Akamai Edge DNS

Massively Reliable and Available
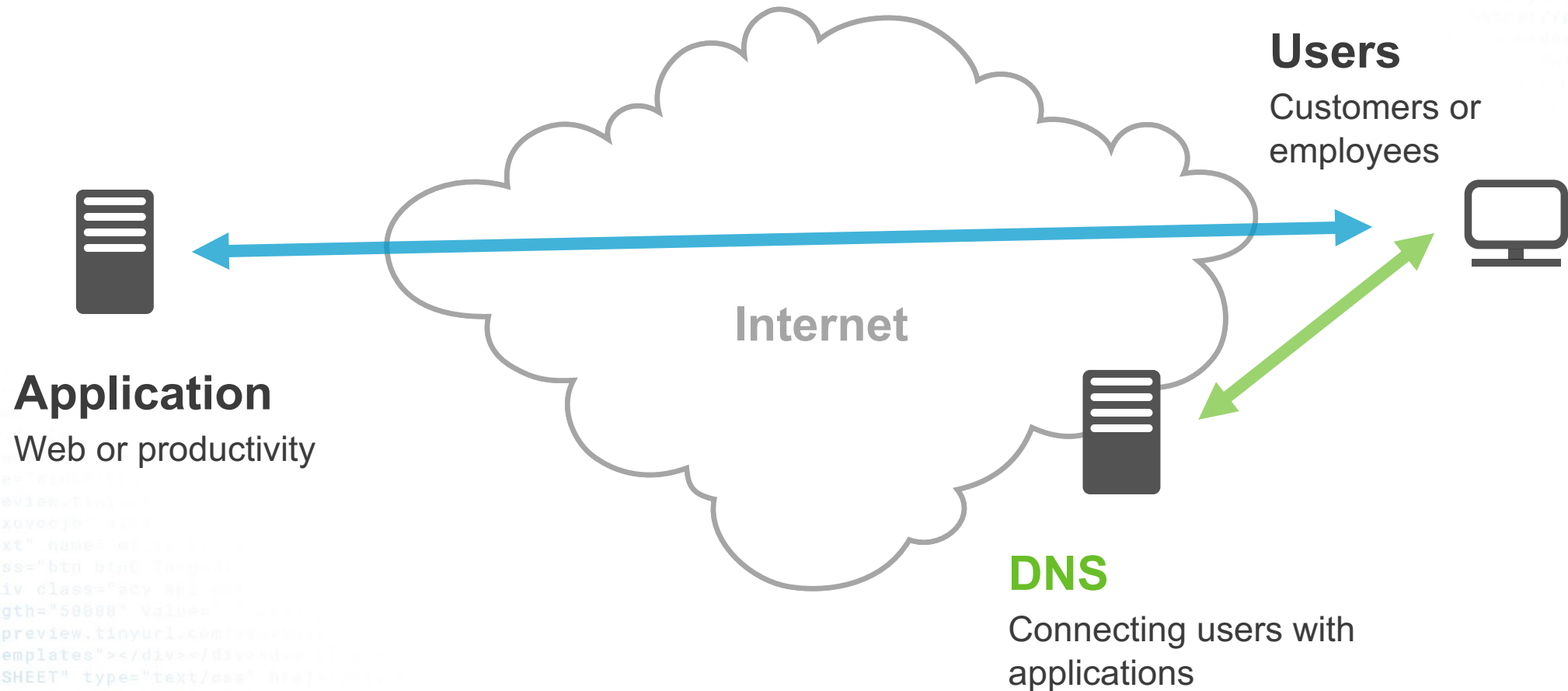Authoritative DNS Service

What is Edge DNS?

Edge DNS is a cloud-based DNS solution that provides:

- 24/7 DNS availability ready to handle the world's large traffic attacks
- Improvement in DNS responsiveness
- Protection against the largest DDoS attacks with a unique availability architecture

This solution is built on a globally distributed anycast network, it can be implemented as a **primary or secondary DNS service**, replacing or expanding existing DNS infrastructure as needed.

As the CDN expands, the Edge DNS network expands.

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A Critical Service for Web Infrastructure

Internet

Users
Customers or employees

Application
Web or productivity

DNS
Connecting users with applications

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Common DNS Challenges

Availability

- Many organizations rely on just two or three DNS servers
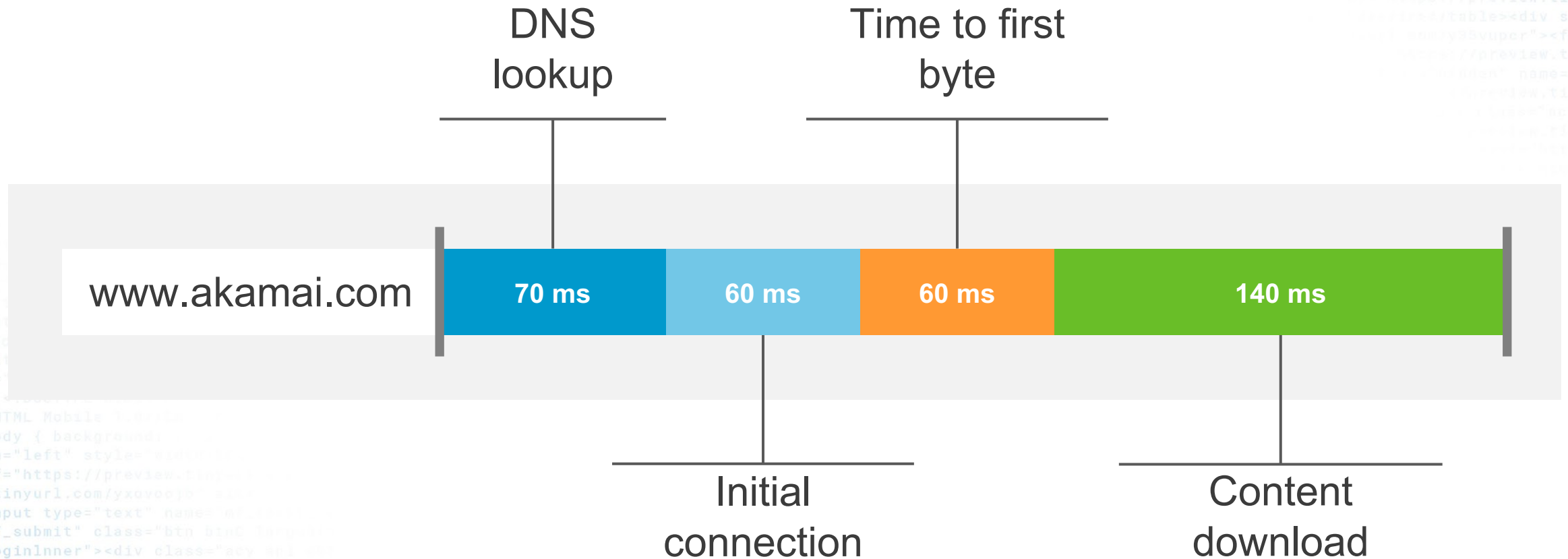- Any DNS outage will result in site downtime

Performance

- Closest DNS server may be physically far away
- High latency leads to longer page load times

Security

- DNS infrastructure exposed to the Internet
- Popular DDoS attack vector
- Forgery or manipulation of DNS data

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Every Page Load Begins with DNS

DNS lookup

Time to first byte

www.akamai.com | 70 ms | 60 ms | 60 ms | 140 ms

Initial connection

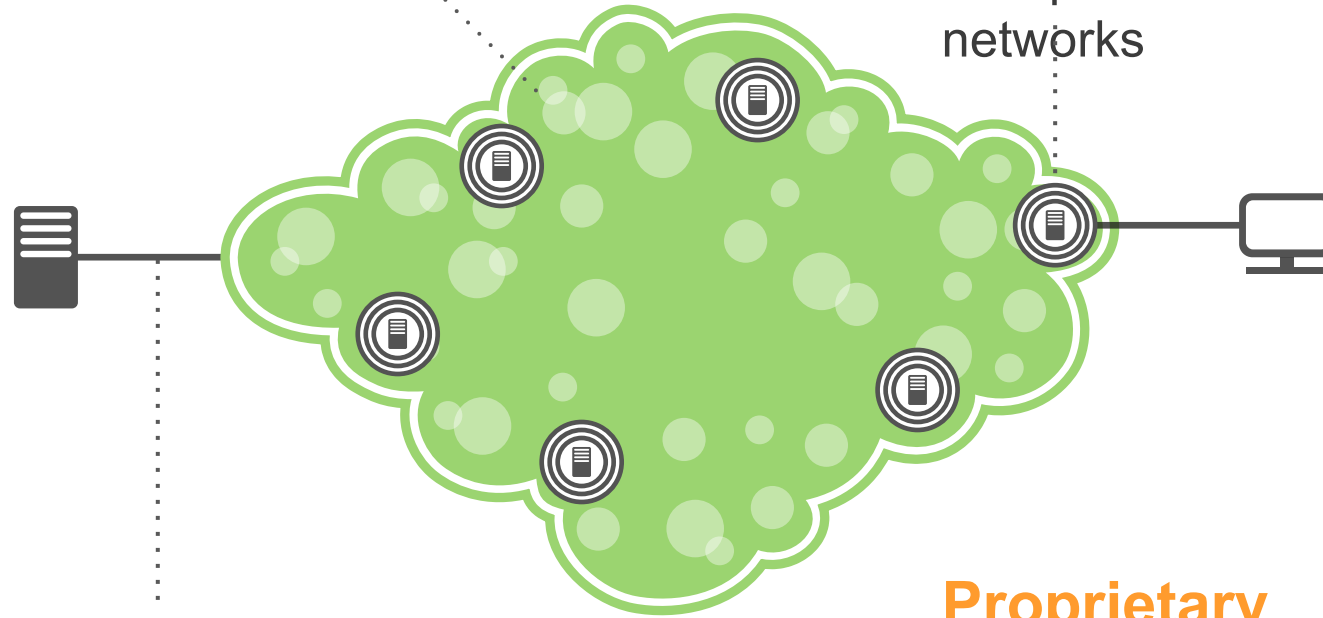Content download

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Globally-Distributed DNS Platform

Global scale

Thousands of name servers deployed in over 200 networks and 28 countries

IP Anycast

Response to DNS queries from multiple name servers on multiple networks

Authoritative

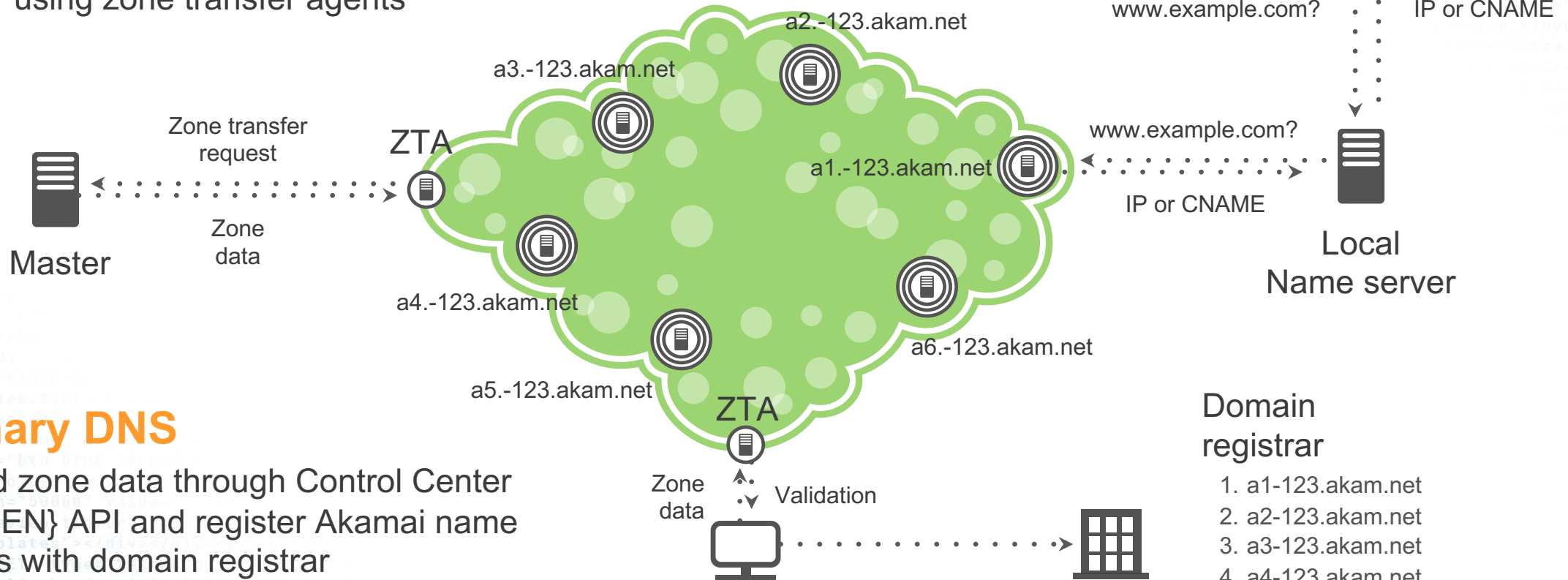Akamai name servers resolve end-user DNS queries with customer zone data

Proprietary

Proprietary implementation not based on BIND for fewer vulnerabilities

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How Edge DNS Works

Secondary DNS

Upload zone data from customer-managed master using zone transfer agents

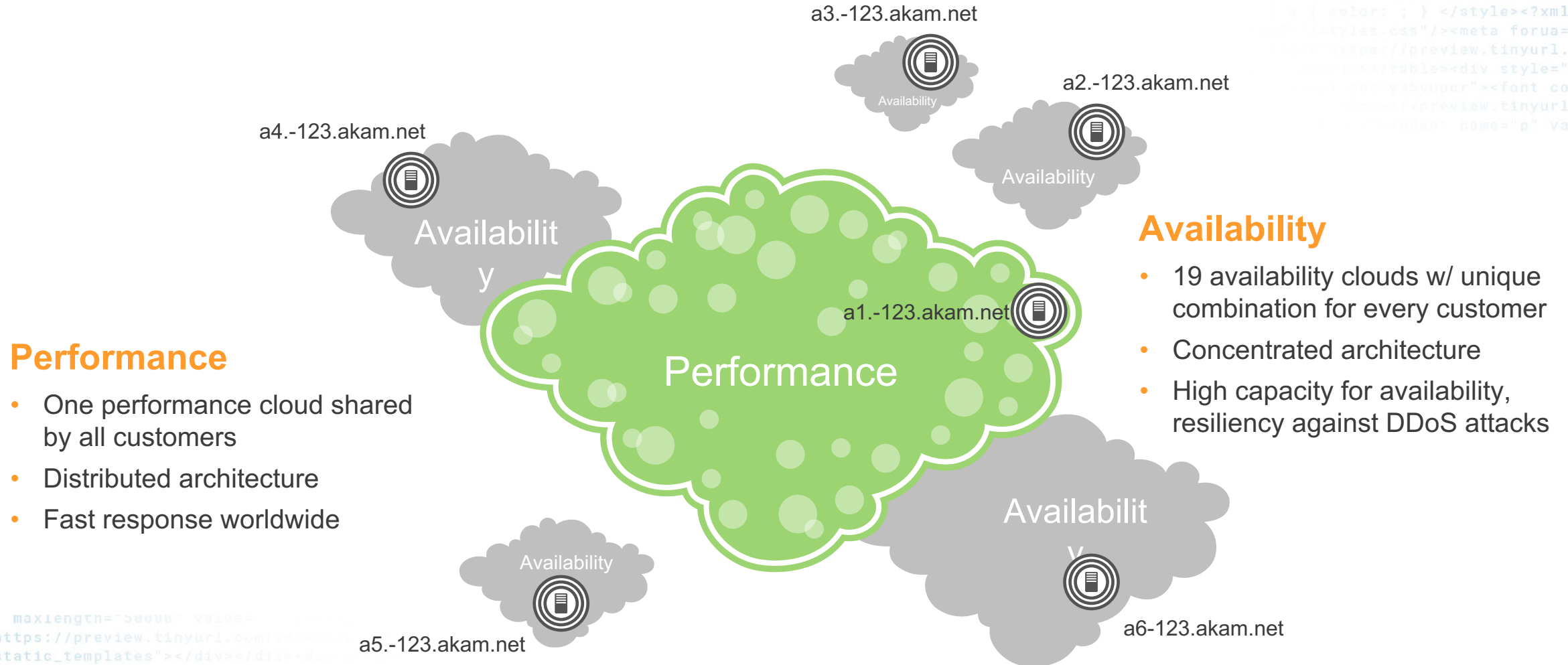## Primary DNS

Upload zone data through Control Center or {OPEN} API and register Akamai name servers with domain registrar
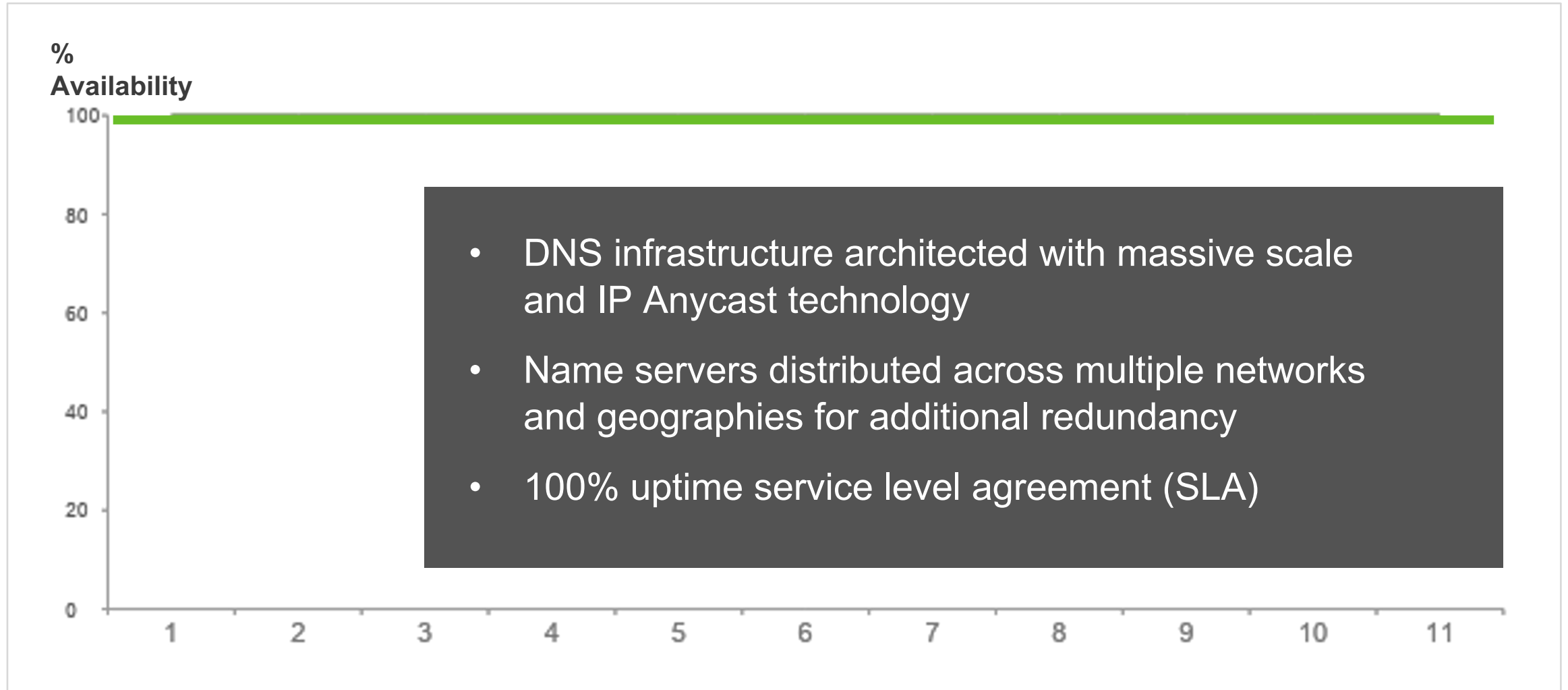
User

www.example.com?   IP or CNAME

a2.-123.akam.net

a3.-123.akam.net

Zone transfer request

ZTA

www.example.com?

a1.-123.akam.net

Master

Zone data

IP or CNAME

Local Name server

a4.-123.akam.net

a6.-123.akam.net

a5.-123.akam.net

ZTA

Zone data   Validation

Domain registrar

1. a1-123.akam.net
2. a2-123.akam.net
3. a3-123.akam.net
4. a4-123.akam.net
5. a5-123.akam.net
6. a6-123.akam.net

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Architecting DNS for Performance and Availability

a3.-123.akam.net

Availability

a2.-123.akam.net

Availability

a4.-123.akam.net

Availability

Availability

- 19 availability clouds w/ unique combination for every customer

- Concentrated architecture

- High capacity for availability, resiliency against DDoS attacks

a1.-123.akam.net

Performance

Performance

- One performance cloud shared by all customers

- Distributed architecture

- Fast response worldwide

Availability

Availability

a5.-123.akam.net

a6-123.akam.net

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Guaranteed Availability

% Availability

- DNS infrastructure architected with massive scale and IP Anycast technology

- Name servers distributed across multiple networks and geographies for additional redundancy

- 100% uptime service level agreement (SLA)

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What Does DNS Performance Mean?

Response (ms)

Legend: —Akamai —Vendor 1 —Vendor 2

- Measurement of raw DNS response times
- Not an accurate indicator of user experience

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Improving User Experience w/ Zone Apex Mapping

Response (ms)

— Akamai — Vendor 1 — Vendor 2

200

150

100

50

0

- Incorporates Akamai mapping data into name resolution
- Resolves DNS requests directly to the optimal edge server
- Dramatic improvement to overall user experience
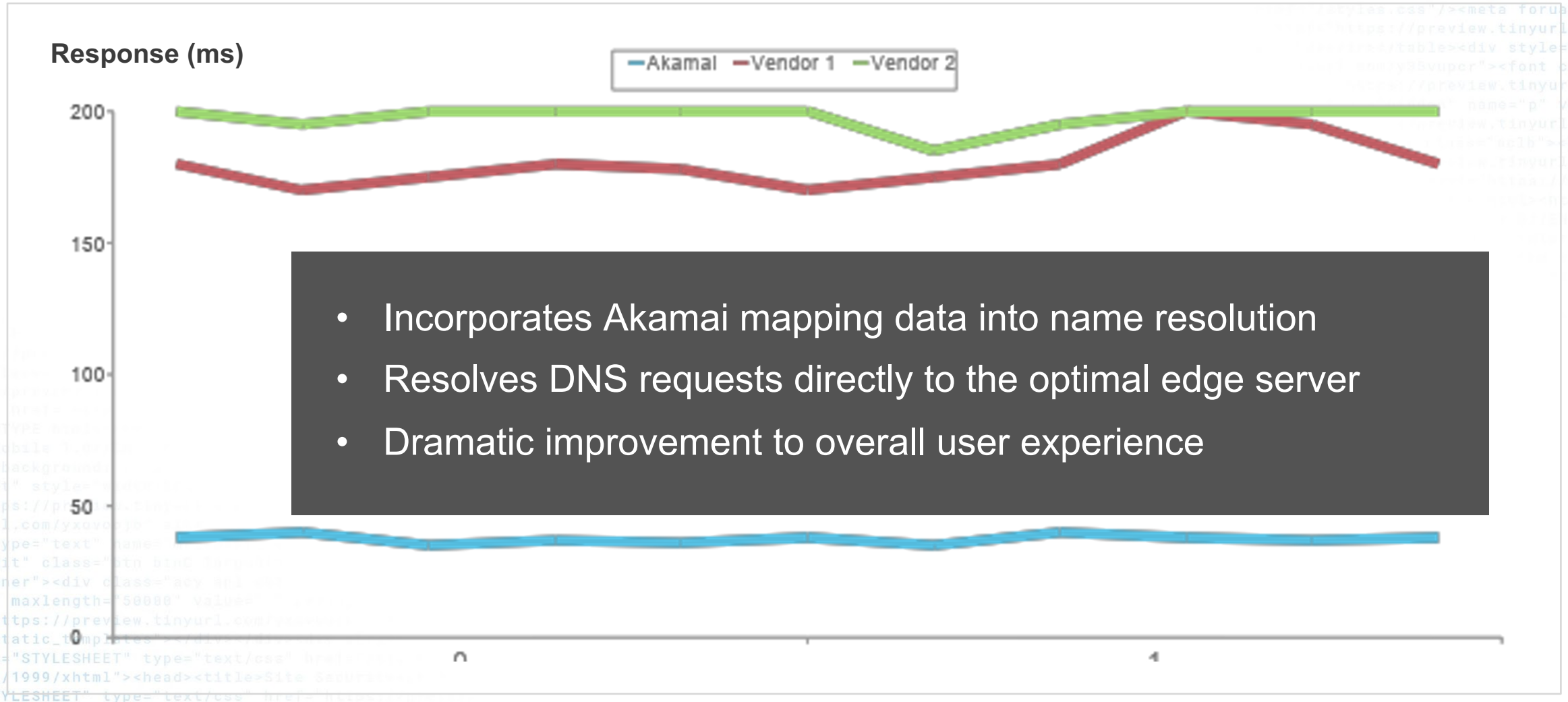
Zone Apex Mapping - How it Works

>200K Edge servers

Edge
server

Name
server
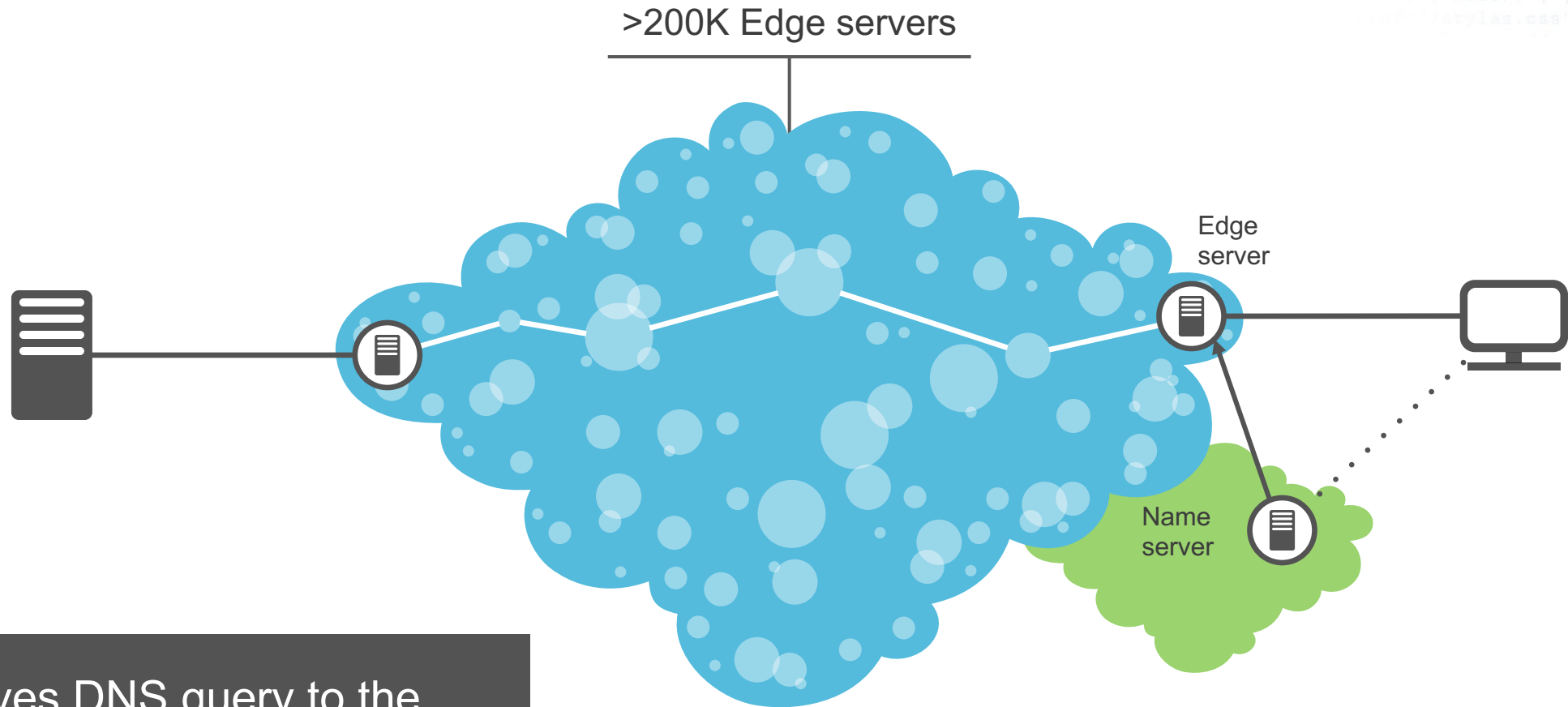
Resolves DNS query to the
optimal Akamai Edge server

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Improved Protection from DDoS Attacks
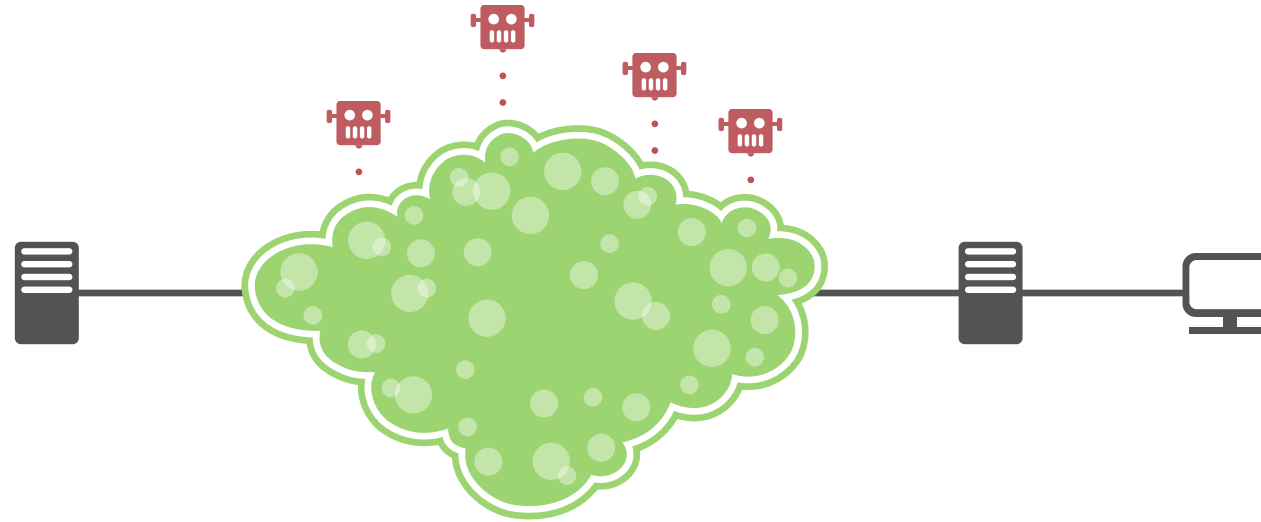
Transfer

- Migrate DNS resolution to a cloud-based service
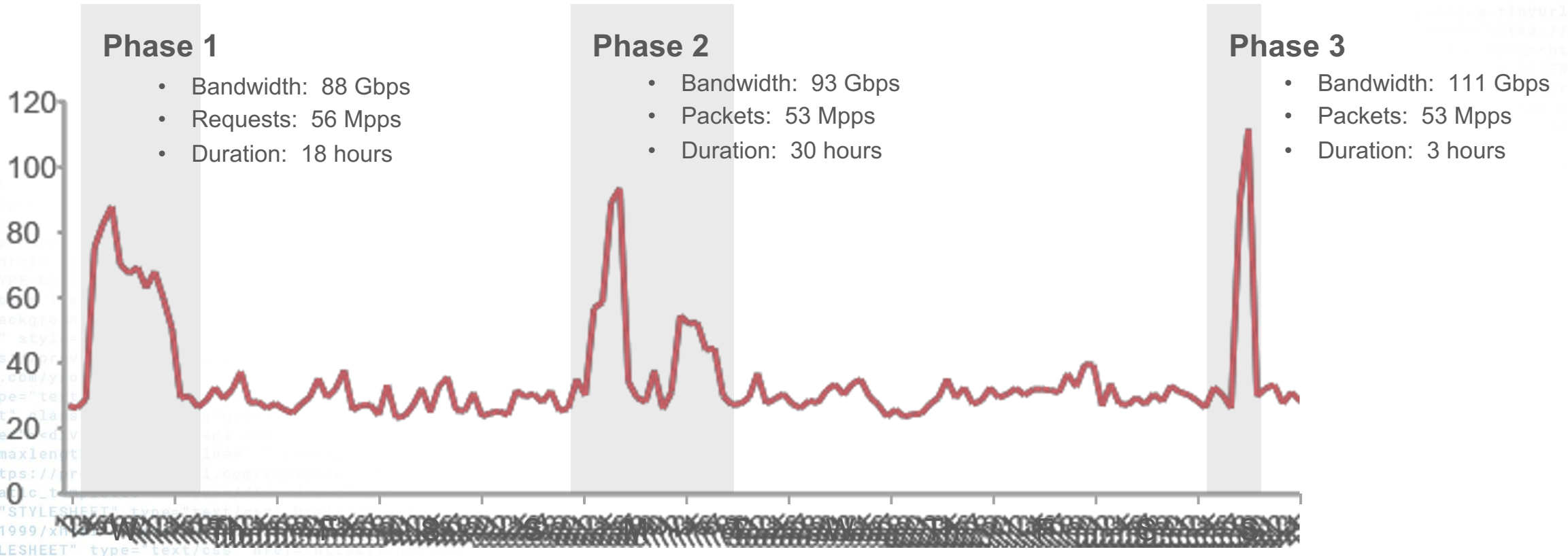- Transfer DDoS risk and responsibility to Akamai

Absorb

- Normal traffic less than 1 percent of total capacity
- No additional fees for DDoS-related traffic

Block

- Restrict responses to known good DNS servers
- Rate limit DNS traffic from malicious IP addresses

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Case Study: DDoS Attack against Media Company

- Attack targeted a politically-active newspaper in APJ

Phase 1
- Bandwidth: 88 Gbps
- Requests: 56 Mpps
- Duration: 18 hours

Phase 2
- Bandwidth: 93 Gbps
- Packets: 53 Mpps
- Duration: 30 hours

Phase 3
- Bandwidth: 111 Gbps
- Packets: 53 Mpps
- Duration: 3 hours

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DNSSEC With Secure Option (Add-On Module)

- Protects against DNS forgery and manipulation

- Reduces overhead required to maintain DNSSEC compliance

Serve

Customer provides ZSK and KSK
and is responsible for key rotation

End
User

Sign and Serve

Akamai provides ZSK and KSK and leverages
Akamai KMI for key rotation

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Simplify Management with Akamai APIs

Akamai APIs

From configuration, reporting and alerting, to managing the security of your digital properties, to managing your content inside the Akamai Intelligent Platform™, you will find APIs to connect your enterprise.

Edge DNS API Catalog

API Name	TYPE	Description
DNS – Zone Management	OPEN	API to manage a primary zone's DNS records
DNS – Zone Reporting	OPEN	API to retrieve DNS hit information

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Akamai Edge Security

Threat Protector

Protection against malware and targeted threats using recursive DNS + cloud security intelligence

Application Access

Simple, unified, and secure corporate application access

Kona Site Defender

Advanced WAF with API protection, client reputation and managed options

API Gateway

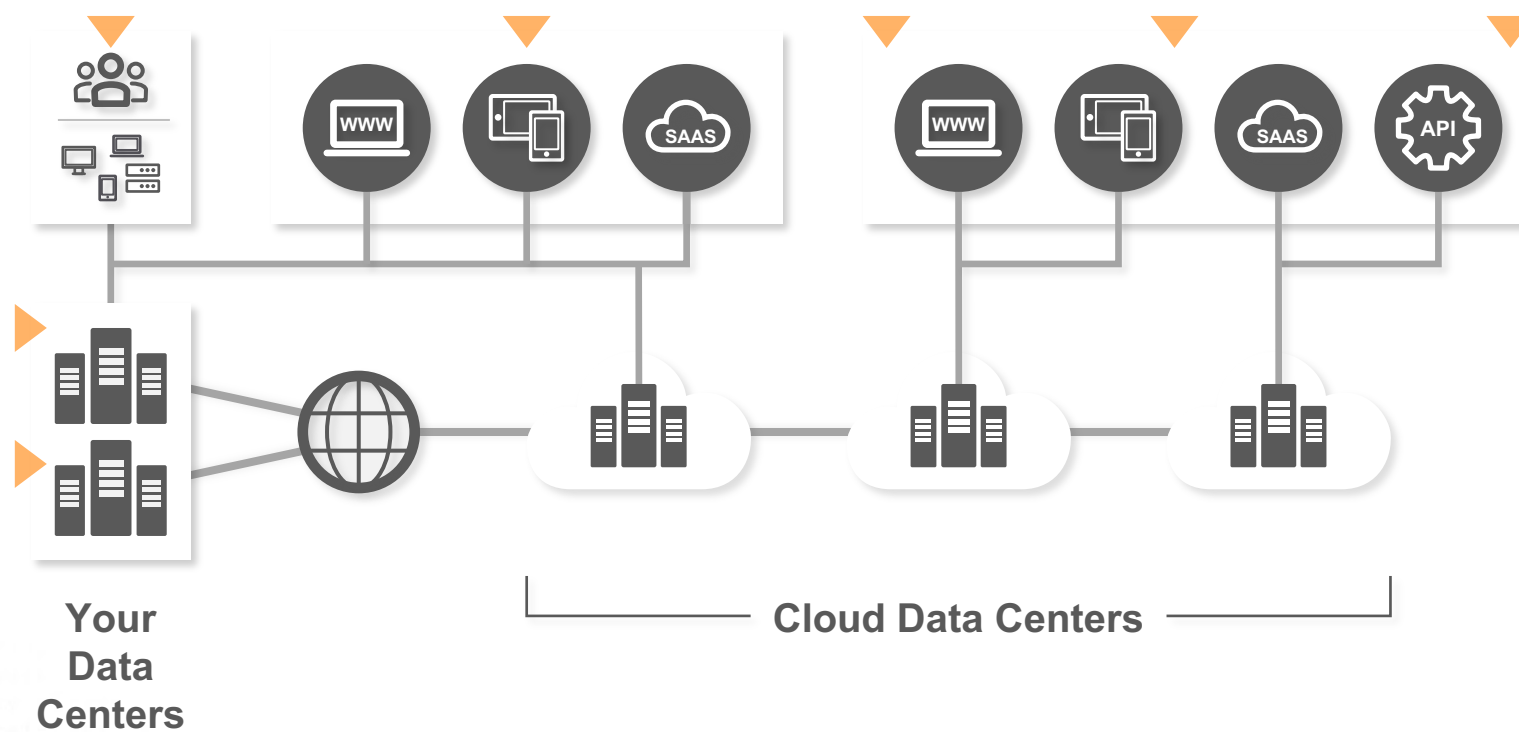Manage access, authentication, and rate controls for APIs

Bot Manager

Machine learning to manage bots & protect against credential abuse

Prolexic

Managed protection for all apps against volumetric DDoS attacks

Edge DNS

Scalable authoritative DNS service w/DDoS protection

Your Data Centers

Cloud Data Centers

Security starts with protecting the **domain** - Otherwise all else fails

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Case Studies
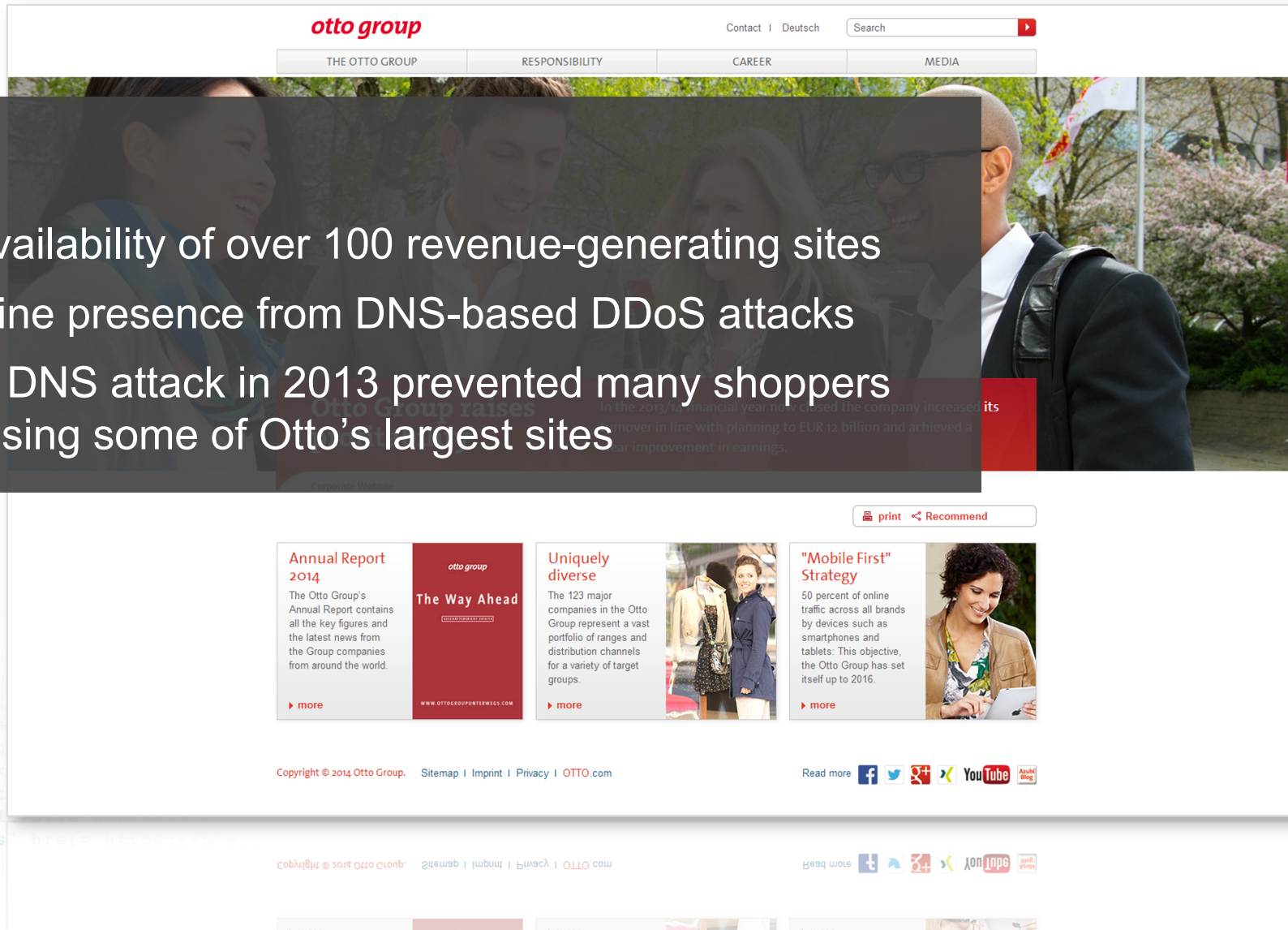
Otto Group

Background

- World's second-largest B2C online retailer

- eCommerce is the fastest growing sales channel and represents 60 percent of total company revenue

- Operates more than 100 online retail sites in 20 countries in Europe, North and South America, and Asia
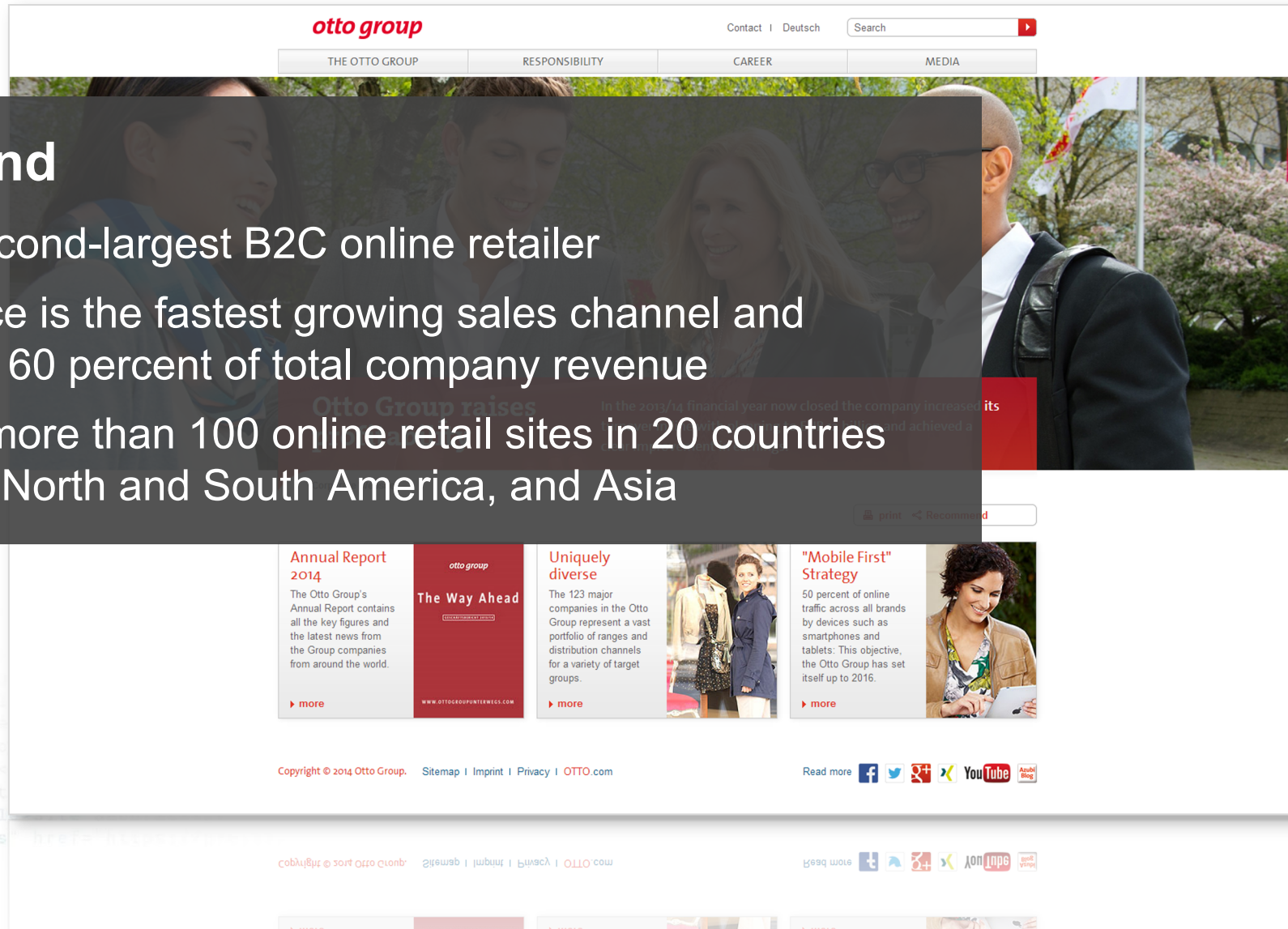
# Otto Group (cont.)

Challenge

- Maintain availability of over 100 revenue-generating sites

- Protect online presence from DNS-based DDoS attacks

- Volumetric DNS attack in 2013 prevented many shoppers from accessing some of Otto's largest sites

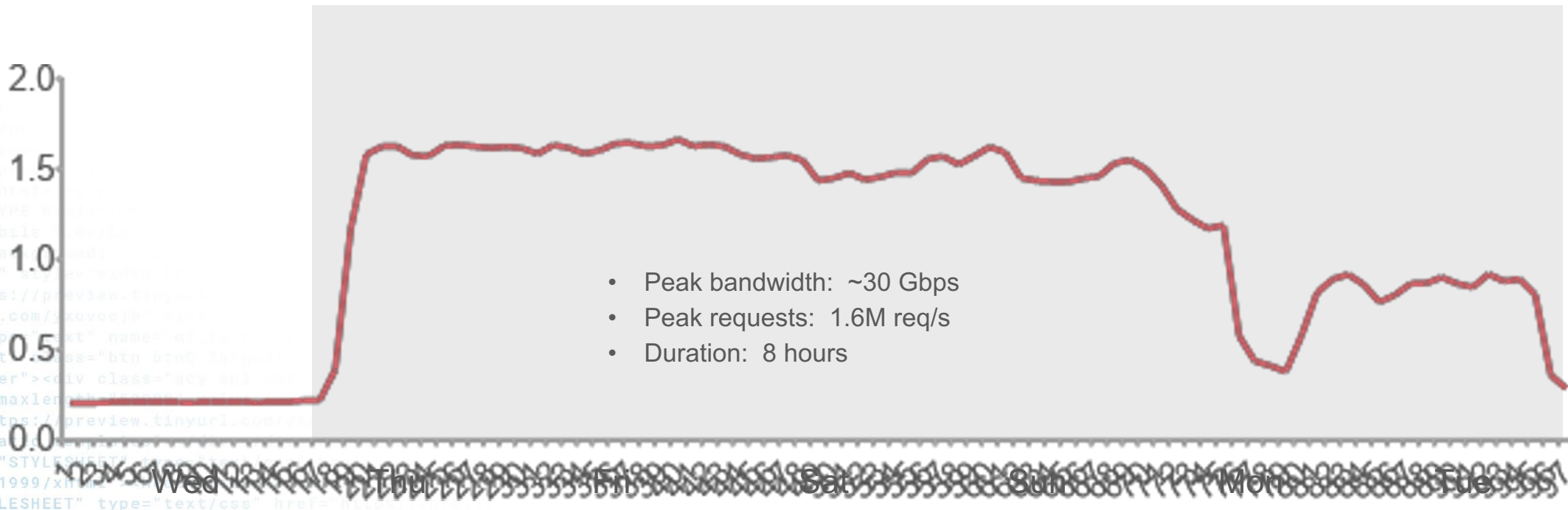Akamai *Experience the Edge*

Otto Group (cont.)

Solution

- Vast bandwidth and worldwide infrastructure provides the ability to mitigate DNS-based DDoS attacks

- 100% uptime safeguards sales revenue through attacks
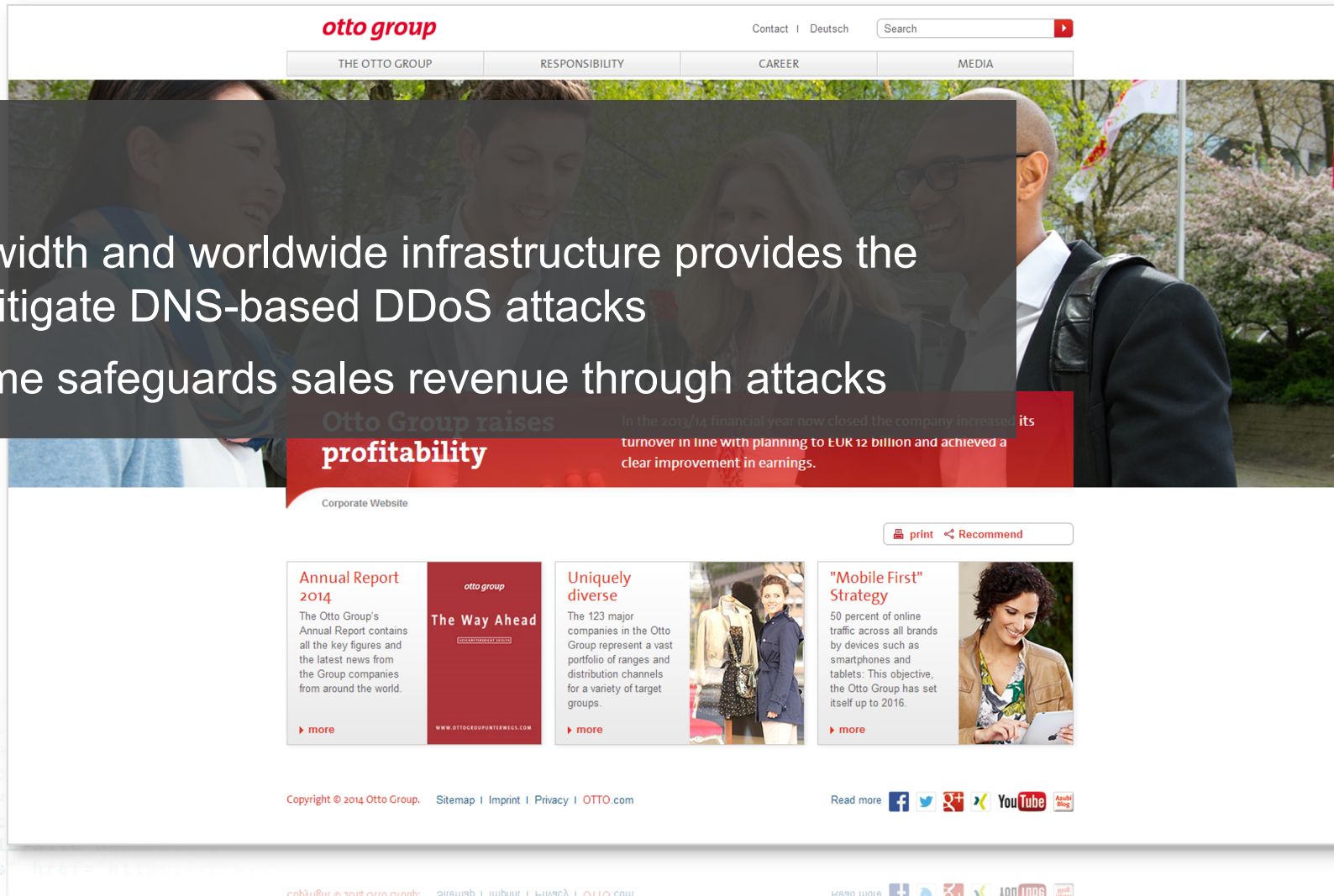
DDoS Attack Against Gaming Company

- Q3 '14 attack targeted an online gaming company in APJ

- Peak bandwidth: ~30 Gbps
- Peak requests: 1.6M req/s
- Duration: 8 hours

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Akamai

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