

Business Case:

# Improve Overall Service Quality and Customer Experience While Dramatically Lowering Carrier Costs

Technology for  
Mobile Network Operators





# Agenda

- Challenges
- Opportunities
- Solution
- Recap

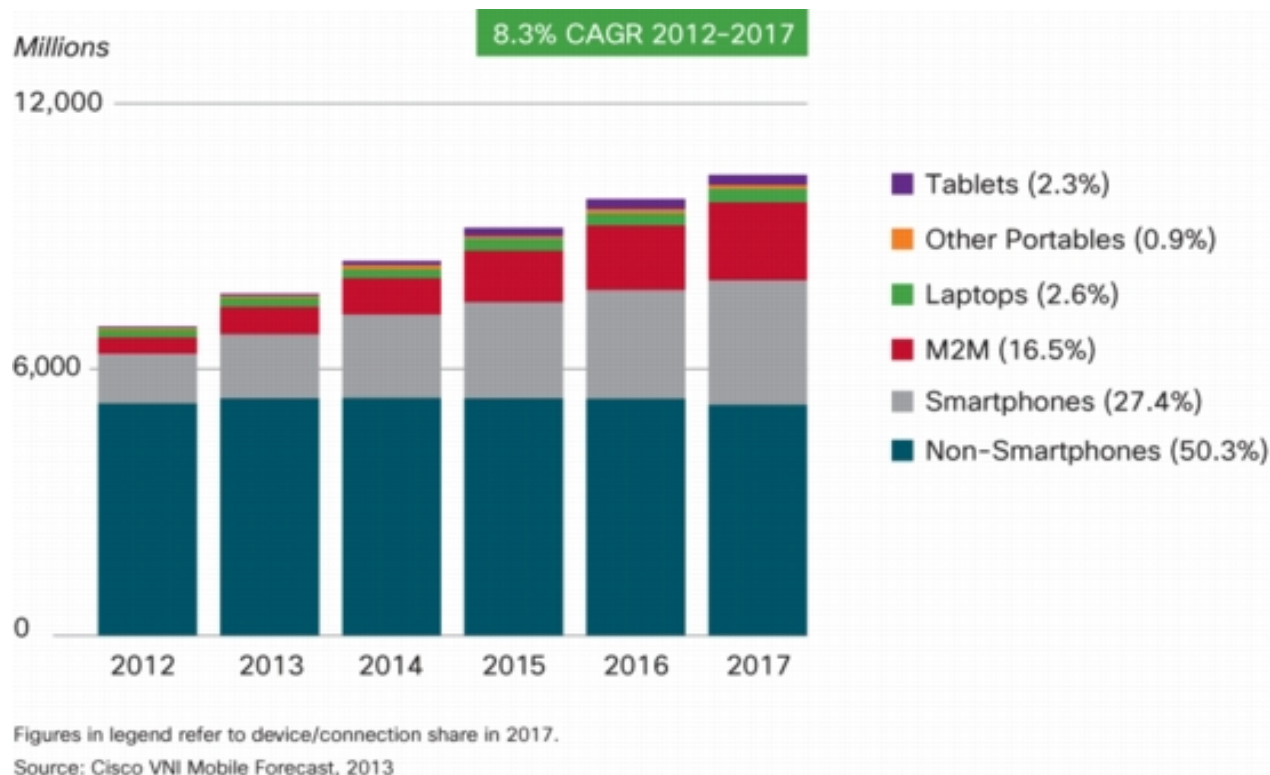


# Challenges



# Everything Is Going Mobile

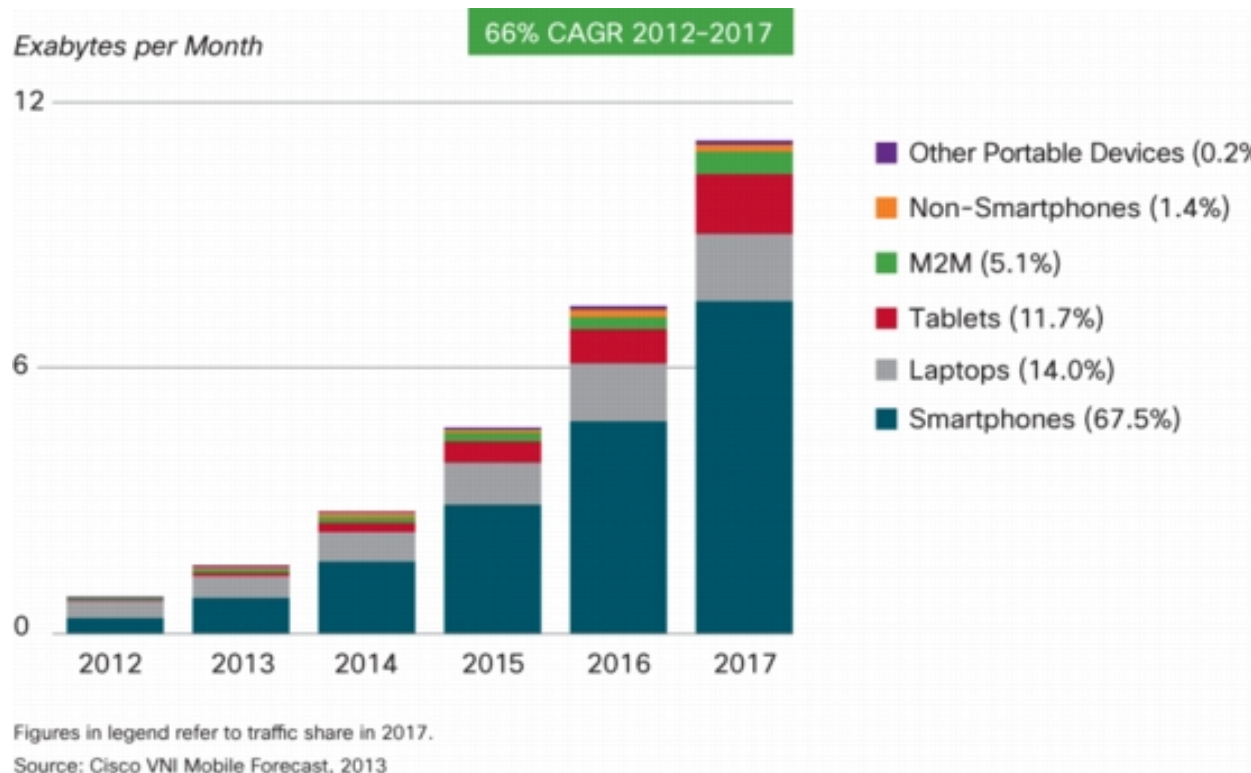
Global subscriptions to reach 9 billion in 2017<sup>1</sup>



<sup>1</sup> [http://www.ericsson.com/res/docs/2012/traffic\\_and\\_market\\_report\\_june\\_2012.pdf](http://www.ericsson.com/res/docs/2012/traffic_and_market_report_june_2012.pdf)

# Everything Is Going Mobile

Mobile data traffic to grow 15X by 2017<sup>1</sup>



<sup>1</sup> [http://www.ericsson.com/res/docs/2012/traffic\\_and\\_market\\_report\\_june\\_2012.pdf](http://www.ericsson.com/res/docs/2012/traffic_and_market_report_june_2012.pdf)

# Everything Is Going Mobile

## Mobile Web users have increasing expectations

71% of global Mobile Web users expect Websites to load as quickly, almost as quickly, or faster on their Mobile phone compared to the computer they use at home.<sup>1</sup>

Almost half (46%) [of Web users] said Websites load more slowly on their phone.<sup>1</sup>

Nearly 60% of Web users say they expect a Website to load on their Mobile phone in three seconds or less.<sup>1</sup>

More than 80% of Mobile Web users would access Websites more often from their phone if the experience was as fast and reliable.<sup>1</sup>

<sup>1</sup> [http://www.compuware.com/en\\_us/about/press-releases/2011/7/new-study-reveals-the-mobile-web-disappoints-global-consumers.html](http://www.compuware.com/en_us/about/press-releases/2011/7/new-study-reveals-the-mobile-web-disappoints-global-consumers.html)

# Mobile World Congress 2014

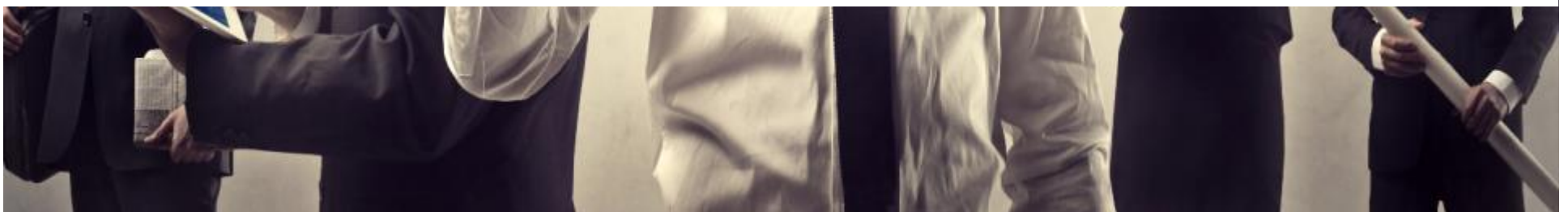
Keynotes focused on topics such as...

- **Optimizing User Experience with Intelligent Network Assets**  
Which tools offer the best ways to optimize end-user experience for different types of application and where should operators focus capital investments?
- **Building the Future Network**  
Where are we really at present and how, in practice, can we make the sea-change to these next-generation networks from existing systems?





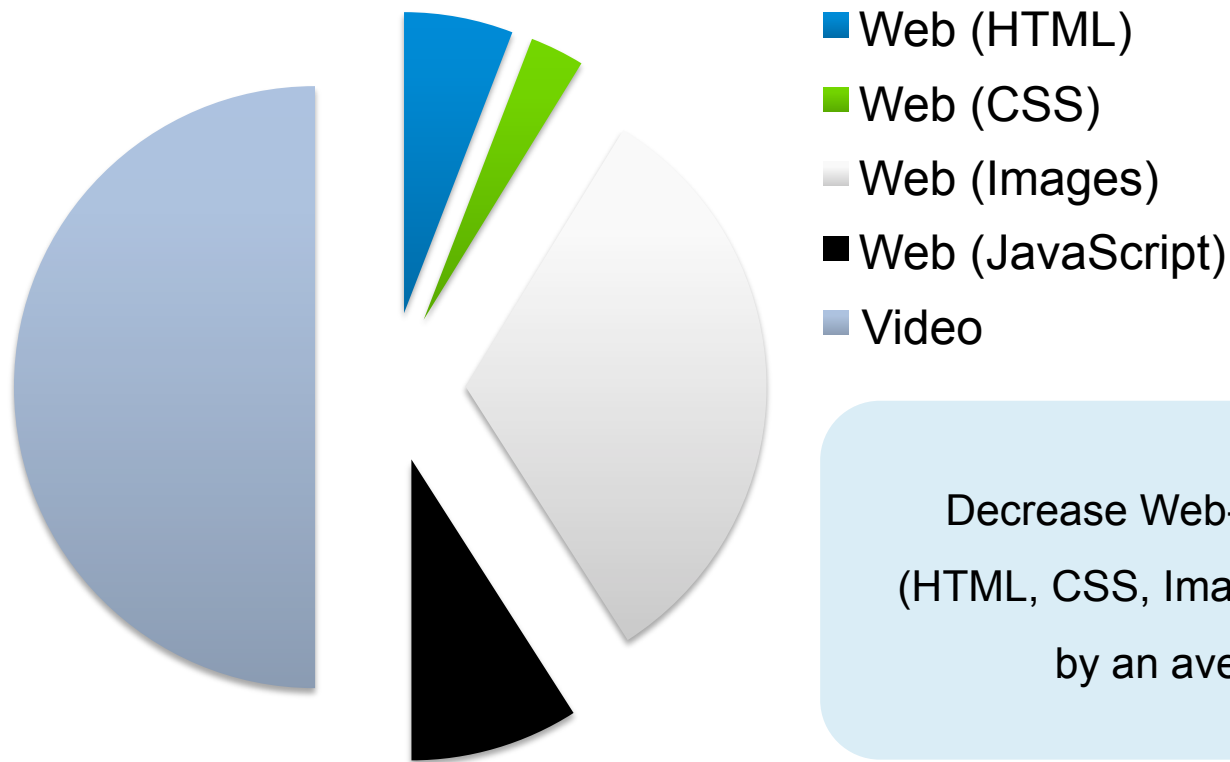
# Opportunities





# Do More With The Same

## Bandwidth usage by content type<sup>1</sup>

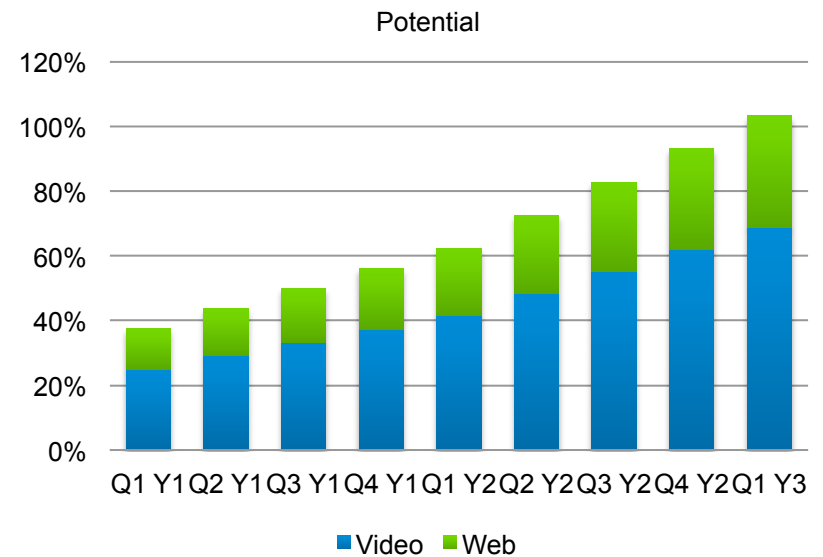
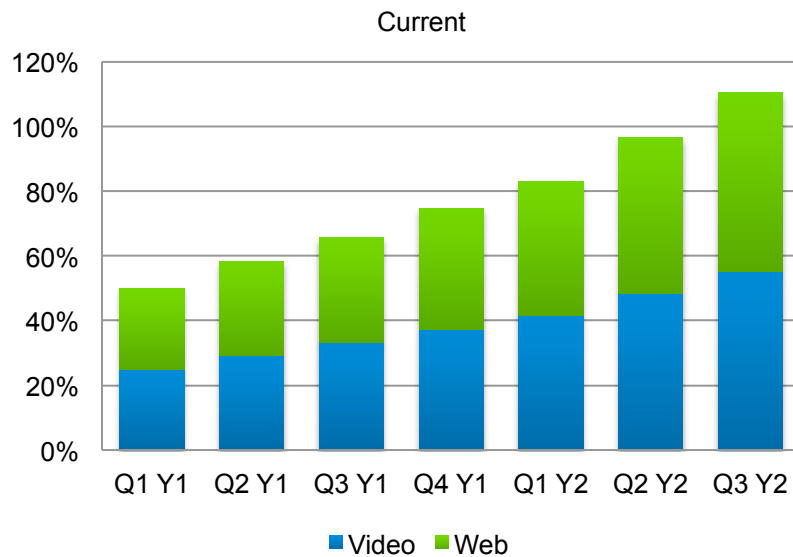


Decrease Web-related bandwidth  
(HTML, CSS, Images, and JavaScript)  
by an average of 50%

<sup>1</sup> <https://developers.google.com/speed/articles/web-metrics>

# Network Capacity With Video

Network capacity extended from Q3 Y2 to Q1 Y3



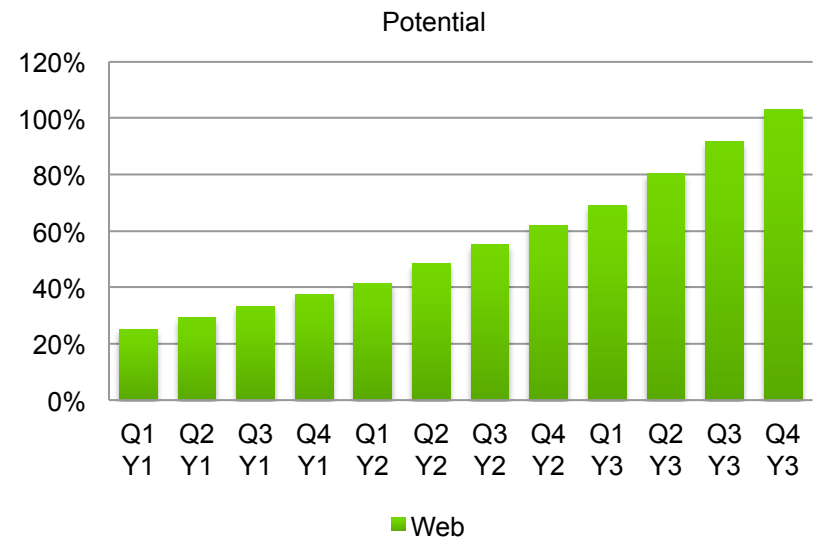
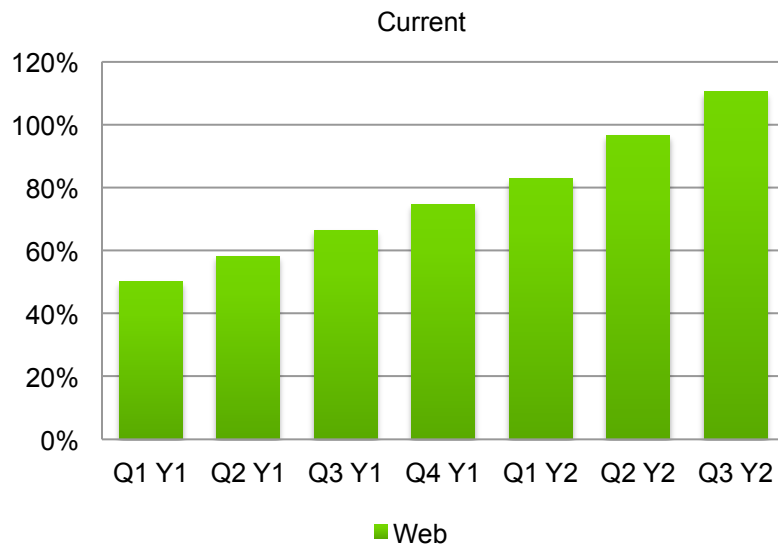
Gain 25% more capacity from existing infrastructure

Require 25% less infrastructure to support future growth

Assuming a network at 50% capacity in Year 1 and a 66% Compound Annual Growth Rate

# Network Capacity Without Video

Network capacity extended from Q3 Y2 to Q4 Y3



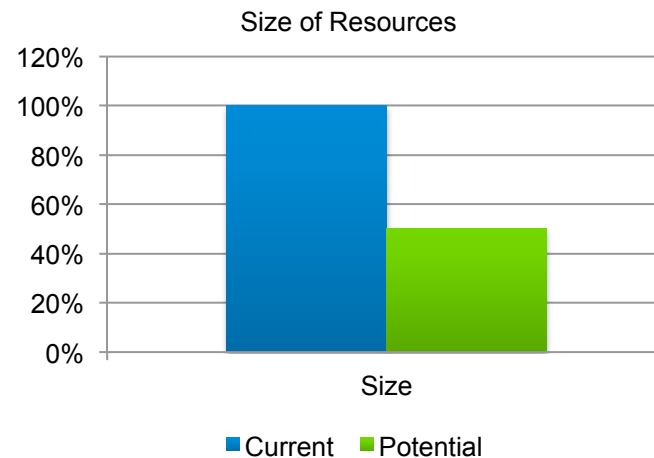
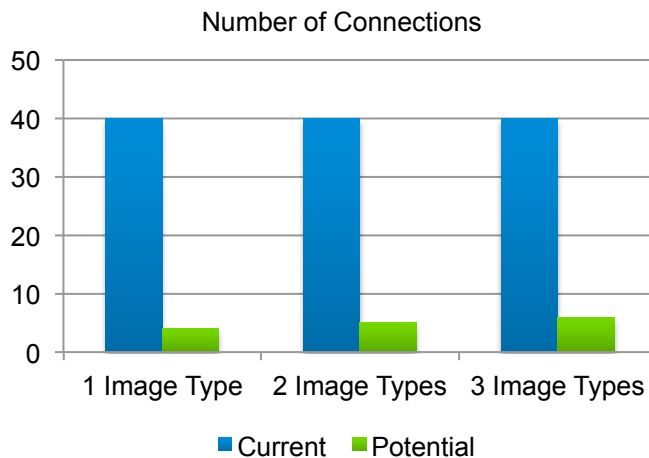
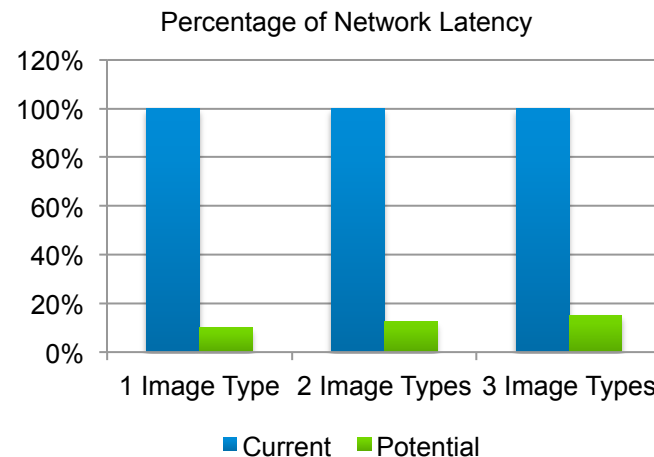
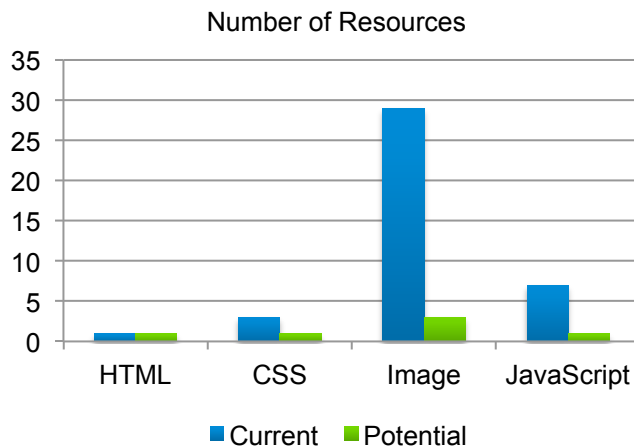
Gain 50% more capacity from existing infrastructure

Require 50% less infrastructure to support future growth

Assuming a network at 50% capacity in Year 1 and a 66% Compound Annual Growth Rate

# Customer Experience

## Current experience is 7X slower than the potential



Current number of resources and network latency is 10X more than the potential

Current Web page load time is 7X slower than the potential

Current bandwidth is 2X more than the potential

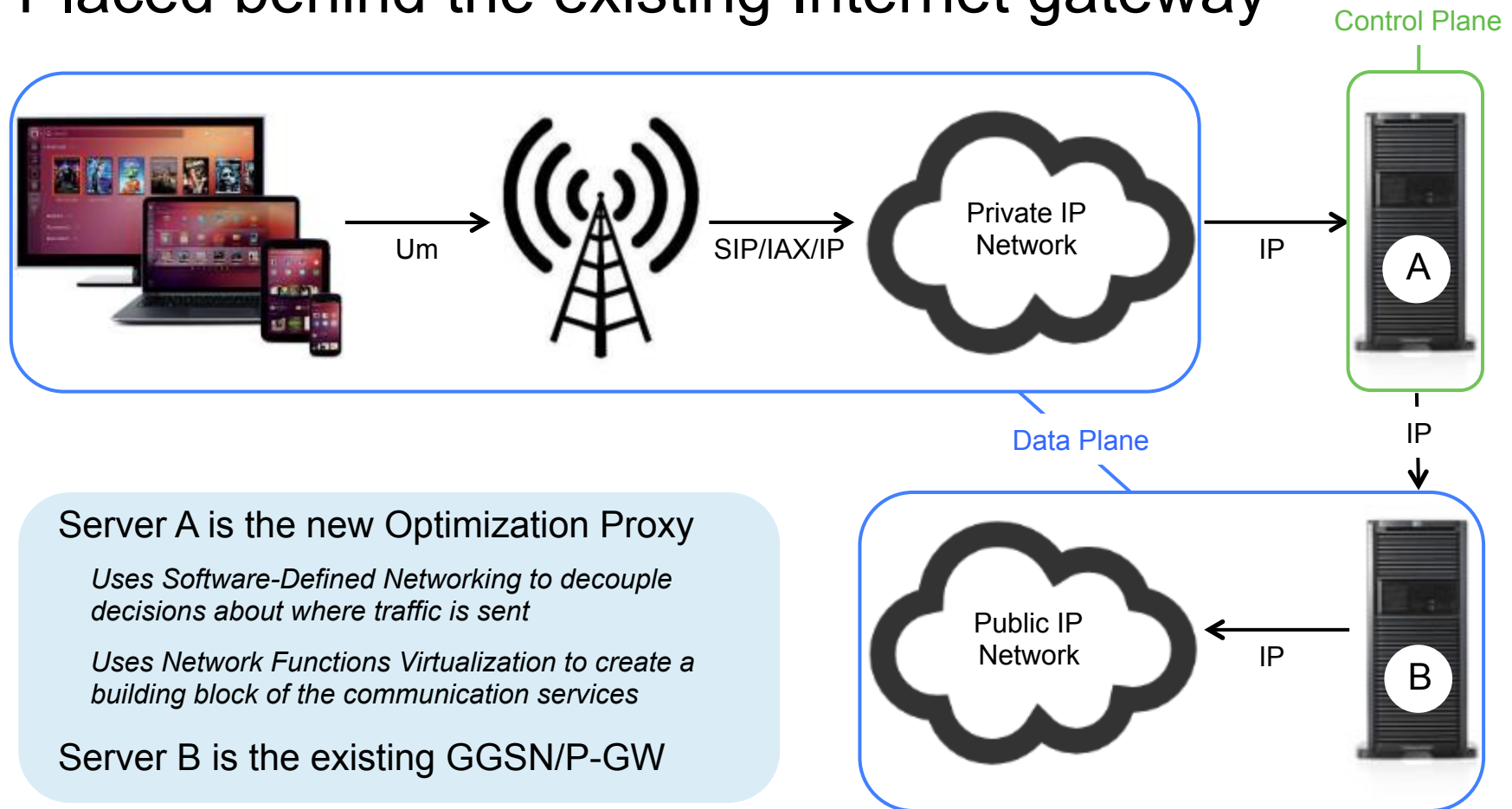


Solution



# Optimization Proxy

Placed behind the existing Internet gateway



Server A is the new Optimization Proxy

*Uses Software-Defined Networking to decouple decisions about where traffic is sent*

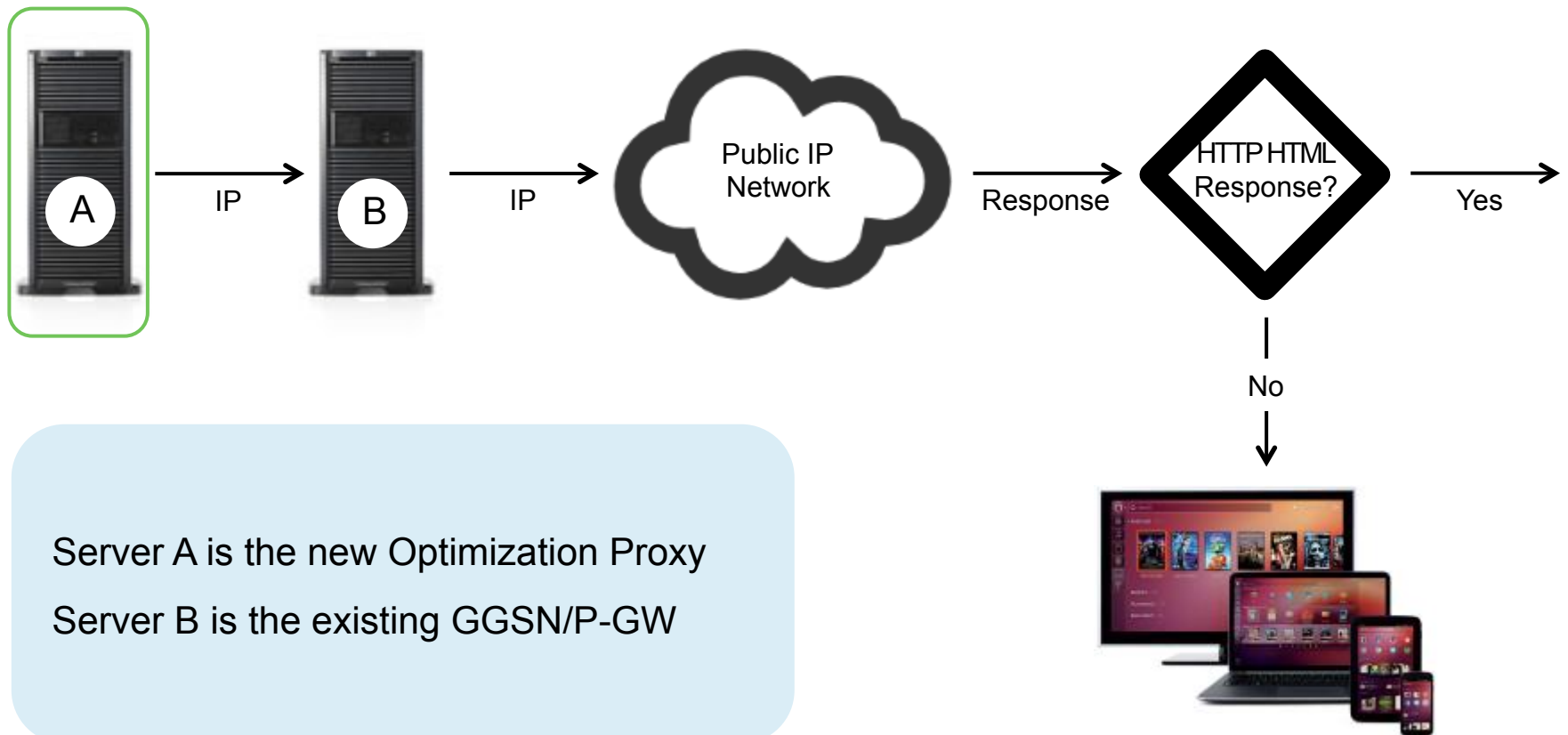
*Uses Network Functions Virtualization to create a building block of the communication services*

Server B is the existing GGSN/P-GW



# Optimization Proxy

Relays HTTPS / compressed non-HTML responses

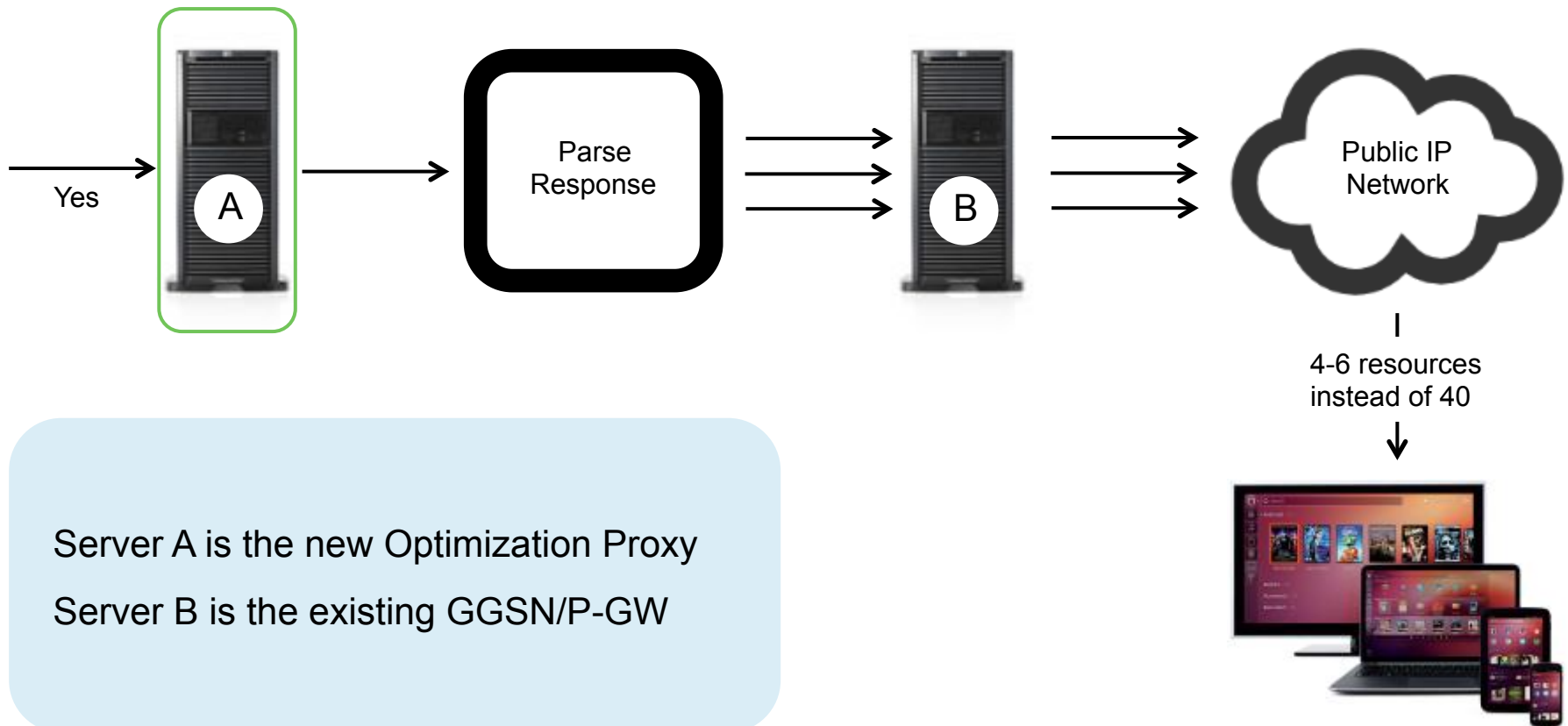


Server A is the new Optimization Proxy  
Server B is the existing GGSN/P-GW

<sup>1</sup> 1/3 of Web content is uncompressed and is compressed if the Web browser supports it.

# Optimization Proxy

Optimizes HTML responses via software compression

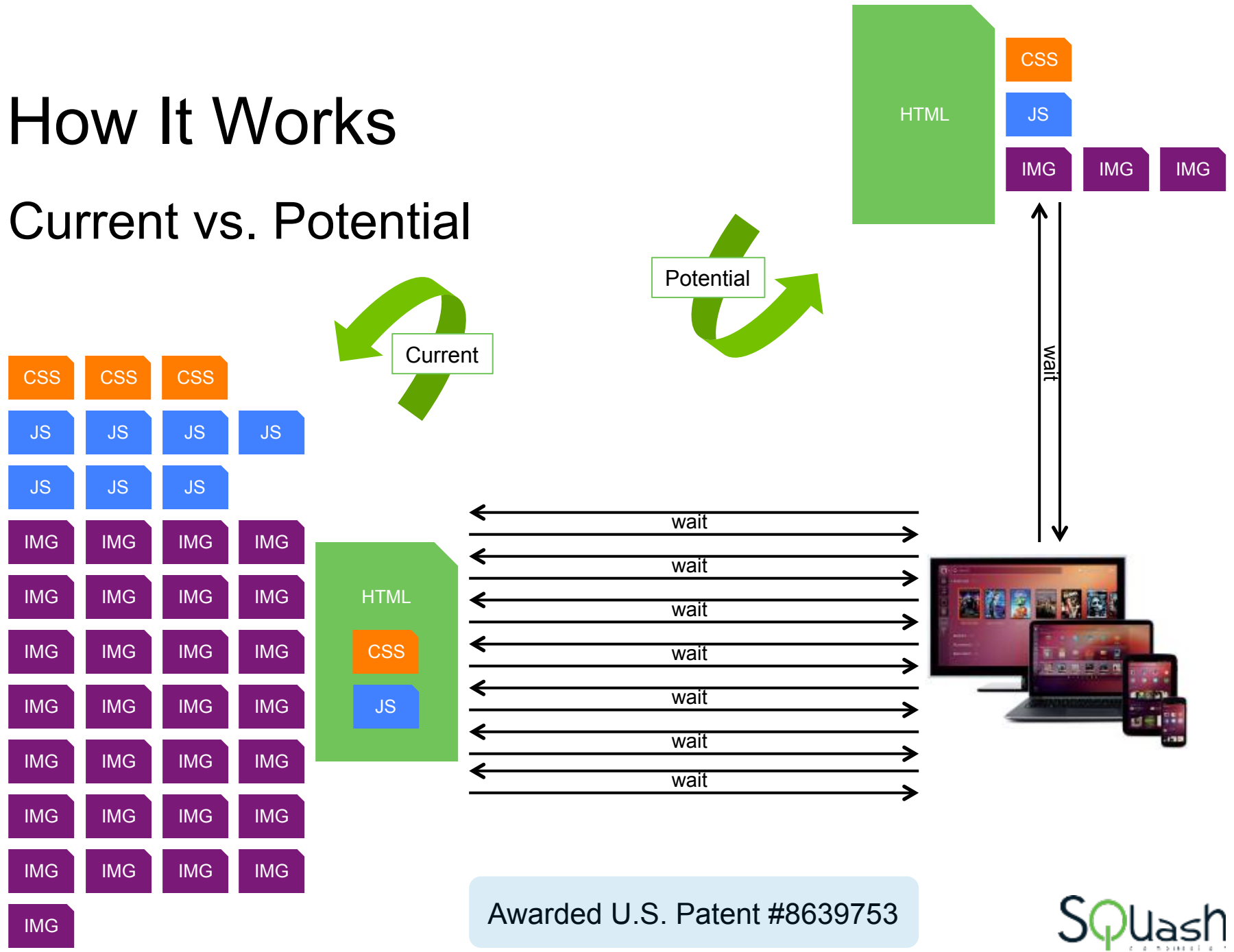


Server A is the new Optimization Proxy  
Server B is the existing GGSN/P-GW

Details are in the Optimization Proxy appendix

# How It Works

## Current vs. Potential



Awarded U.S. Patent #8639753



Recap



## We Discussed...

- Global subscriptions to reach 9 billion and Mobile data traffic to grow 15X by 2017
- Mobile users have increasing expectations
- Gain 25% - 50% more capacity from existing infrastructure
- Require 25% - 50% less new infrastructure to support future growth
- Increase customer satisfaction and loyalty with 7X faster page load time, 50% less bandwidth, and 90% less latency





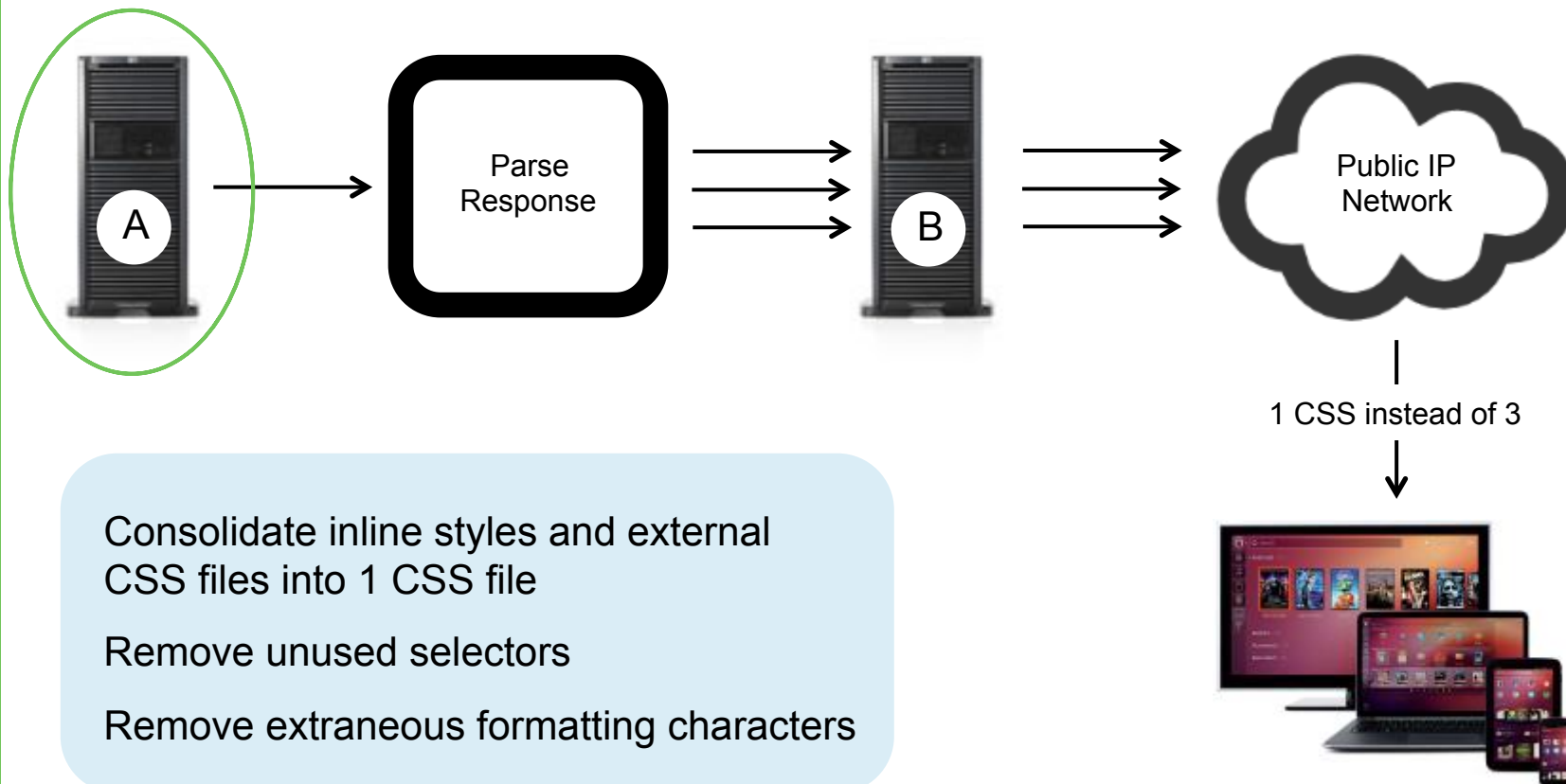
## Appendix Optimization Proxy





# Optimization Proxy

## Optimize CSS in HTML response

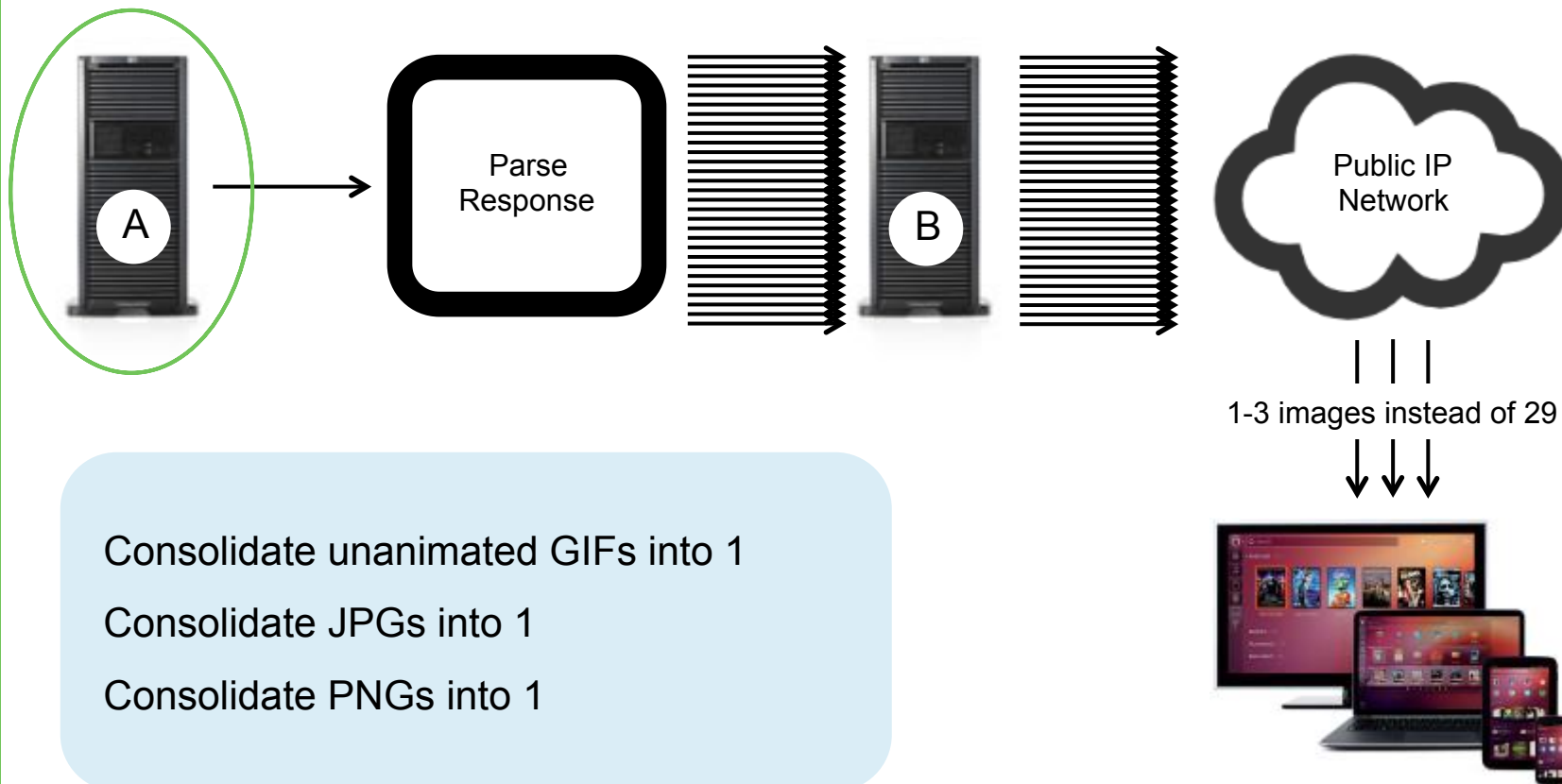


- Consolidate inline styles and external CSS files into 1 CSS file
- Remove unused selectors
- Remove extraneous formatting characters

Server A is the new Optimization Proxy. Server B is the existing GGSN/P-GW.

# Optimization Proxy

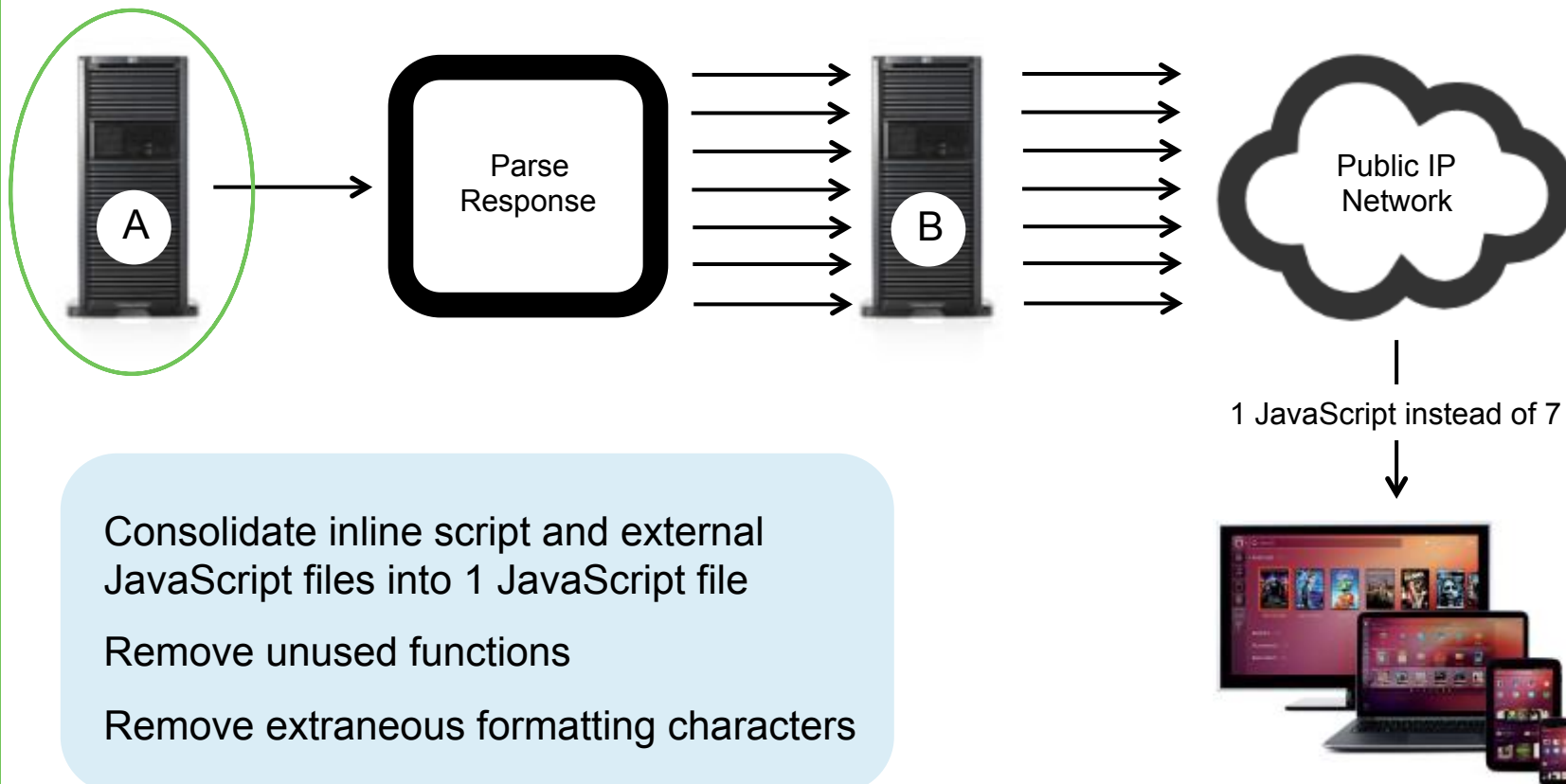
## Optimize images in HTML response



Server A is the new Optimization Proxy. Server B is the existing GGSN/P-GW.

# Optimization Proxy

## Optimize JavaScript in HTML response

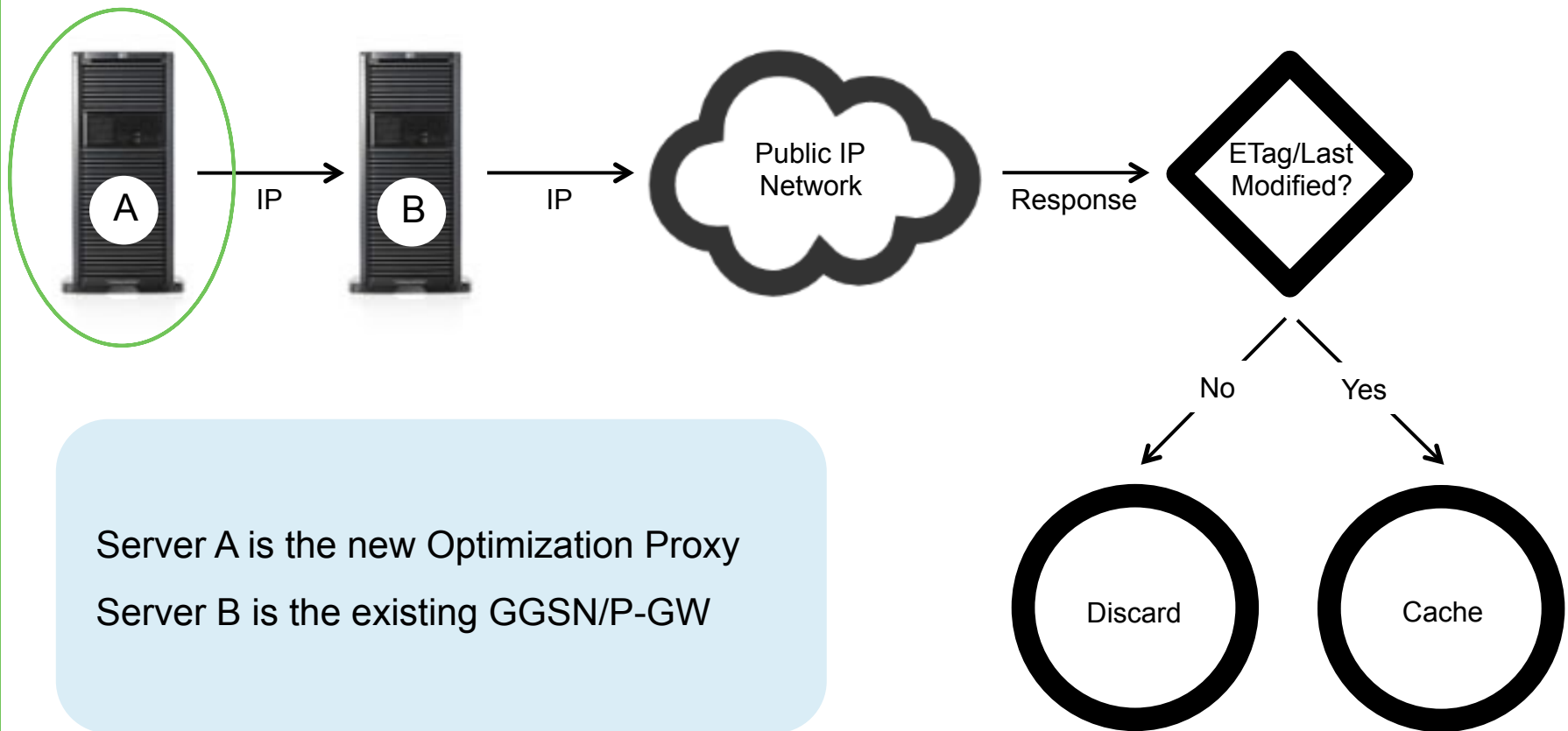


- Consolidate inline script and external JavaScript files into 1 JavaScript file
- Remove unused functions
- Remove extraneous formatting characters

Server A is the new Optimization Proxy. Server B is the existing GGSN/P-GW.

# Optimization Proxy

1<sup>st</sup> request for resource from destination server



# Optimization Proxy

2<sup>nd</sup> + request for resource from destination server

