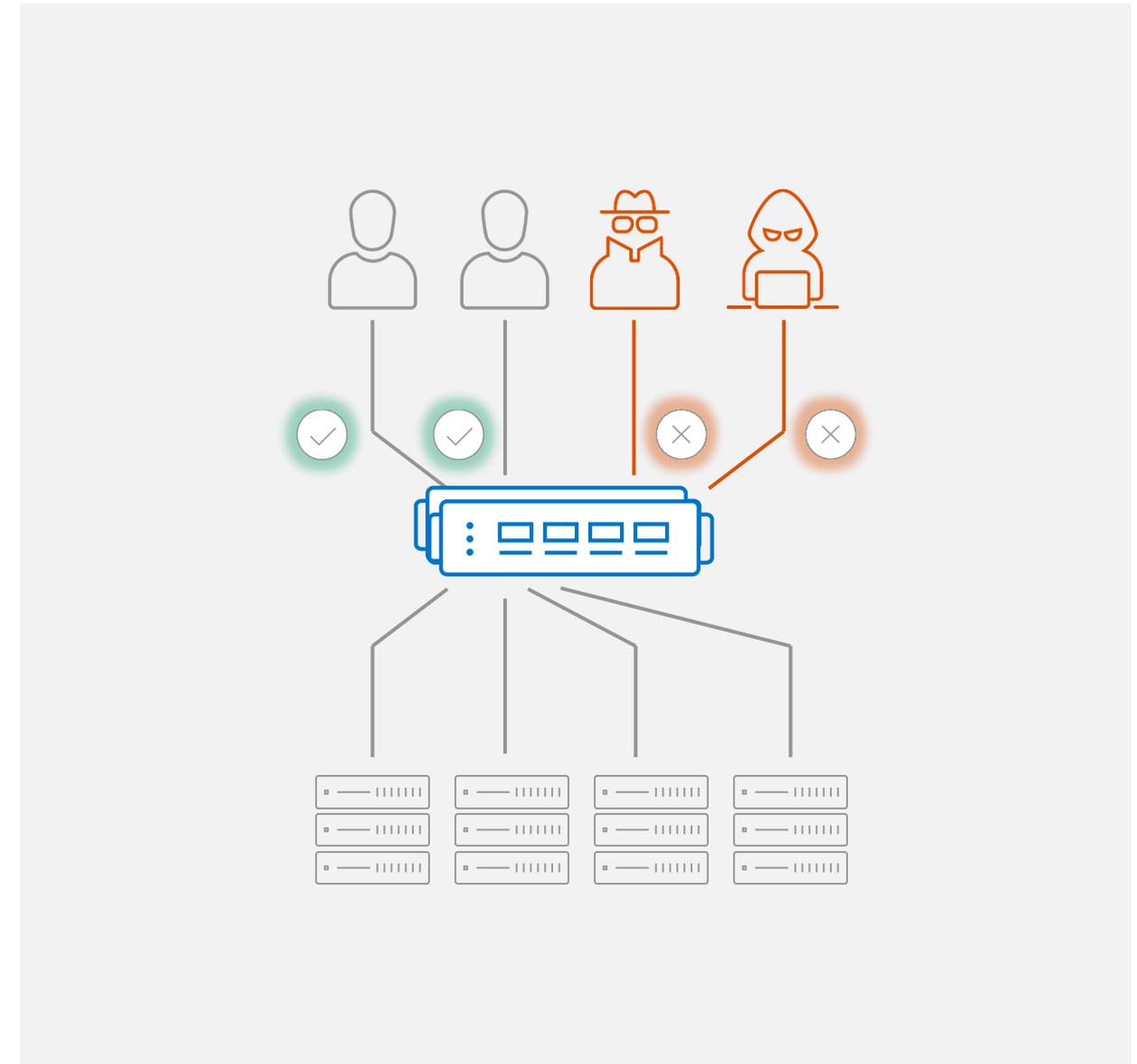
Application Access Management (AAM)

Seamless Authentication

BENEFIT

- Offloads authentication processing from web and application servers
- Consolidates multiple authentication points to simplify access management
- Enables Single Sign-on for multiple applications
- Custom authentication and authorization policies based on user, VIP, ACL or requested URL

ADVANTAGE

- Supports popular authentication methods and services such as SAML, RADIUS, LDAP, OCSP and Kerberos
- No adjustment to web servers or infrastructure

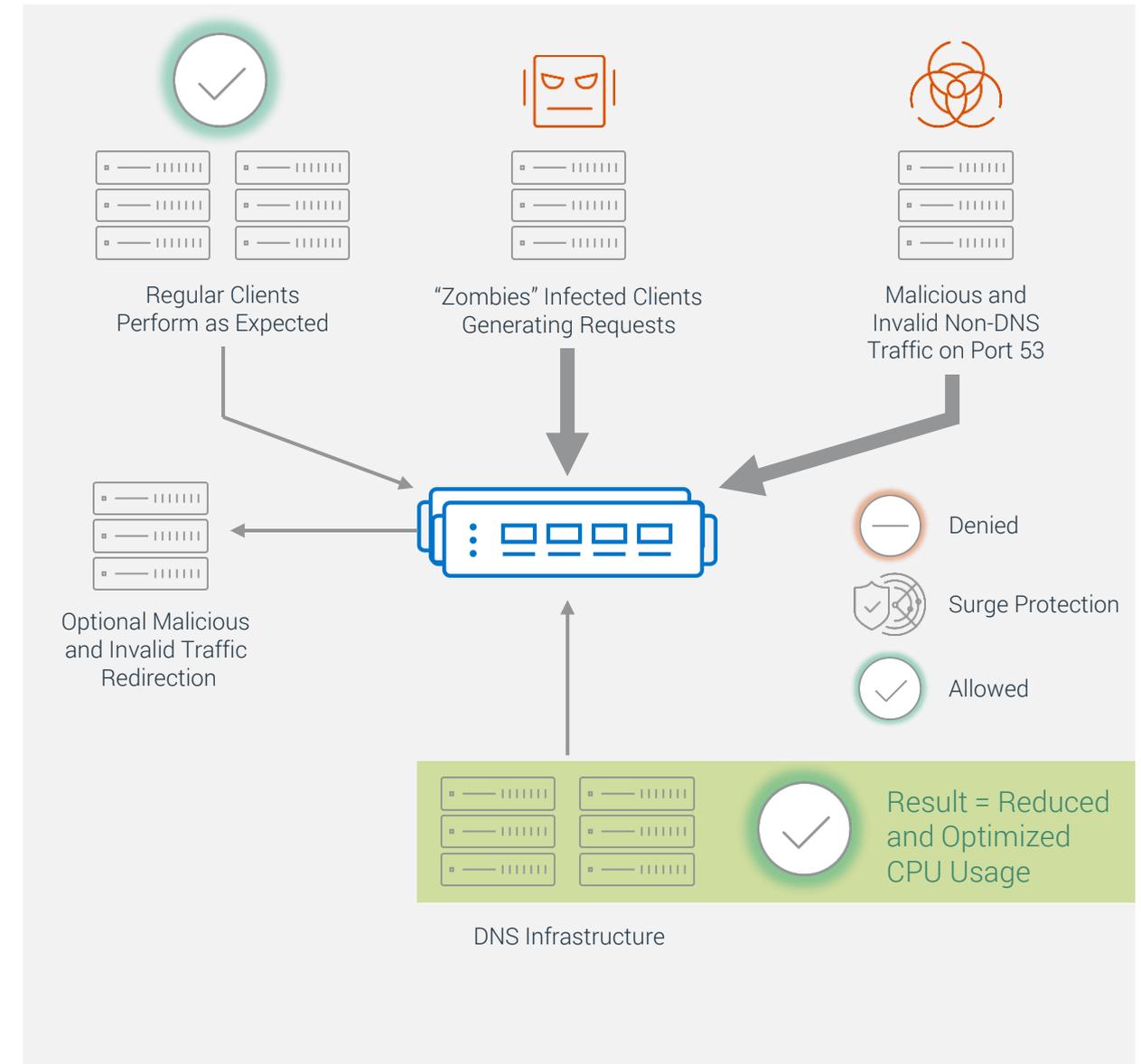Access Granted
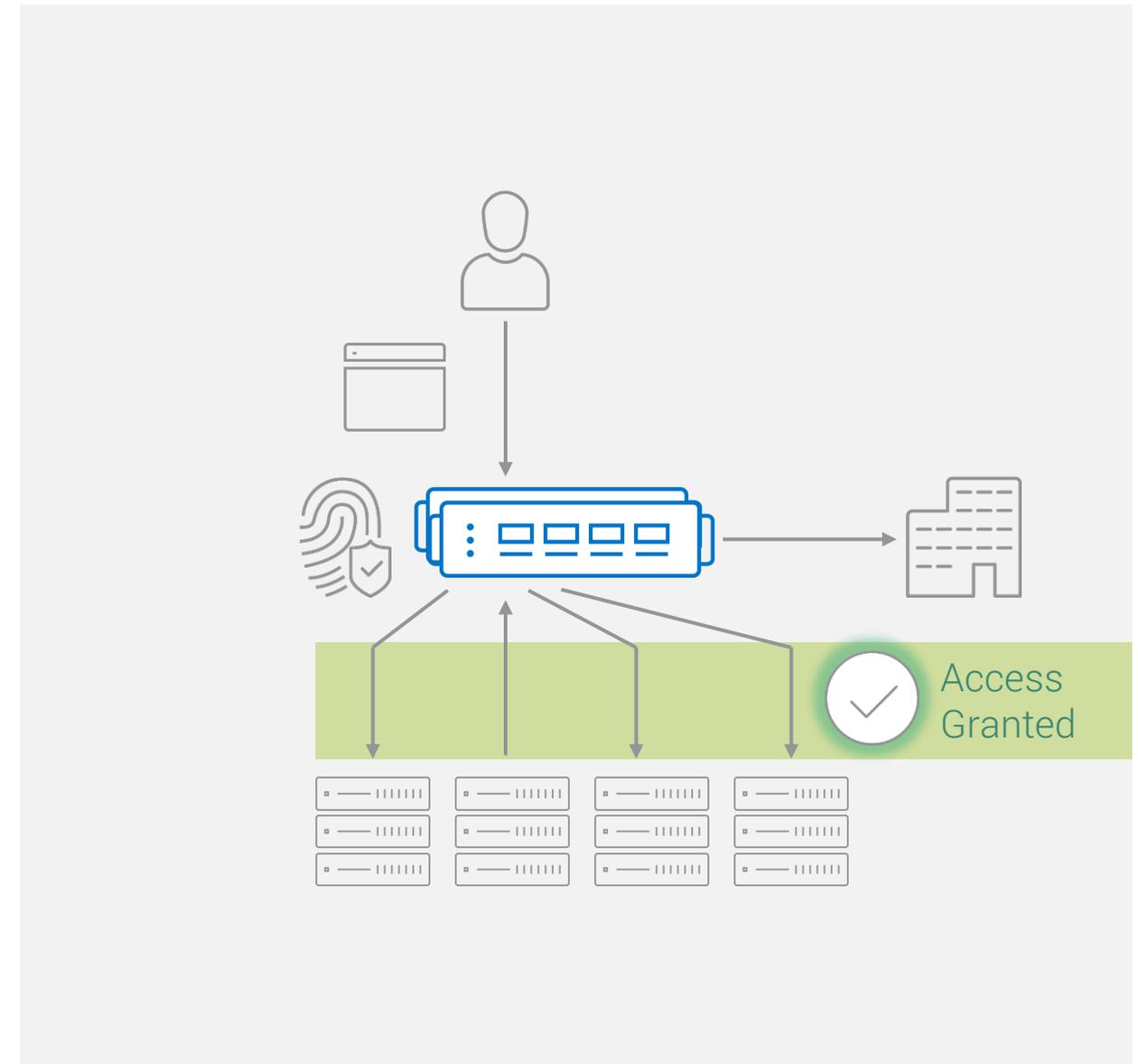
DNS Application Firewall

Protect Critical Infrastructure

BENEFIT

- Uninterrupted DNS services
- Protects vulnerable infrastructure
- Ensures infrastructure cannot be a weapon against a 3rd party

ADVANTAGE

- Blocks non-DNS traffic (up to 70%)
- Surge protection
- Full DNS command set (aFleX and built-in)
- Redirection for "honey pots"

Regular Clients Perform as Expected

"Zombies" Infected Clients Generating Requests

Malicious and Invalid Non-DNS Traffic on Port 53

Optional Malicious and Invalid Traffic Redirection

Denied

Surge Protection

Allowed

Result = Reduced and Optimized CPU Usage

DNS Infrastructure
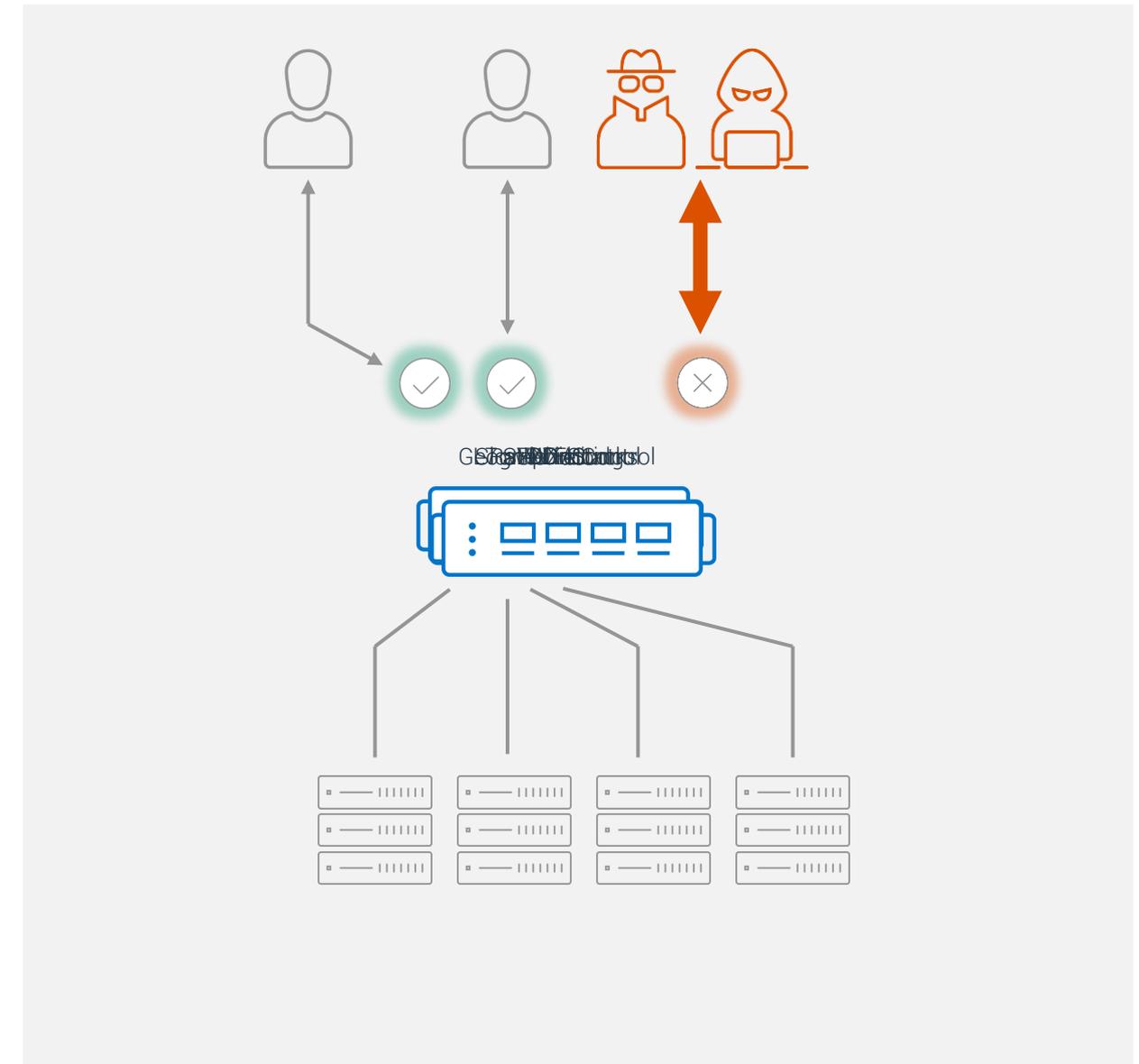
DDoS Protection

Multi-vector Edge Protection

BENEFIT

- Large-scale DDoS protection
- Advanced protection features
- Predictable operations

ADVANTAGE

- Full DDoS defense covers network and application attacks
- Hardware DDoS protection for common attacks
- SYN flood protection to 200 M per second

ADC Management

Secure Application Services: Business Portal

A10 BUSINESS PORTAL

Product Inventory

Manage Licenses

Software Documentation

Community/Forums

Central ecommerce portal to manage A10 product related information

Ease of Use and Management

o Management Plane
- Multiple dedicated core(s)
- Quick response times

o CLI (Command Line Interface)
- Industry standard CLI, familiar interface
- Easy to use, comprehensive help
- "Cisco-like" reduces learning curve

o Fully programmable via aXAPIs

o Conversion of 'Contexts' to ADPs

o GUI (Graphical User Interface)
- Fewer screens and steps for tasks
- Intuitive and easy to use

CONFIDENTIAL | DO NOT DISTRIBUTE

aFleX:

Comprehensive DPI and Traffic Management

o Deep packet inspection and scripting language

o Benefits

- Adjust traffic and L7 data as needed

- Fix or optimize applications

- Complete traffic control
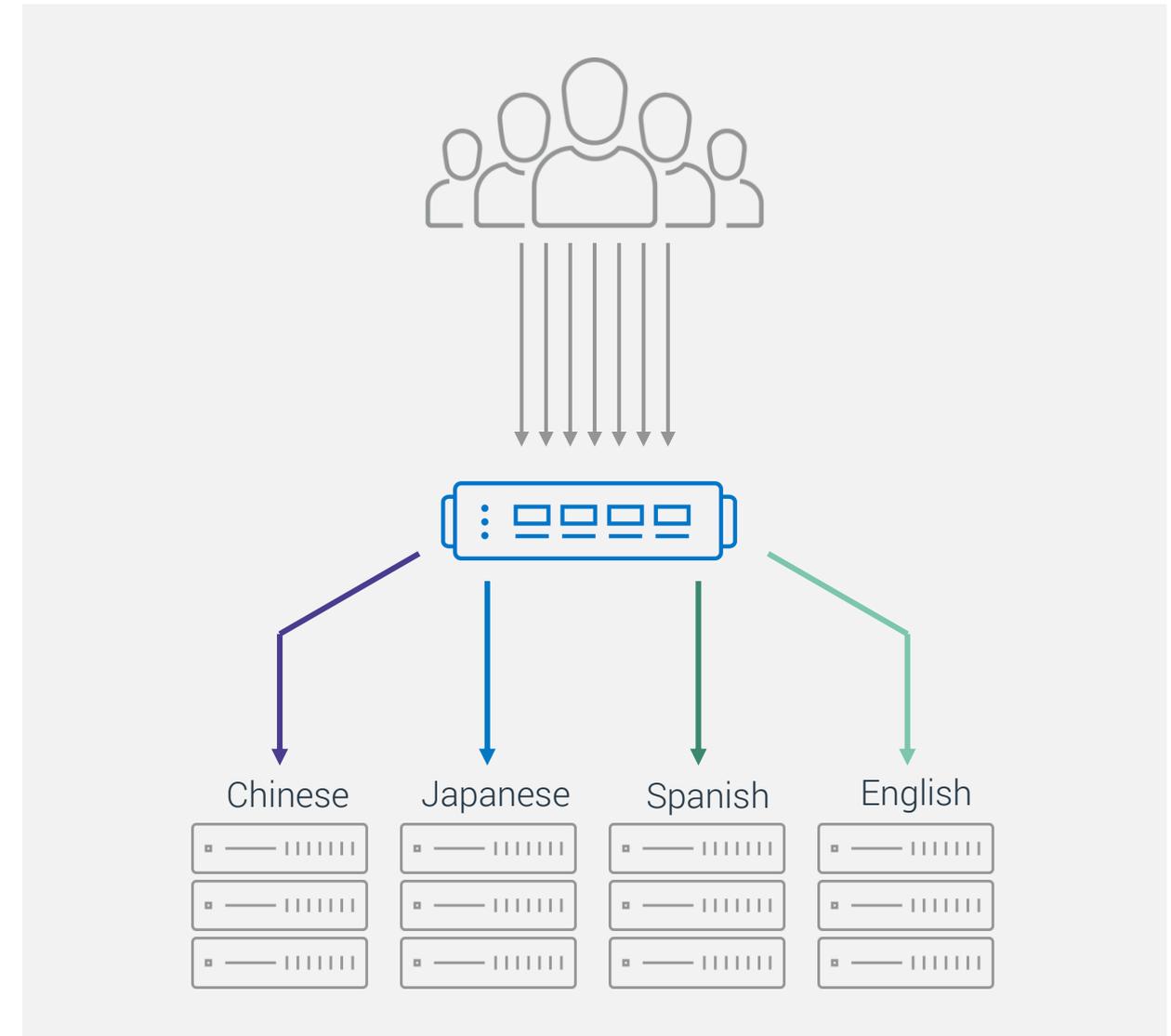
Example: Automatically displays a Web page based on the user's language, using the language set in the user's browser.

aXAPI

Customizable Management Options for Integration

o **Integrate into Third-party Applications**
  - Reporting
  - Centralized configuration management
  - Provisioning

o **Custom Management Solutions**
  - Integrated into homegrown apps versus using the A10 CLI or GUI

o **Interactive Infrastructure**
  - Applications can issue triggers to change traffic management behavior based on external events
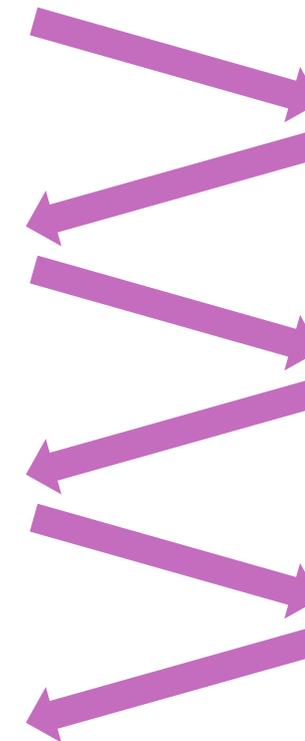
Third-party Application

| aXAPI |

Authentication request, containing Thunder admin username and password.

If authentication is successful, Thunder replies with a session ID and status 200 - ok

Configuration or monitoring request, containing the session ID
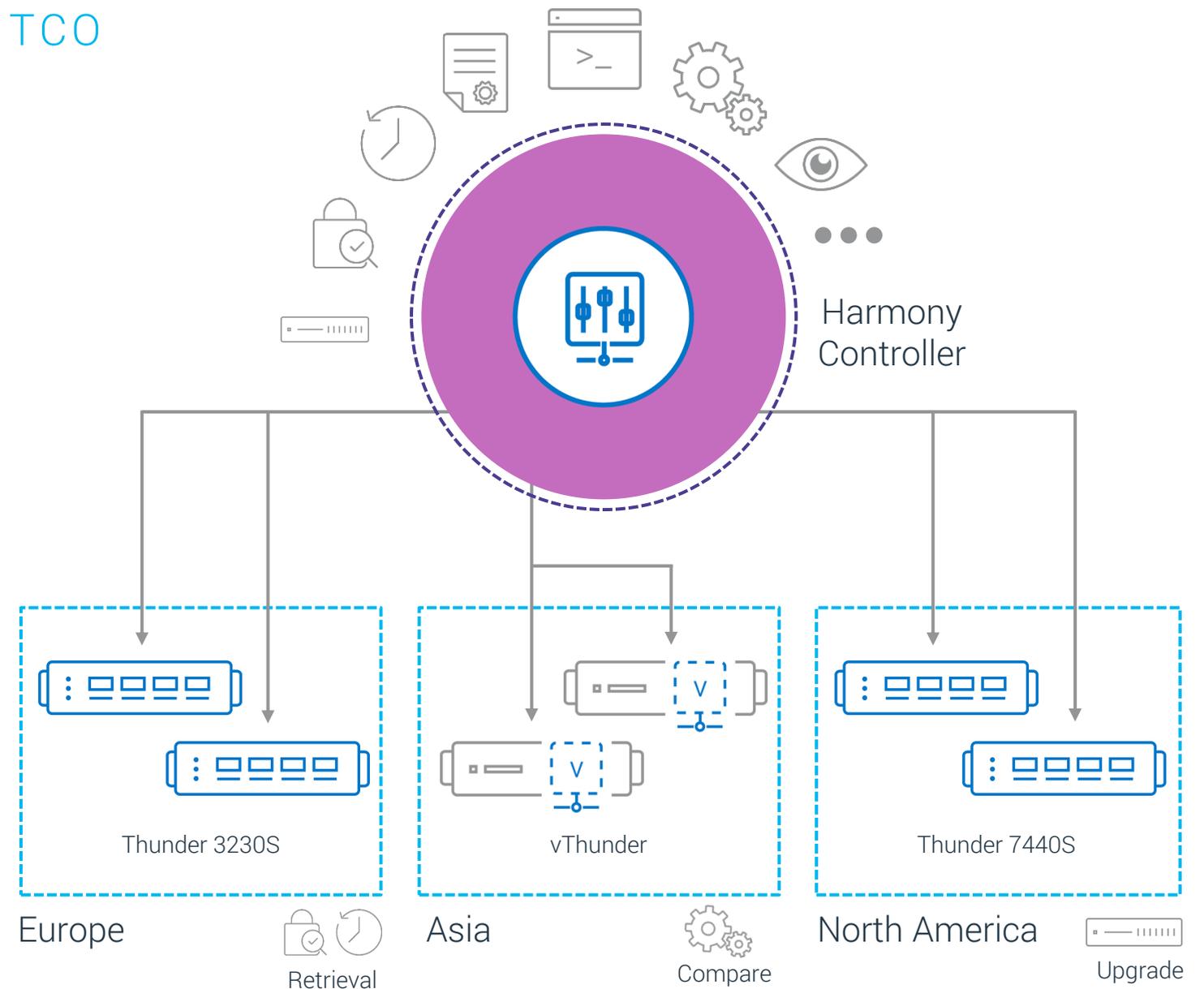
If session ID is Valid, and session has not timed out or been closed, Thunder performs the requested action and replies with status 200 - OK

Next configuration or monitoring request, containing the session ID

Thunder performs requested action, if session ID is valid and session has not timed out or been closed

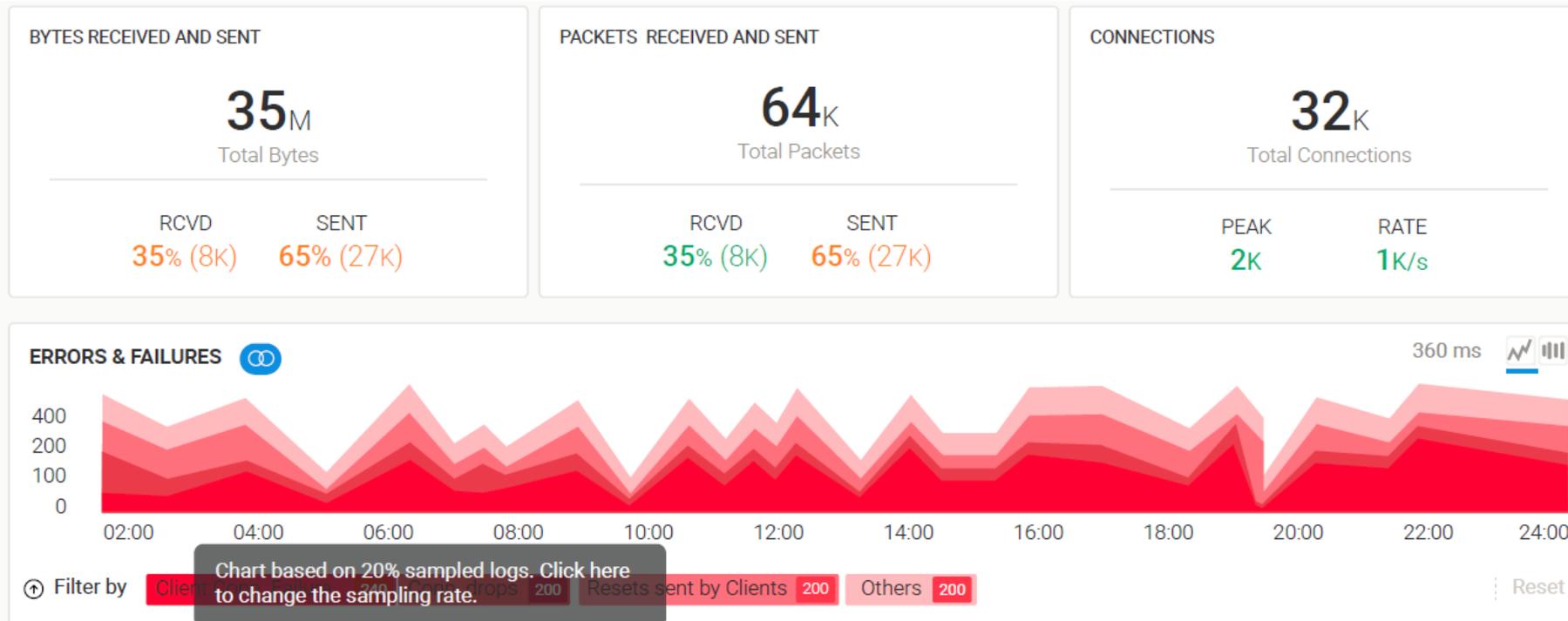Third-party application sends session close request or allows session to time out.

Harmony

Centralized/Automated Operations for Lower TCO

- Central network management system for all A10 devices

- Automate repetitive tasks and eliminate human error

- Centralized control of events and configuration

- Faster operation for reduced OpEx

- Detailed L4-7 analytics

Harmony Controller

Thunder 3230S

vThunder

Thunder 7440S

Europe

Asia

North America
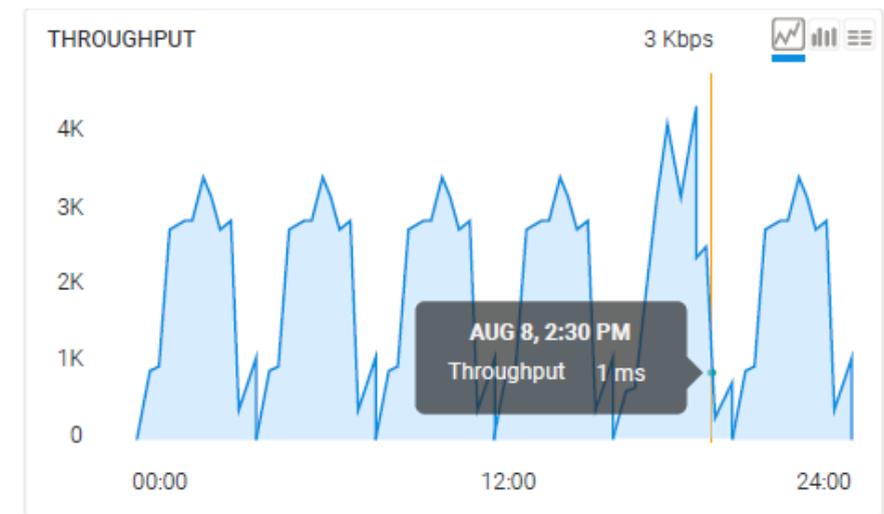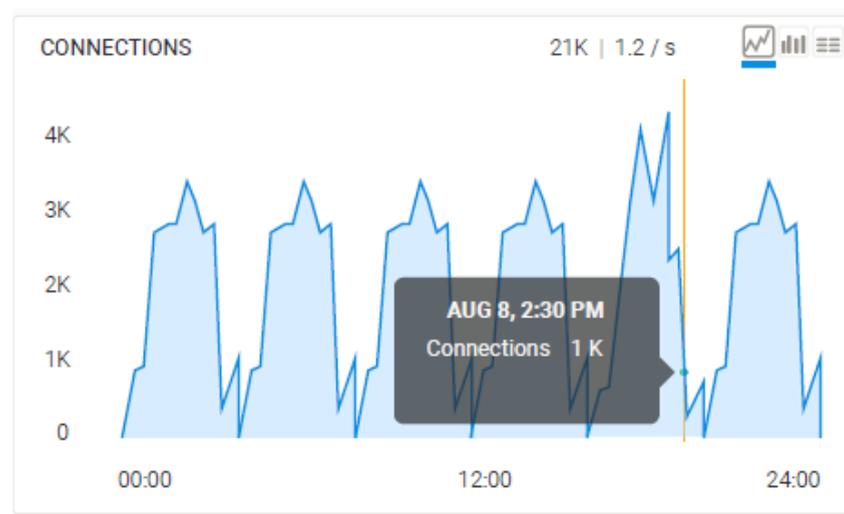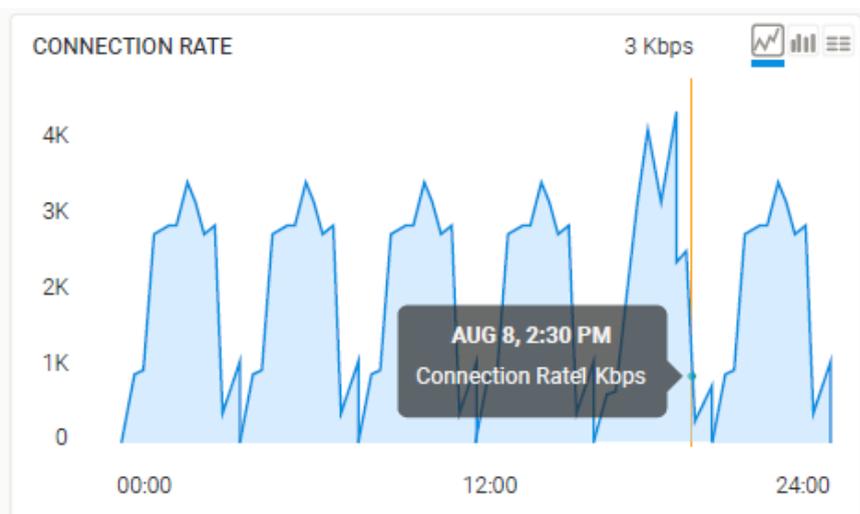
Retrieval

Compare

Upgrade

Granular TCP-Based Analytics: Client View
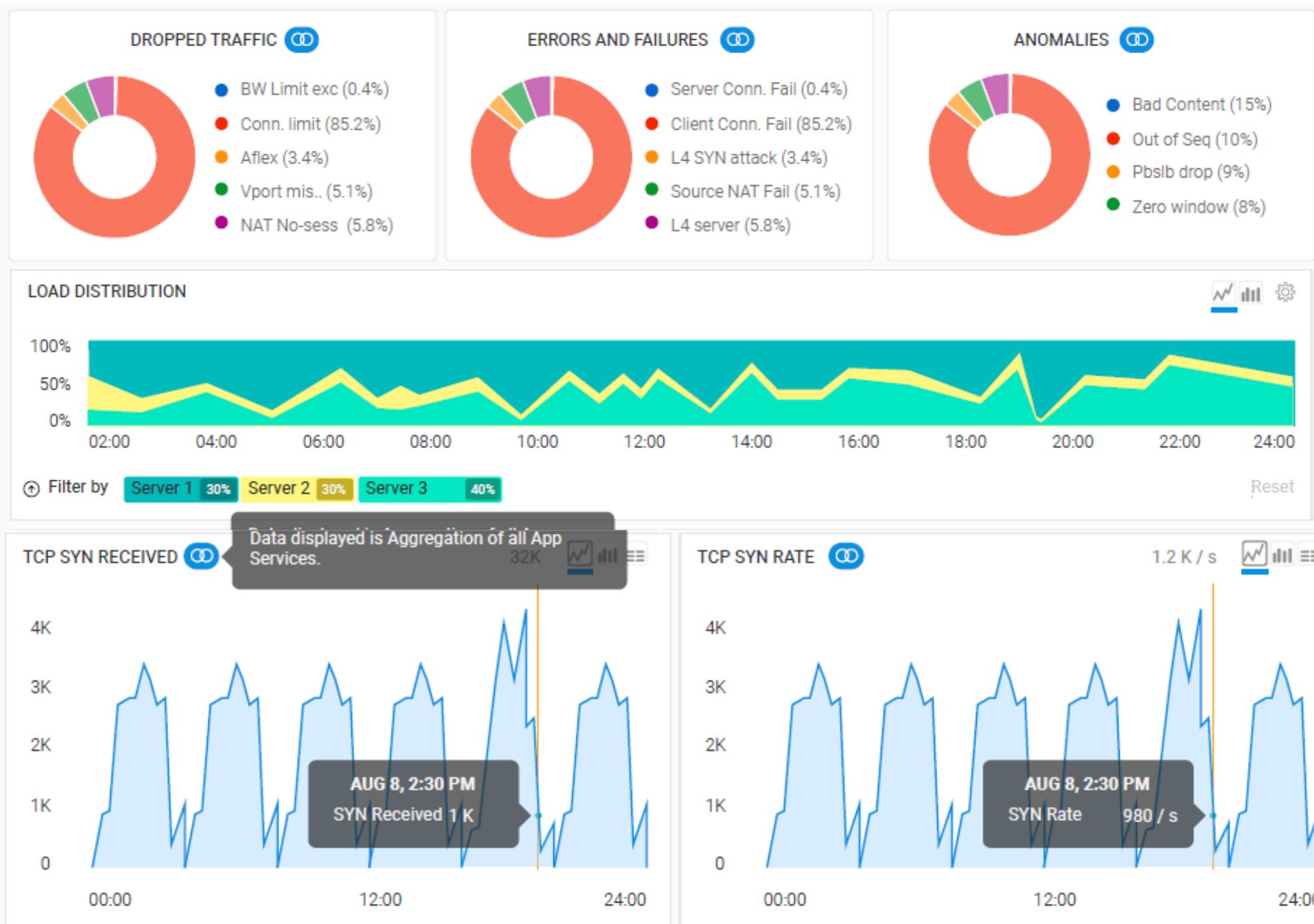

- Bytes and packets sent/received; Connections
- Errors and failures
- Top clients by: Bandwidth, Connections, Throughput

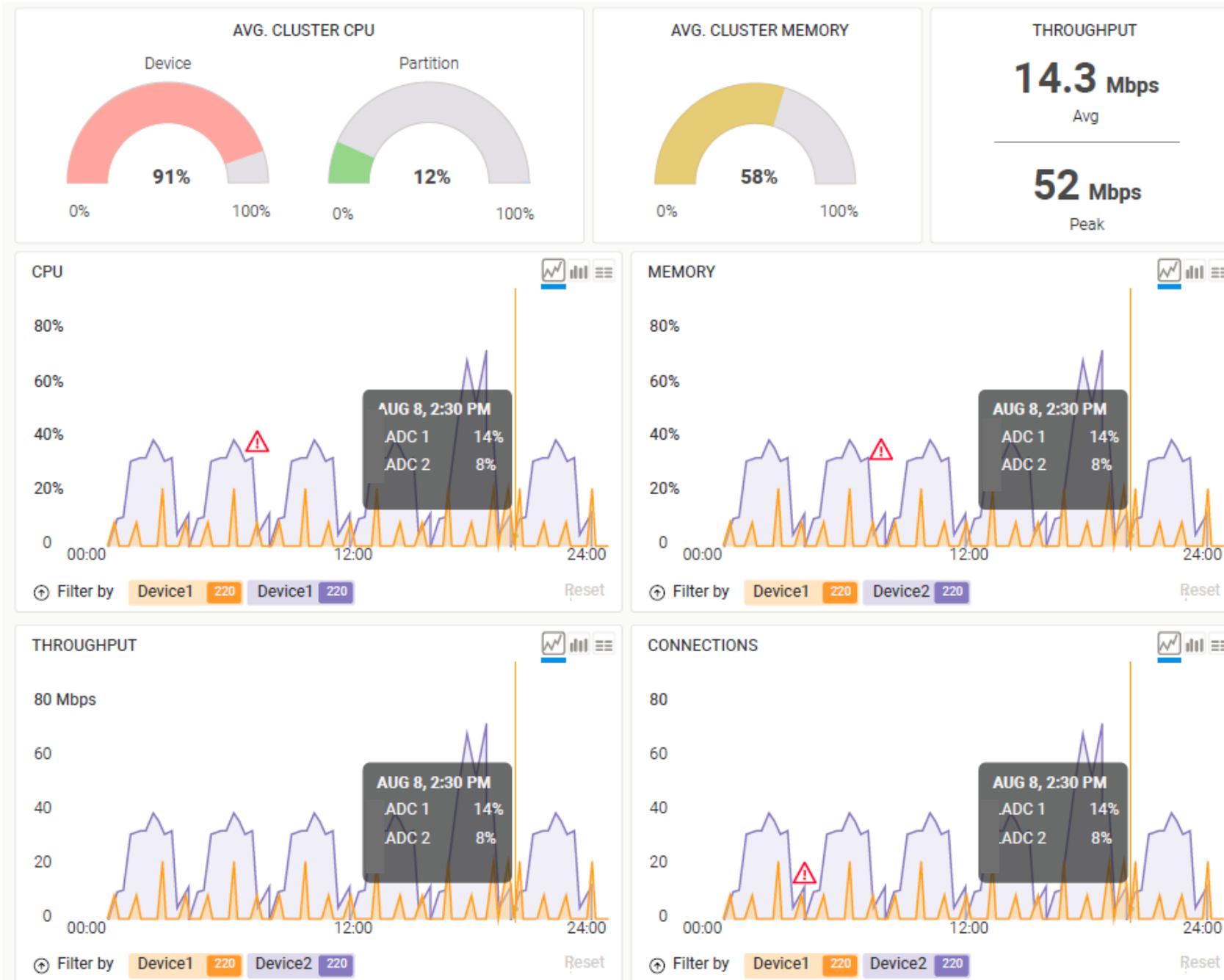• Preliminary Screen captures..
  Final Available in Q3 2018

Granular TCP-Based Analytics: ADC View

- Dropped traffic, errors/failures, anomalies
- Load distribution by server
- TCP SYN: received, rates
- DSR received

• Preliminary Screen captures..
  Final Available in Q3 2018

Granular TCP-Based Analytics: Cluster View

- Average cluster CPU by device and partition

- Average cluster memory

- Average and peak throughput

- Connections

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- Preliminary Screen captures.. Final Available in Q3 2018

Granular TCP-Based Analytics: App Server View

- ○ Server health over time
  - ■ Traffic by server: Connections, rates, throughput, bytes and packets received/sent

- ○ Logs:
  - ■ Normal, errors, anomalies
  - ■ Filters by protocol, client, VIP

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• Preliminary Screen captures..
Final Available in Q3 2018

Ecosystem Integration and Partnerships

Infrastructure and Containers

App Services and DevOps

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Third-party Integrations

SDN/Cloud Orchestration Integration

- Achieve automation, operational agility, and reduced TCO

- SDN integration
  - Overlay & fabric integration
  - VXLAN and NVGRE
  - IBM SDN-VE, Cisco APIC, VMware NSX
- Cloud orchestration integration
  - Policy integration with Cloud orchestration platforms
  - aGalaxy, Microsoft SCVMM, VMware vCloud Director, OpenStack

A10 Plug-in for VMware vRealize Orchestrator

vRealize Automation

vSphere Web Client

vRealize Orchestrator Client

vRealize Orchestrator

A10 Plug-in

A10 vThunder
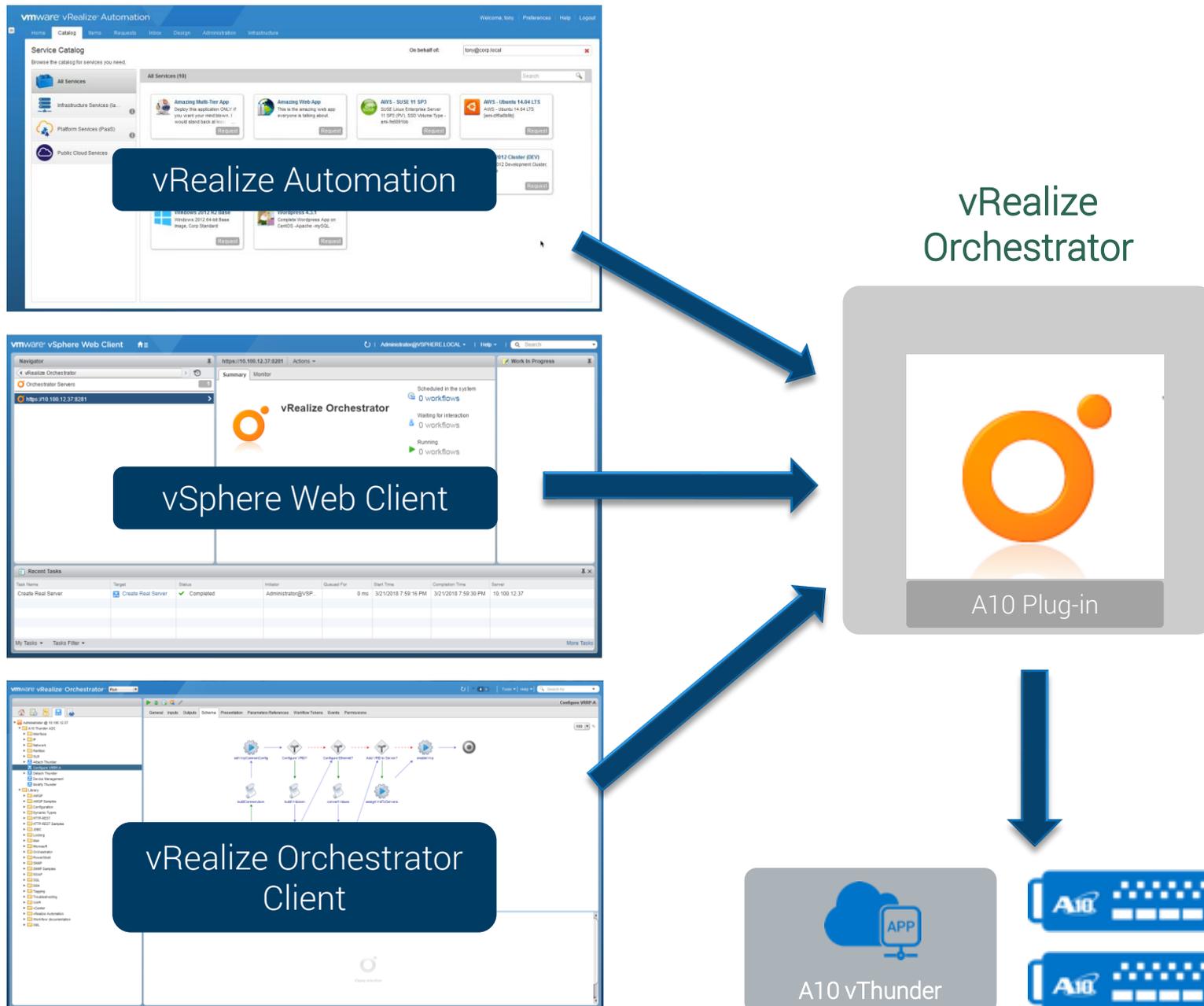
A10 Thunder ADC VRO Plugin

o Automatically provision Thunder ADC devices

o Physical, Virtual and Bare Metal

o Connect ADC to vRO workflow designer via A10 aXAPIs

o 50+ workflows for configuring L4-L7 functionality

o 75+ Action Scripts for ADC workflows

Built for DevOps and Infrastructure as Code

Integrated into
DevOps Processes

ANSIBLE

Jenkins

CHEF

Atlassian
Bamboo

puppet labs®

Travis CI

API Driven and
Programmable

python™

REST APIs

A10

Other Management Options

ADP/L3V, Templates and aVCS

o ADP and L3V Multi-tenancy

- Multi-tenancy for consolidation

- Separate admin look and feel, overlapping IP addresses

- Up to

  - 128 partitions

  - 1000+ L3V partitions

o Application Centric Templates

- Simplified configuration, monitoring and trouble shooting based on use cases

- Eases deployment, monitoring and operations

o aVCS clustering

- Single point of management

- Scale up to 8 units in a cluster

- Scale to 1.7 Tbps in a cluster

o Management processing

- Dedicate selectable number of cores

- Improved response times

Usability – App Centric Templates
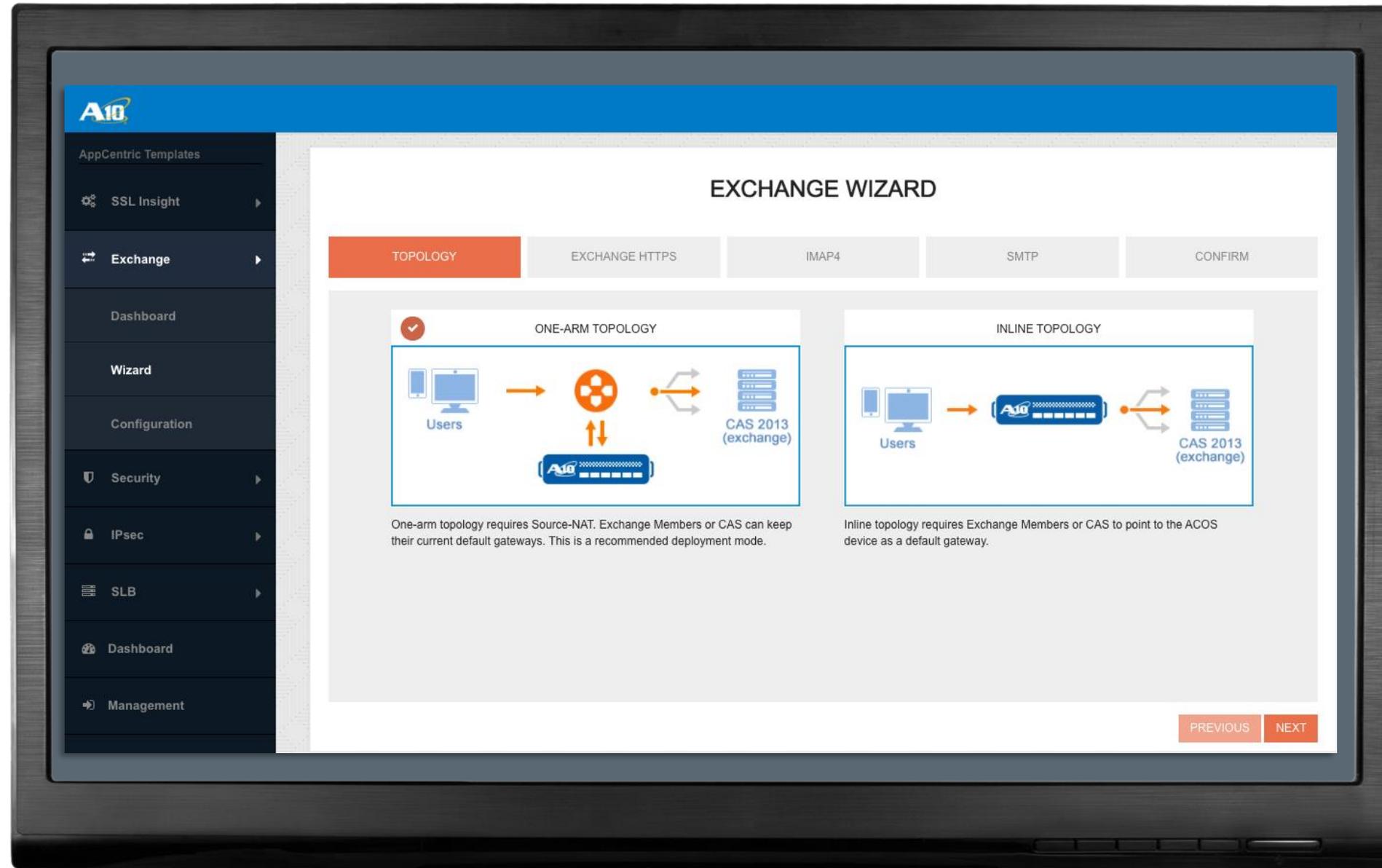
Telemetry: Traffic Visibility and Report Generation

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Cloud

Ecosystem Integrations

Private Cloud

- VMware vRO, Cisco UCSD
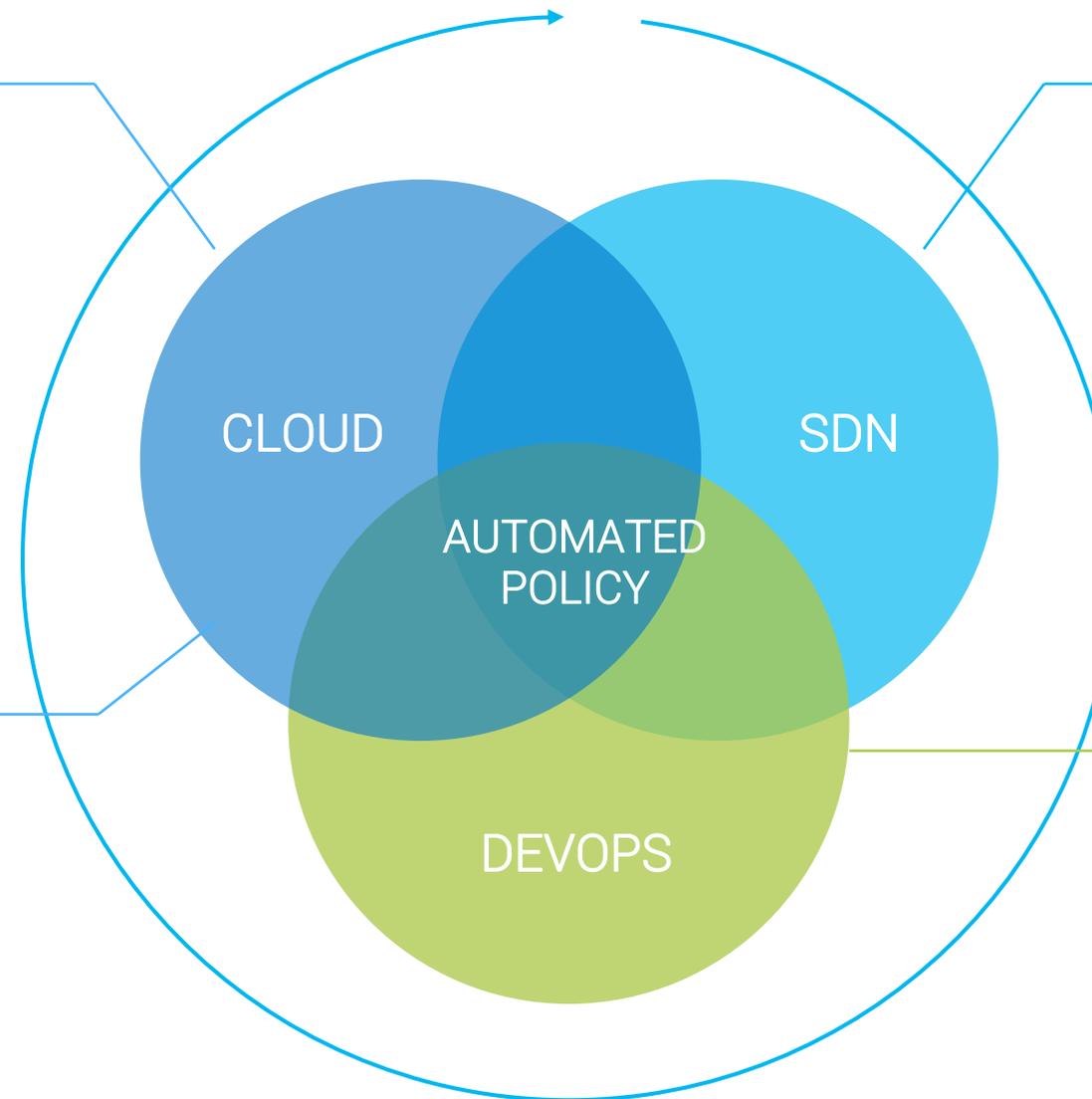- OpenStack, RedHat, Huawei, ZTE
- Docker/Kubernetes

Public Cloud

- AWS, Azure
- Google, Alibaba

Virtual Network

- Cisco ACI
- VMware NSX*

Automation

- Ansible
- Puppet
- Chef

CLOUD

SDN

AUTOMATED POLICY

DEVOPS

Automated Policy with A10's Open API
Fully Programmable

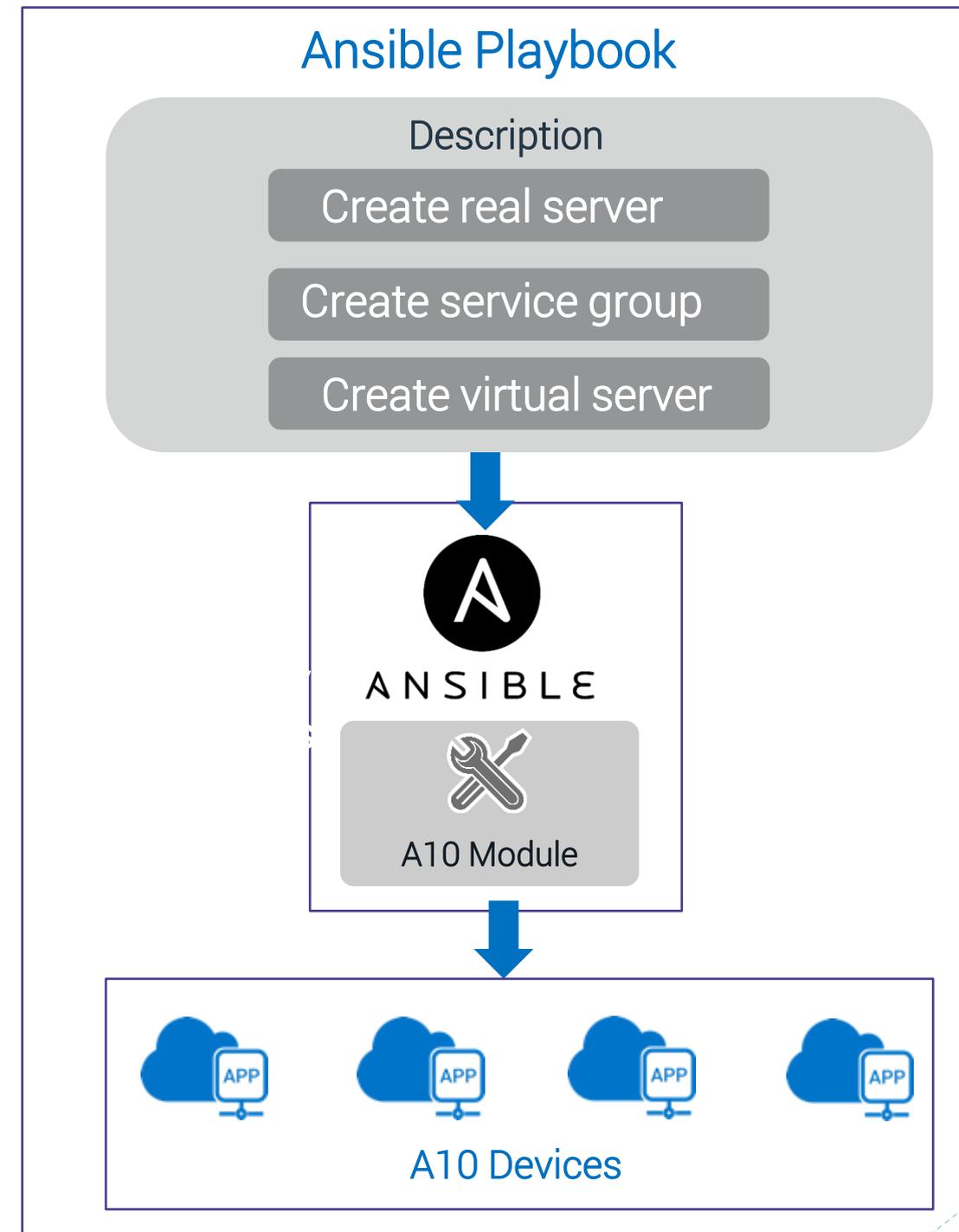*roadmap

A10 Ansible Playbook

A10 Ansible Modules

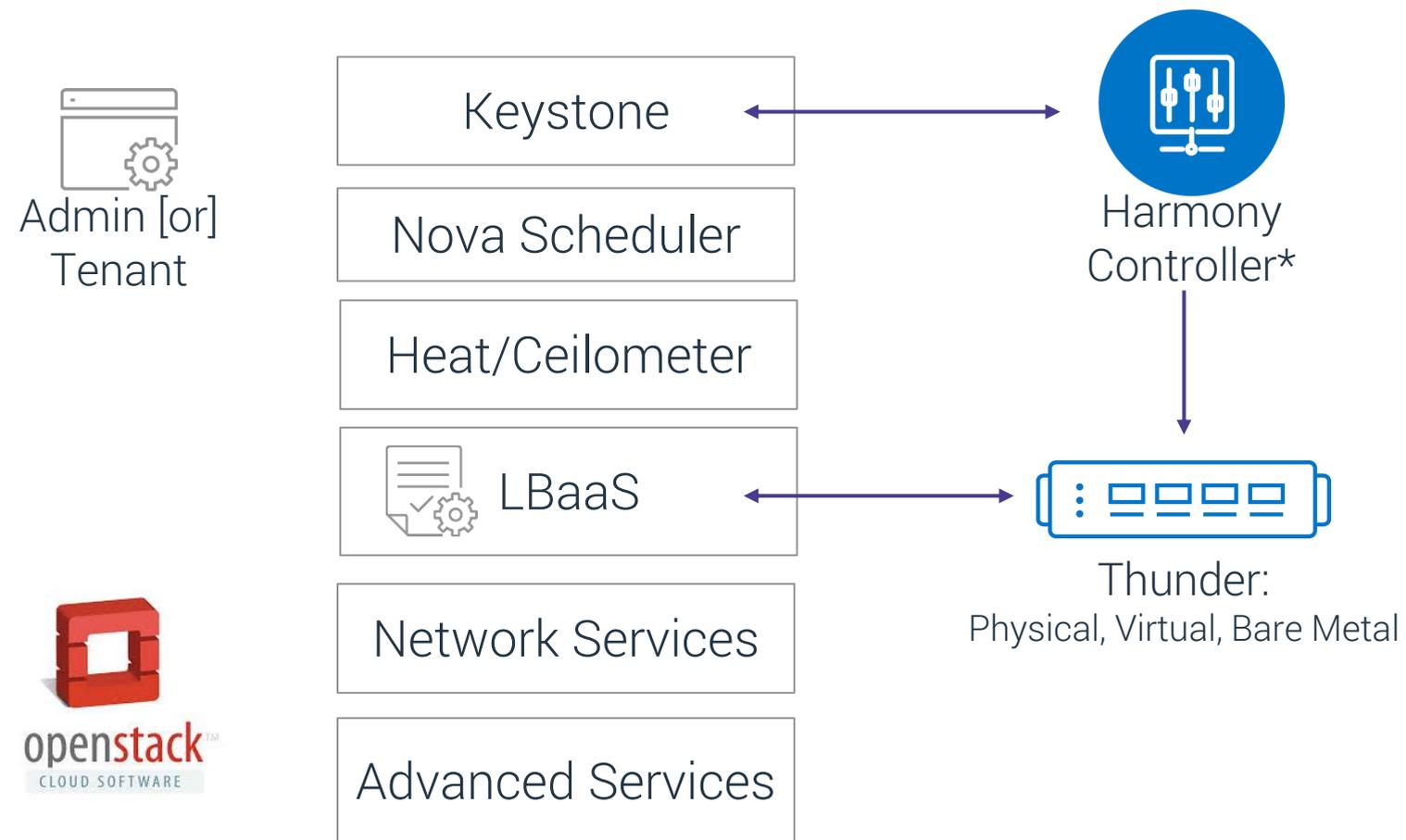*Configuration Management for A10 devices*

- Ansible Module comes with example playbooks
- A10 Module is part of the 'Network Modules'
- Available for download from A10 GitHub page

Automate A10 ADC Configuration

- Automate A10 Thunder / vThunder configuration workflows
- Manage Servers, Service Groups, Virtual Servers
- Heath monitor configuration workflows

Ansible Playbook

Description

Create real server

Create service group

Create virtual server

ANSIBLE

A10 Module

A10 Devices

OpenStack LBaaS

Admin [or] Tenant

| Keystone |
| Nova Scheduler |
| Heat/Ceilometer |
| LBaaS |
| Network Services |
| Advanced Services |

Harmony Controller*

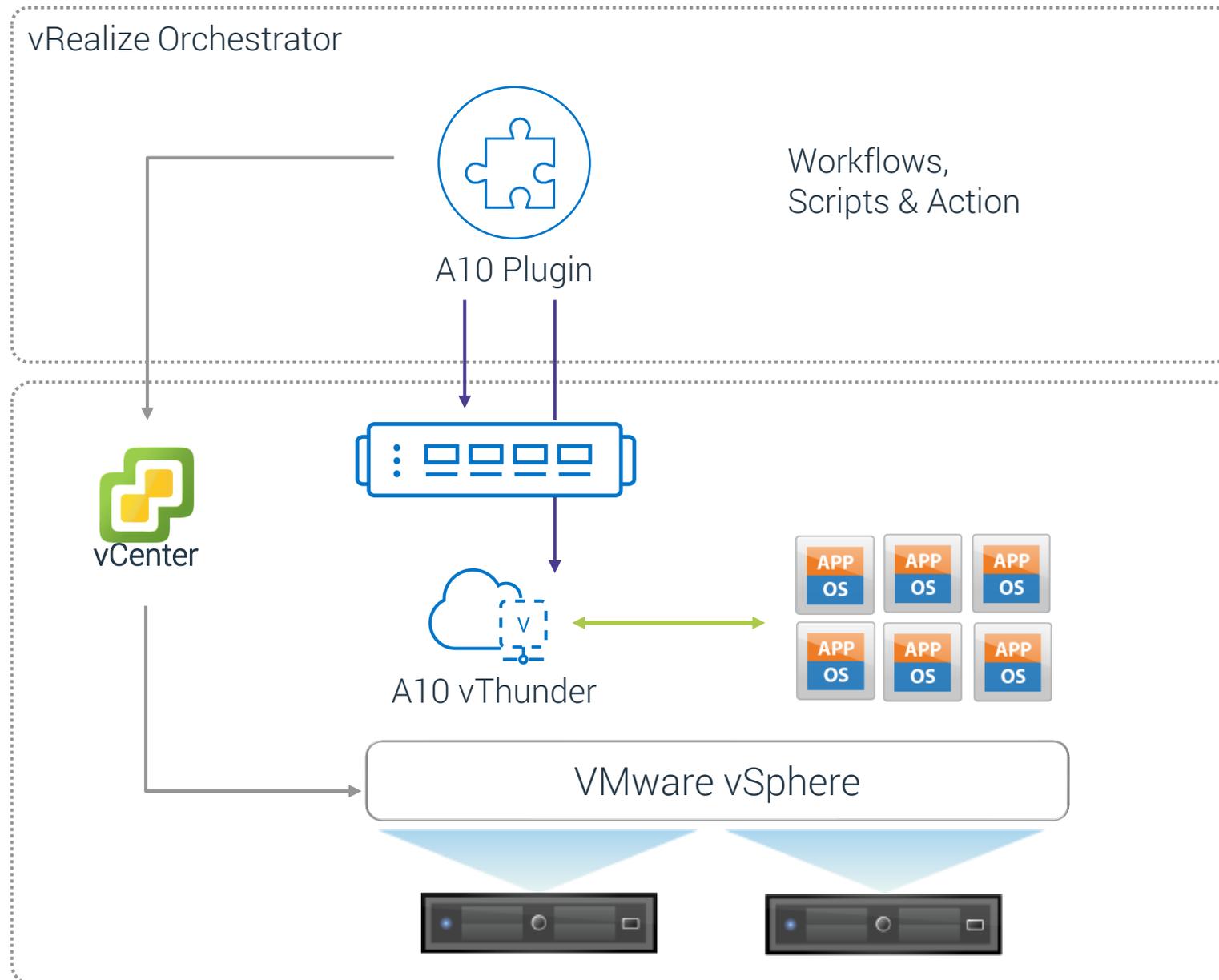Thunder:
Physical, Virtual, Bare Metal

A10 LBaaS

- L4-L7 Load Balancing
- L7 HTTP Rules
- Advanced Health Monitoring
- SSL Offloading
- NAT Pools
- Network Overlay (VXLAN)
- Multi-tenancy with L3V ADP
- High Availability Cluster

- Community LBaaS driver (Icehouse, Juno, Kilo, Liberty, Mitaka)
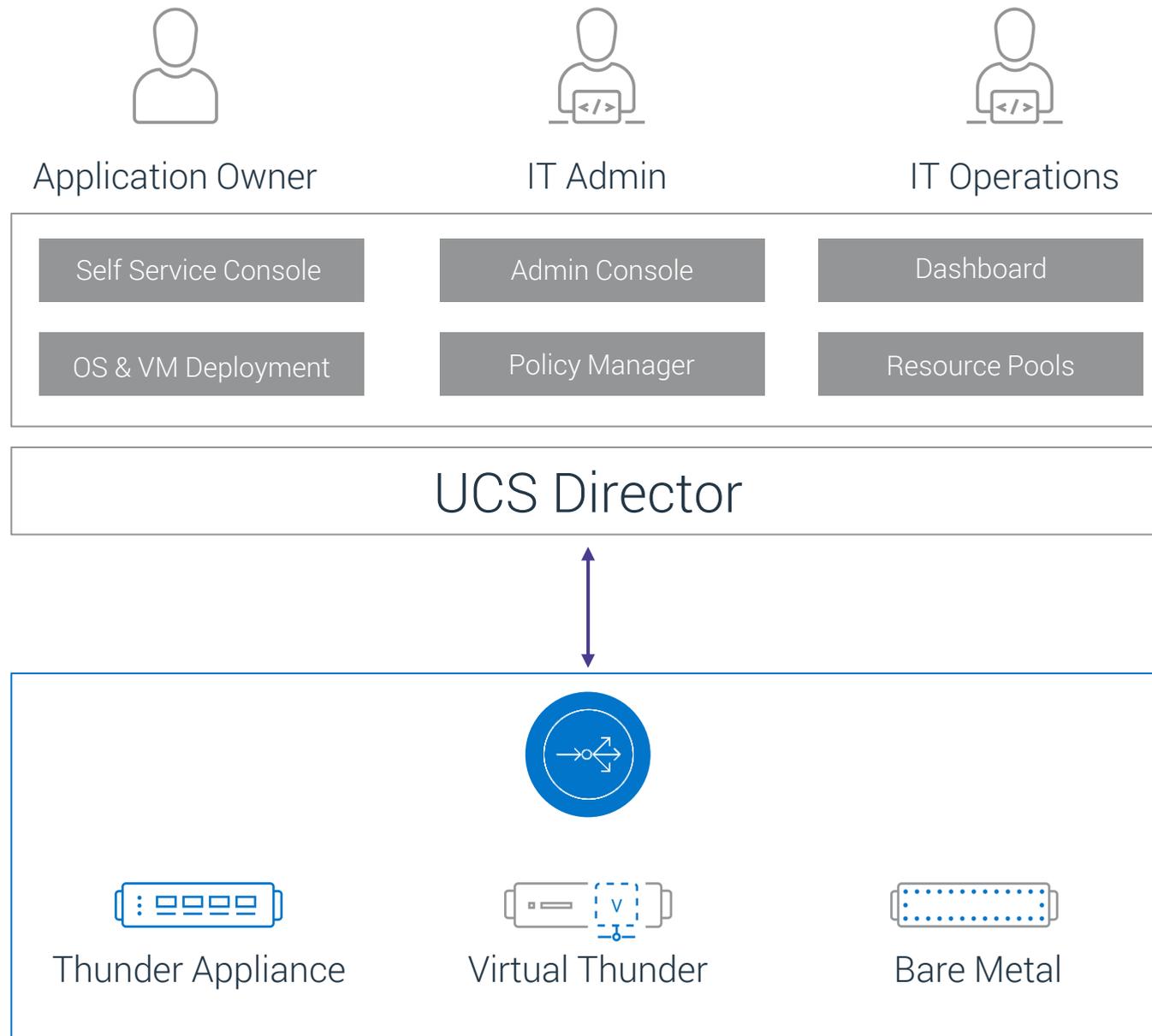- Custom driver (additional ADC Features)

* Roadmap

VMware vRealize Integration

vRealize Orchestrator

A10 Plugin

Workflows,
Scripts & Action

vCenter

A10 vThunder

APP OS   APP OS   APP OS
APP OS   APP OS   APP OS

VMware vSphere

A10 vRO Plugin

- L4-L7 Load Balancing
- L7 HTTP Rules
- Health Monitoring
- SLB Templates
- SSL Offload
- NAT Pools
- Trunk Interfaces
- Multi-tenancy w/ L3V ADP
- High Availability Cluster

Cisco UCS Director Connector

Application Owner   IT Admin   IT Operations

| Self Service Console | Admin Console | Dashboard |
| OS & VM Deployment | Policy Manager | Resource Pools |

UCS Director

Thunder Appliance   Virtual Thunder   Bare Metal

A10 UCSD Connector*

- L4-L7 Load Balancing
- L7 HTTP Rules
- Health Monitoring
- SLB Templates
- SSL Offload
- NAT Pools
- Trunk Interfaces
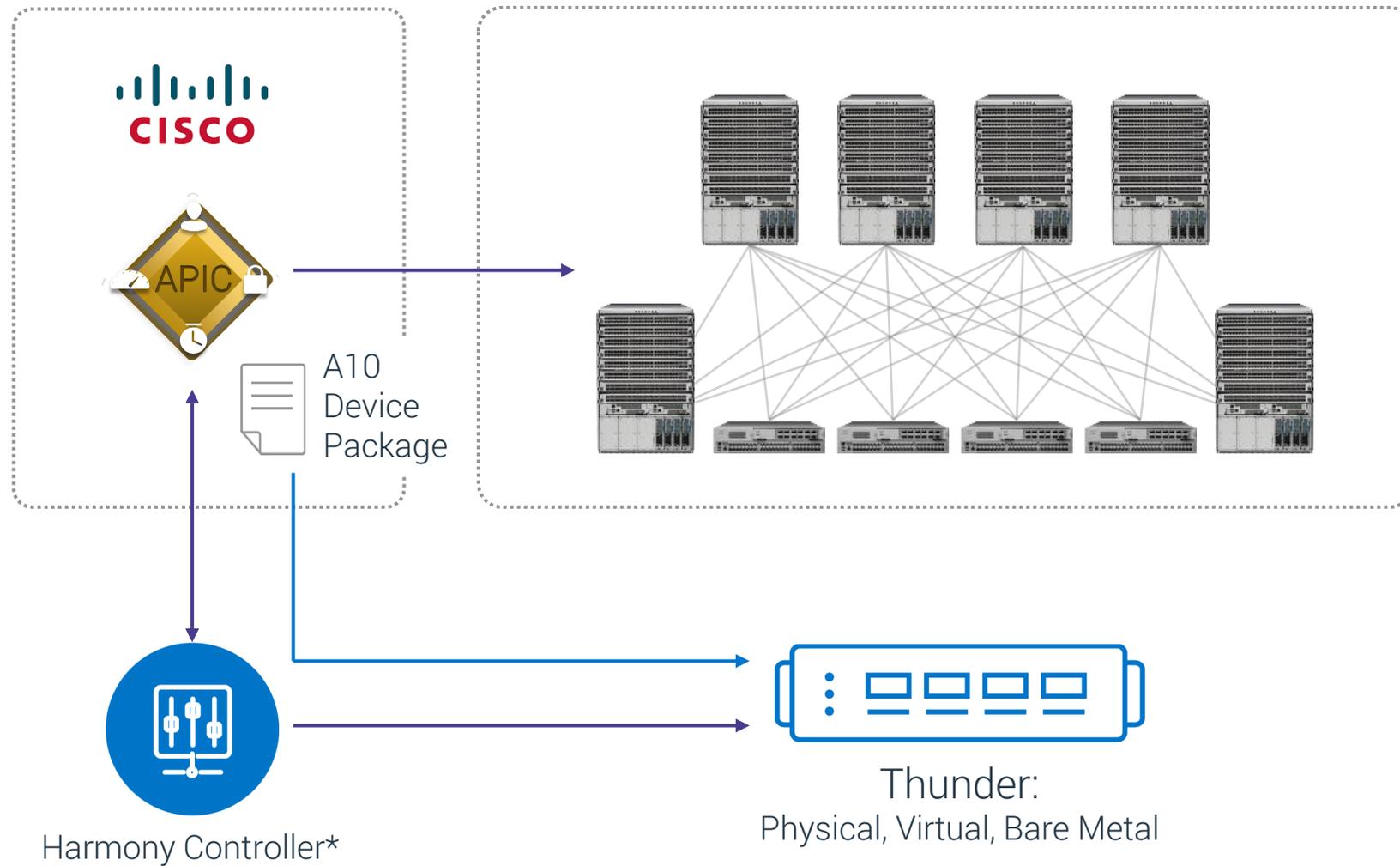- Multi-tenancy w/ L3V ADP
- High Availability Cluster

* Roadmap

Cisco ACI Integration

A10 ACI Device Package

- L4-L7 Load Balancing
- L7 HTTP Rules
- Advanced Health Monitoring
- SLB Templates
- SSL Offload
- SSL Insight
- NAT Pools
- Trunk Port (PC, VPC)
- Multi-tenancy w/ L3V ADP
- High Availability Cluster

* Roadmap

APIC

A10 Device Package

Harmony Controller*

Thunder:
Physical, Virtual, Bare Metal