

An Overview of Amazon Silk

Amazon's new cloud-powered browser

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**Web Page
Complexity
is
Steadily
Increasing**

Amazon's Home Page

~1996



**Welcome to Amazon.com
Books!**

*[One million titles,](#)
[consistently low prices.](#)*

(If you explore just one thing, make it our personal notification service. We think it's very cool!)

SPOTLIGHT! -- AUGUST 16TH

These are the books we love, offered at Amazon.com low prices. The spotlight moves **EVERY** day so please come often.

ONE MILLION TITLES

Search Amazon.com's [million title catalog](#) by author, subject, title, keyword, and more... Or take a look at the [books we recommend](#) in over 20 categories... Check out our [customer reviews](#) and the [award winners](#) from the Hugo and Nebula to the Pulitzer and Nobel... and [bestsellers](#) are 30% off the publishers list...

EYES & EDITORS, A PERSONAL NOTIFICATION SERVICE

Like to know when that book you want comes out in paperback or when your favorite author releases a new title? Eyes, our tireless, automated search agent, will send you mail. Meanwhile, our human editors are busy previewing galleys and reading advance reviews. They can let you know when especially wonderful works are published in particular genres or subject areas. Come in, [meet Eyes](#), and have it all explained.

YOUR ACCOUNT

Check the status of your orders or change the email address and password you have on file with us. Please note that you **do not** need an account to use the store. The first time you place an order, you will be given the opportunity to create an account.

2 elements
1 domain
10 kilobytes

Amazon's Home Page

~1996



The screenshot shows the original Amazon.com homepage. On the left is a large blue 'A' logo with 'amazon.com' and 'Earth's biggest bookstore' below it. To the right, the text 'Welcome to Amazon.com Books!' is displayed. Below this, a quote reads: 'One million titles, consistently low prices.' Further down, a section titled 'SPOTLIGHT! -- AUGUST 16TH' mentions book prices. Below that, 'ONE MILLION TITLES' is highlighted, followed by a search bar and a list of categories. The 'EYES & EDITORS, A PERSONAL NOTIFICATION SERVICE' section describes an automated search agent. Finally, the 'YOUR ACCOUNT' section provides information on account management.

amazon.com
Earth's biggest bookstore

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Books!

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consistently low prices.*

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2 elements
1 domain
10 kilobytes

2011



The screenshot shows the Amazon.de homepage from 2011. The layout is more complex, featuring a top navigation bar with links like 'Mein Amazon', 'Sonderangebote', and 'Wunschzettel'. A large central banner promotes the Kindle e-reader with the text 'Der erste deutsche Kindle' and a price of '99€'. To the right, there's a section for 'Amazon Prime' and 'Ausgewählte Themen und Partner-Links'. Below the banner, a 'Das interessiert Kunden aktuell' section displays various products like 'Transformers 3', 'Samsung Galaxy S II', and 'The Elder Scrolls V: Skyrim'. Further down, a 'Uhren für Damen, Herren und Kinder von Topmarken' section shows watches from brands like Citizen, Pulsar, and Skagen. The bottom right corner features a 'Jeans Neue Trends' advertisement and a '4-fach punkten' (4x points) promotion.

amazon.de
Hallo! Melden Sie sich an, um persönliche Empfehlungen zu erhalten.
Neukunde? Bitte hier starten.

Mein Amazon | Sonderangebote | Wunschzettel | Gutscheine | Geschenke | Mein Konto | Hilfe | Impressum

Suche Alle Kategorien

Alle Kategorien ansehen

- Bücher
- Kindle
- Musik, DVD & Games
- Computer & Software
- Elektronik & Foto
- Küche & Haushalt
- Baumarkt, Garten & Tier
- Auto & Motorrad
- Lebensmittel & Drogerie
- Spielzeug & Baby
- Kleidung, Schuhe & Uhren
- Sport & Freizeit

Der erste deutsche
Kindle
99€
Jetzt bestellen

Kindle eBooks
Gratis Kindle Lese-Apps
Kindle-Zubehör

Amazon Prime
Jede Lieferung am nächsten Tag
Mehr Details

Ausgewählte Themen und Partner-Links
SONY Entertainment | Hollywood | Disney | Nintendo | CEWE Fotobuch | Filme leihen | Harry Potter

Die besten
Geschenkkdeen
Hier klicken
unterstützt von: BRAUN

SONY
Kleine Kamera. Große Perspektiven.
• APS-C Exmor™ Sensor mit 16,1 Megapixel
• Frei wählbare Wechselobjektive
• Bis zu 10 Bilder pro Sek.
• Variable Hintergrundunschärfe
Die neue NEX-5N von Sony
Mehr Infos »

Anzeige

Uhren für Damen, Herren und Kinder von Topmarken

Damenuhren

- Dolce & Gabbana
- Esprit
- Cerruti
- Guess
- Festina

Herrenuhren

- Citizen
- Pulsar
- Skagen
- Jacques Lemans
- Tommy Hilfiger

Kinderuhren

- Disney
- Esprit
- Hello Kitty
- s.Oliver
- Scout

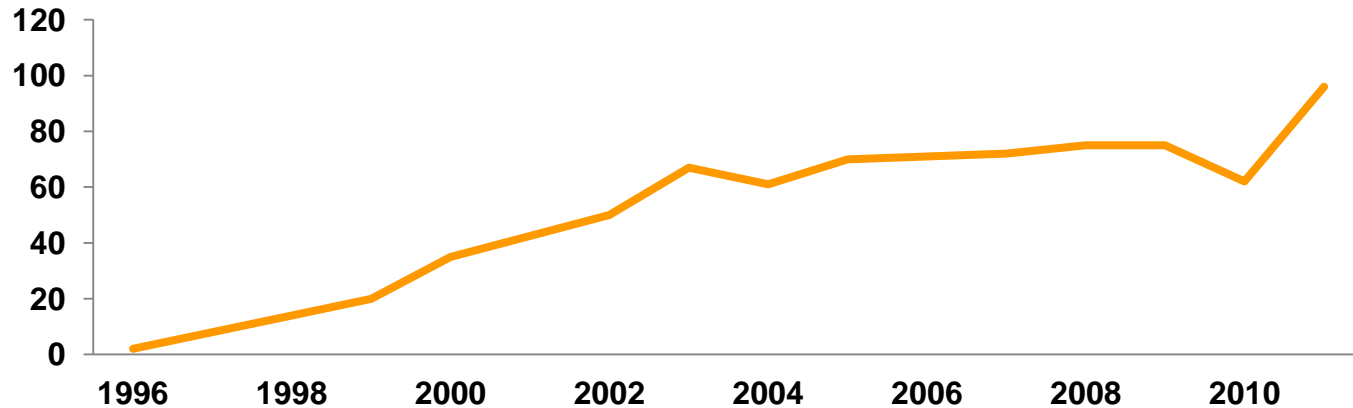
Jeans
Neue Trends
Hier klicken

= 4-fach punkten
Sammeln Sie extra Amazon.de Punkte im
Marketing-Programm

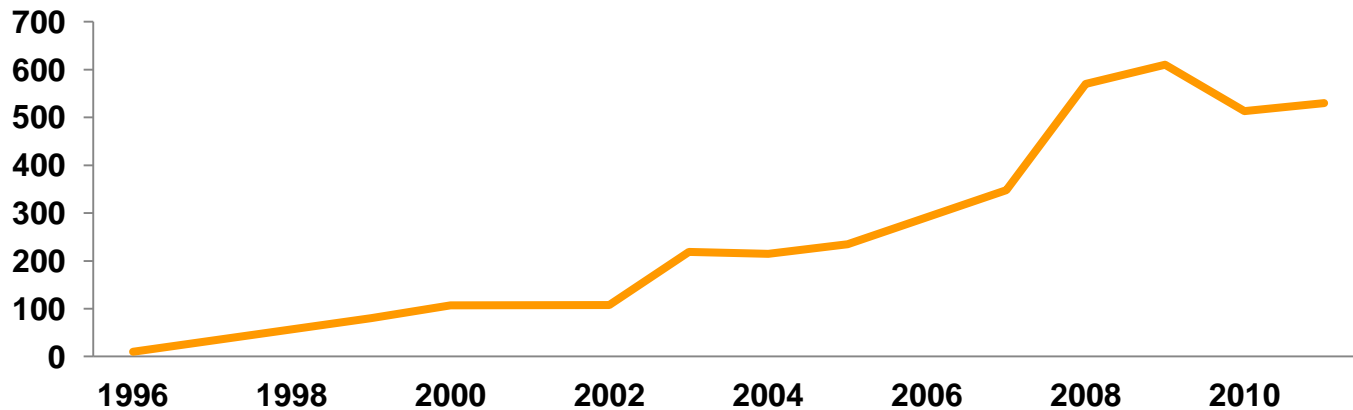
96 elements
12 domains
530 kilobytes

Amazon Home Page Size Growth

Total Elements

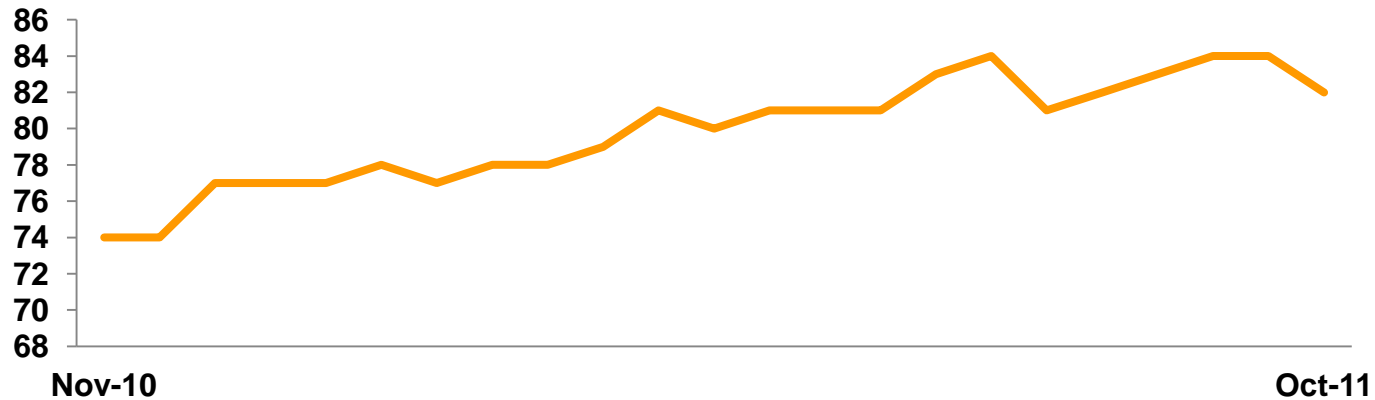


Total Kilobytes

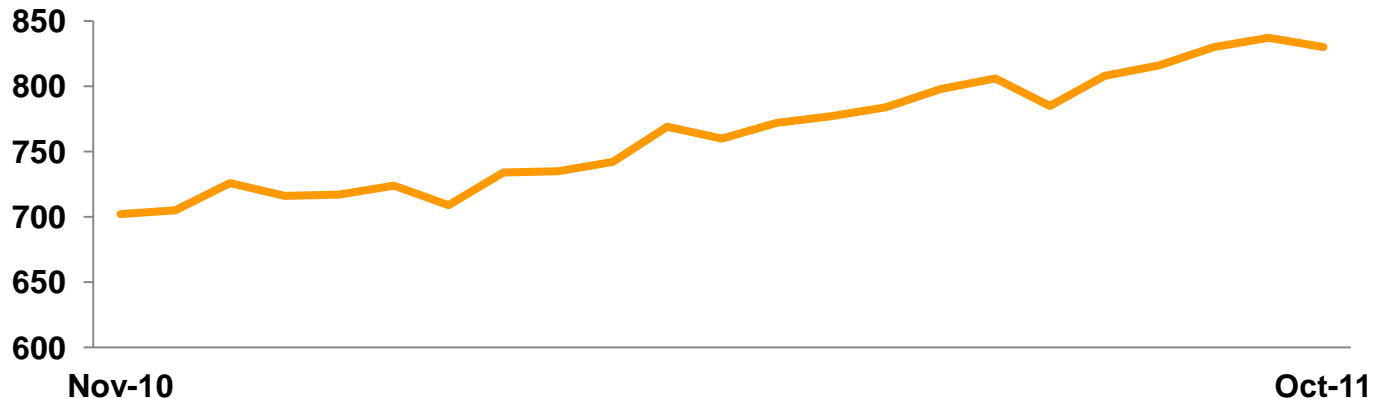


HTTP Archive Data

Total Elements Per Page

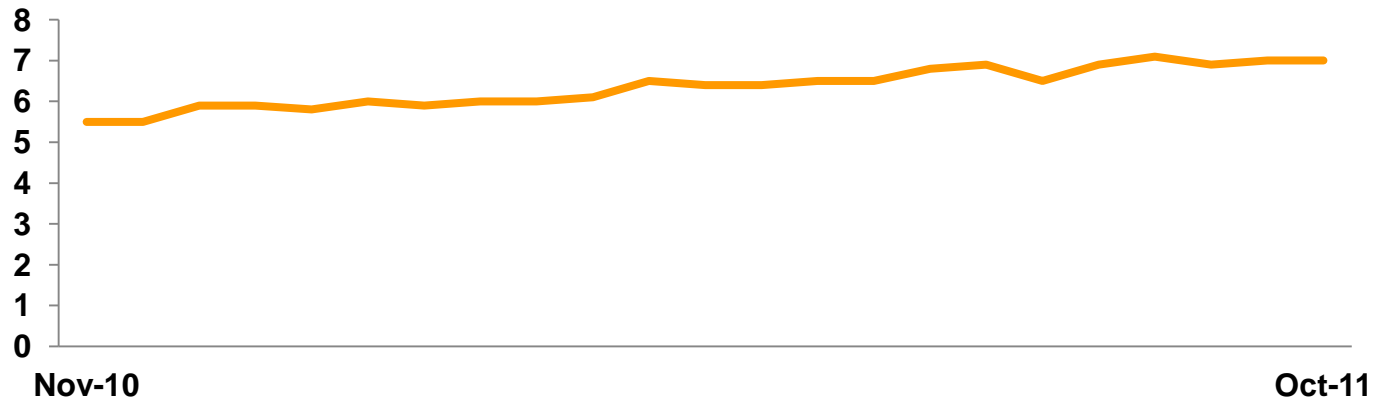


Total Kilobytes Per Page

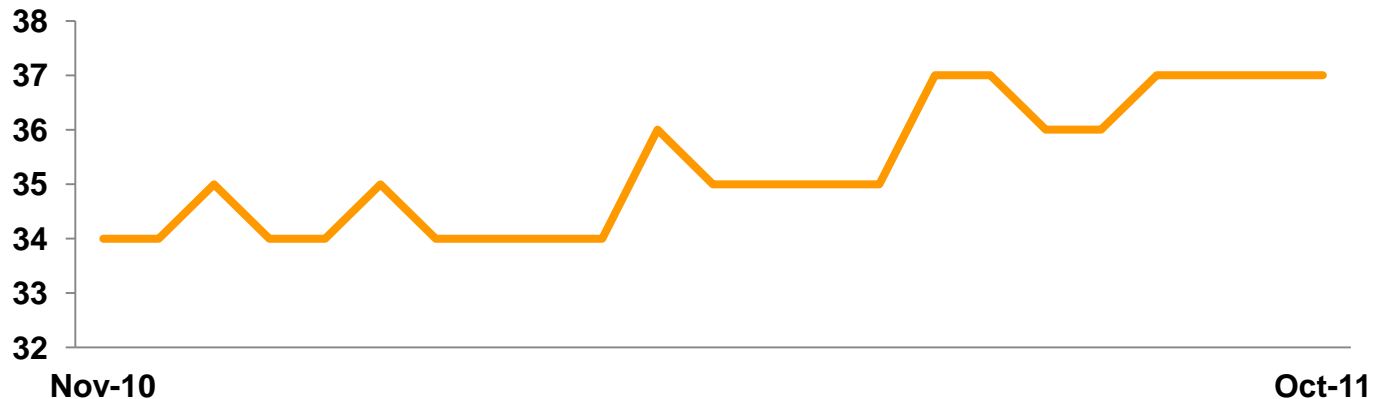


HTTP Archive Data

HTML Elements Per Page

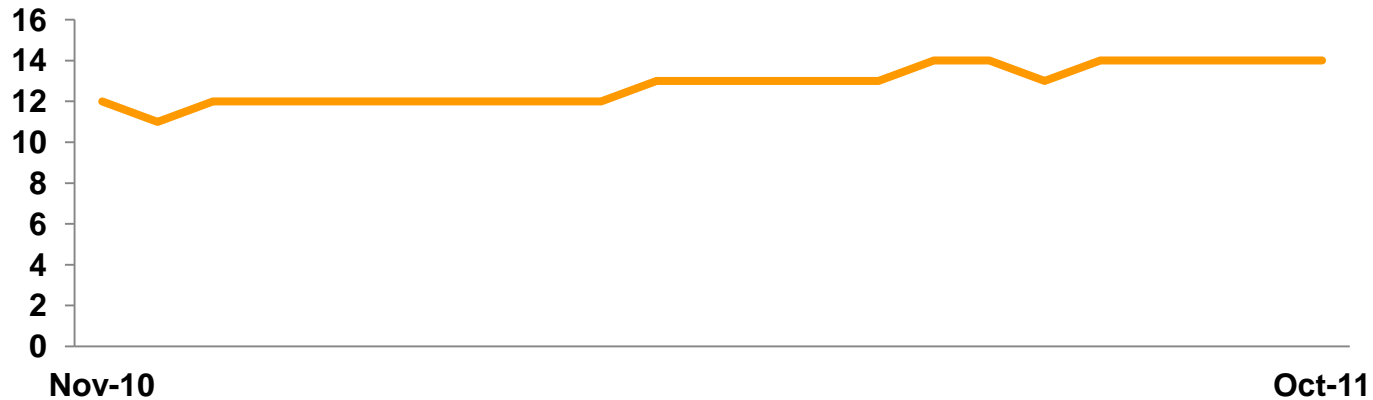


HTML Kilobytes Per Page

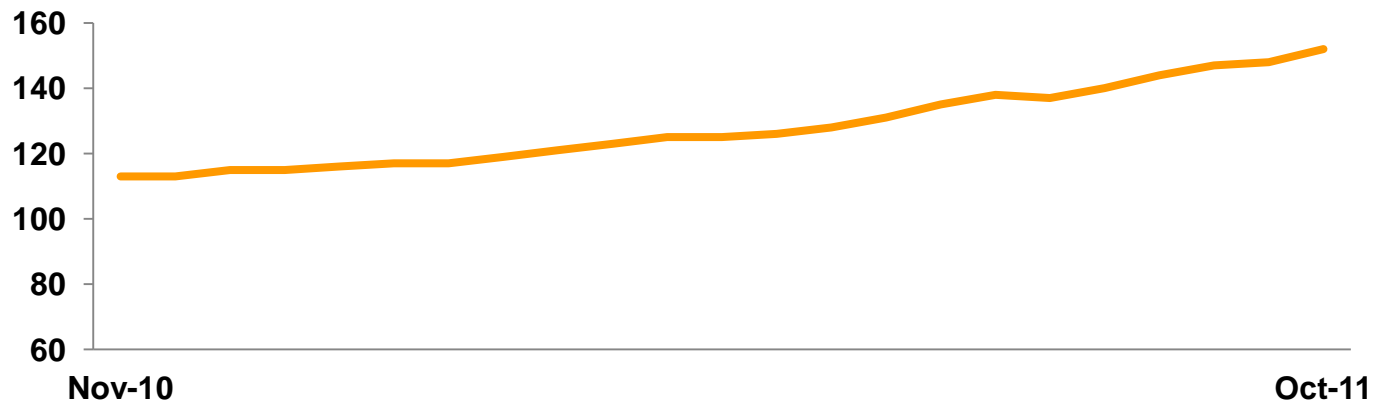


HTTP Archive Data

Javascript Elements Per Page

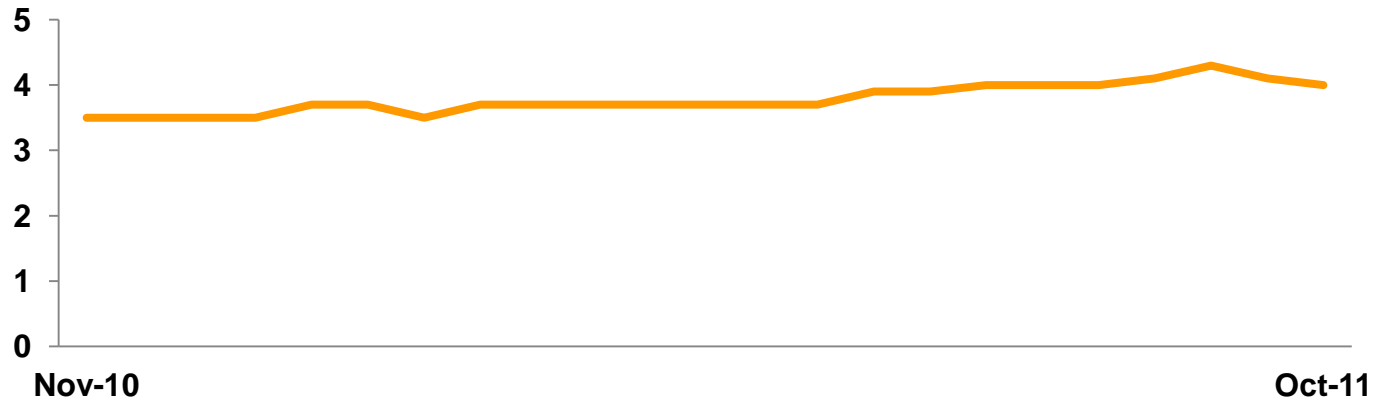


Javascript Kilobytes Per Page

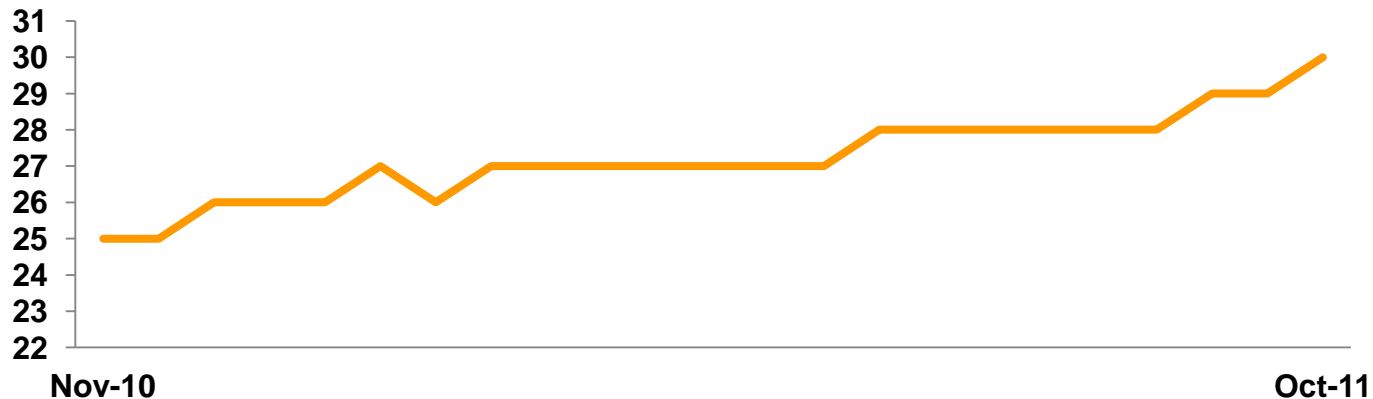


HTTP Archive Data

CSS Elements Per Page



CSS Kilobytes Per Page



HTTP Archive Data

Images Per Page

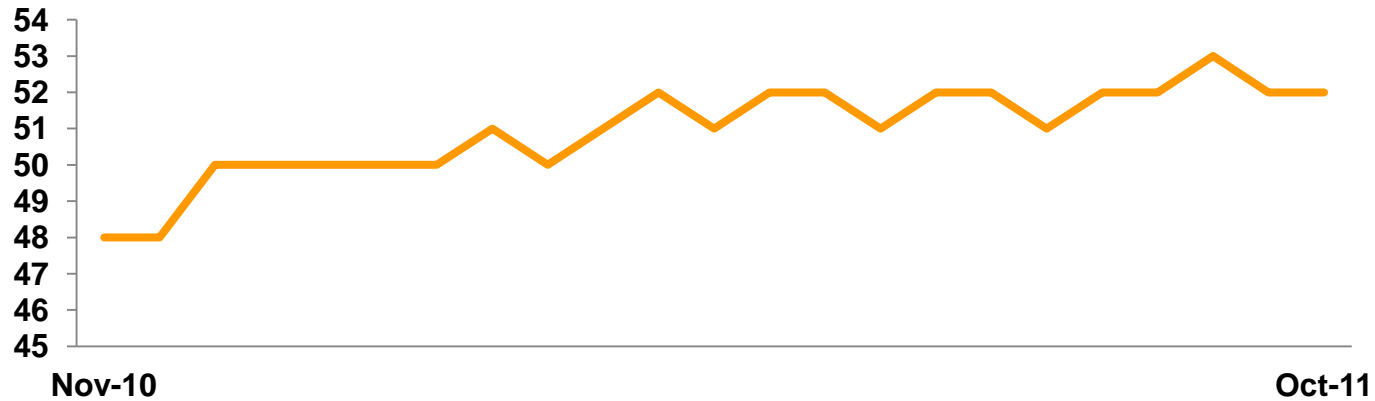
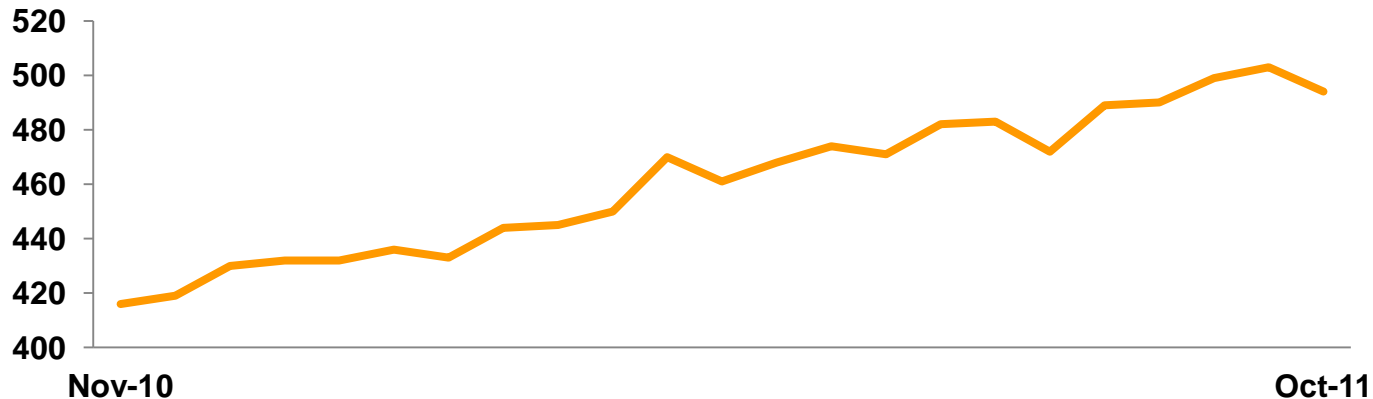
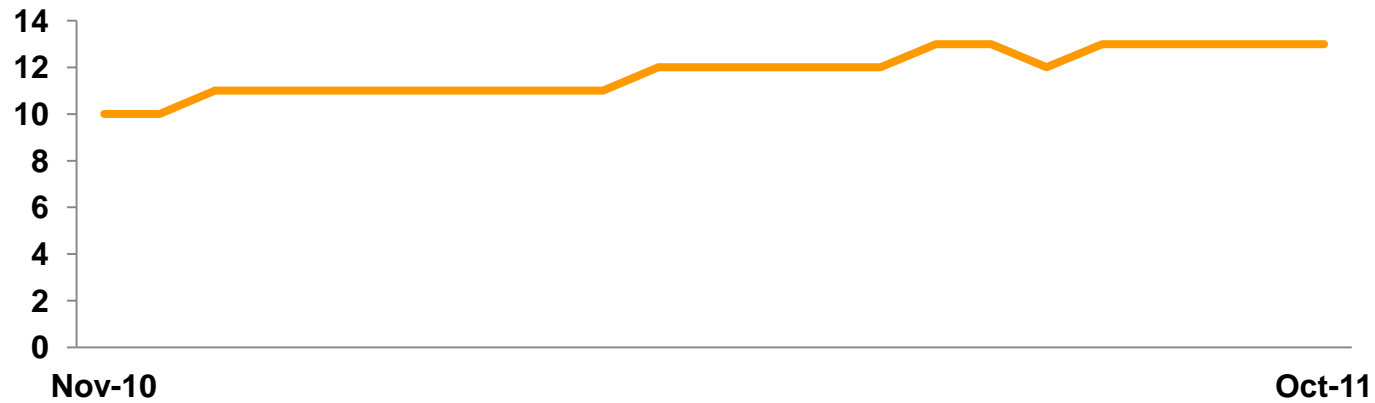


Image Kilobytes Per Page



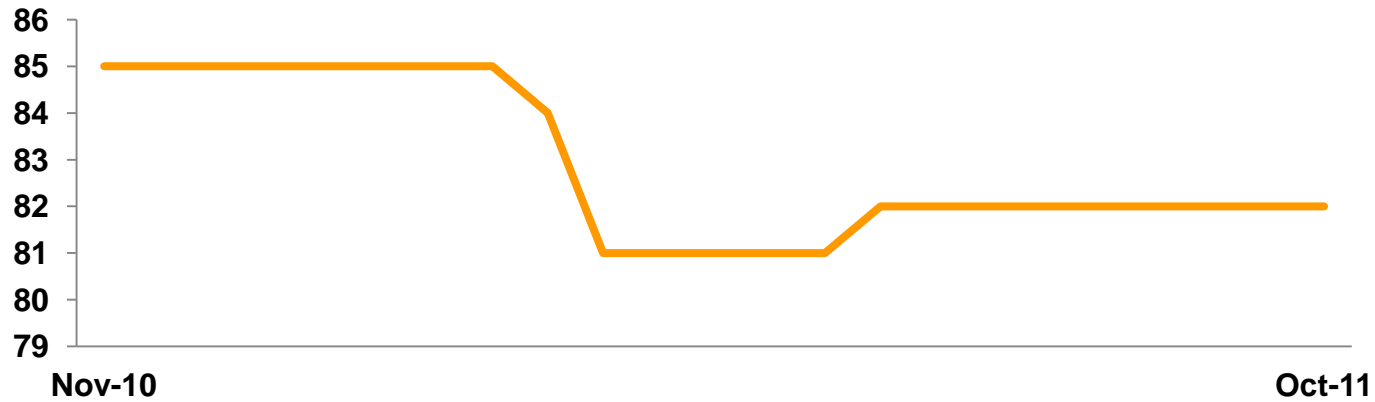
HTTP Archive Data

Number of Domains Per Page



HTTP Archive Data

Average Page Speed Score



**Are we losing the battle?
war?**

**Migration to
Mobile
Makes the
Problem
Even Worse**

What do you get for \$500?

	Desktop	Laptop	Tablet	Phone
CPU	Quad 2.1Ghz	Dual 2.1Ghz	Dual 1.2Ghz	Dual 1Ghz
Memory	4GB	3GB	1GB	512MB
Disk/Flash	1000GB	320GB	32GB	8GB
Network	1Gbps	54Mbps	54Mbps	10Mbps

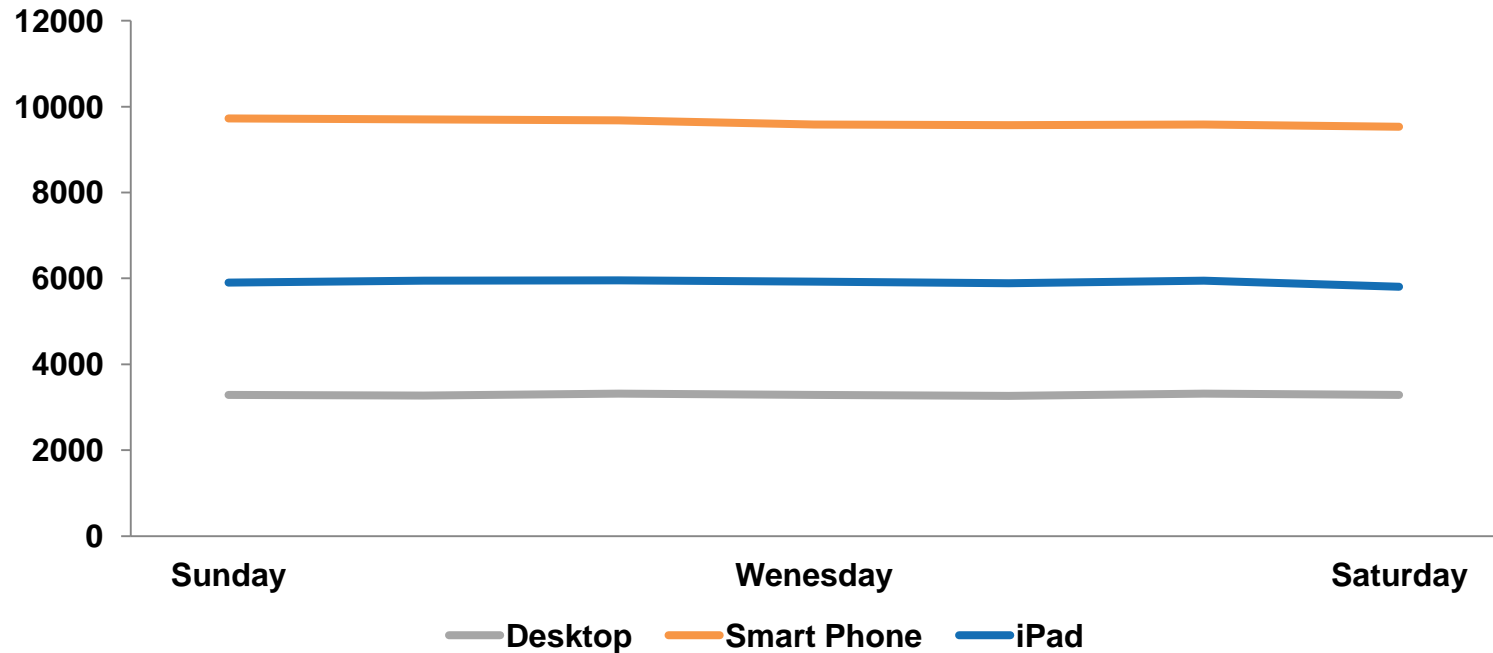
The Network Matters

**Power Saving Mode (PSM)
degrades wi-fi performance**

**Radio Resource Control (RRC)
degrades cellular performance**

Mobile Platform Load Times

Amazon Detail Page Load Times By Platform (milliseconds)



**Complex
Web**

+

Mobile

=



**Complex
Web**

+

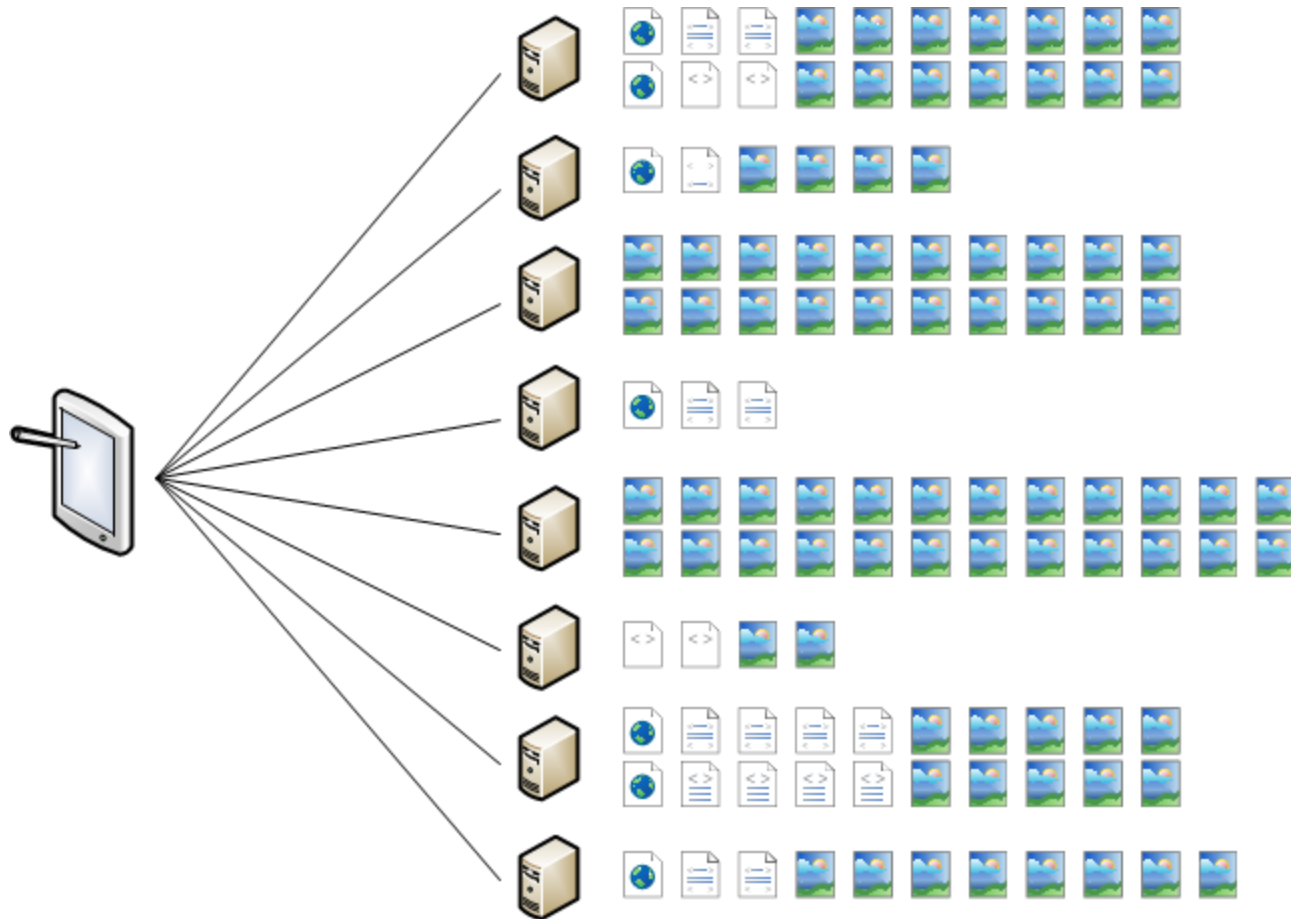
**Amazon
Silk**

=

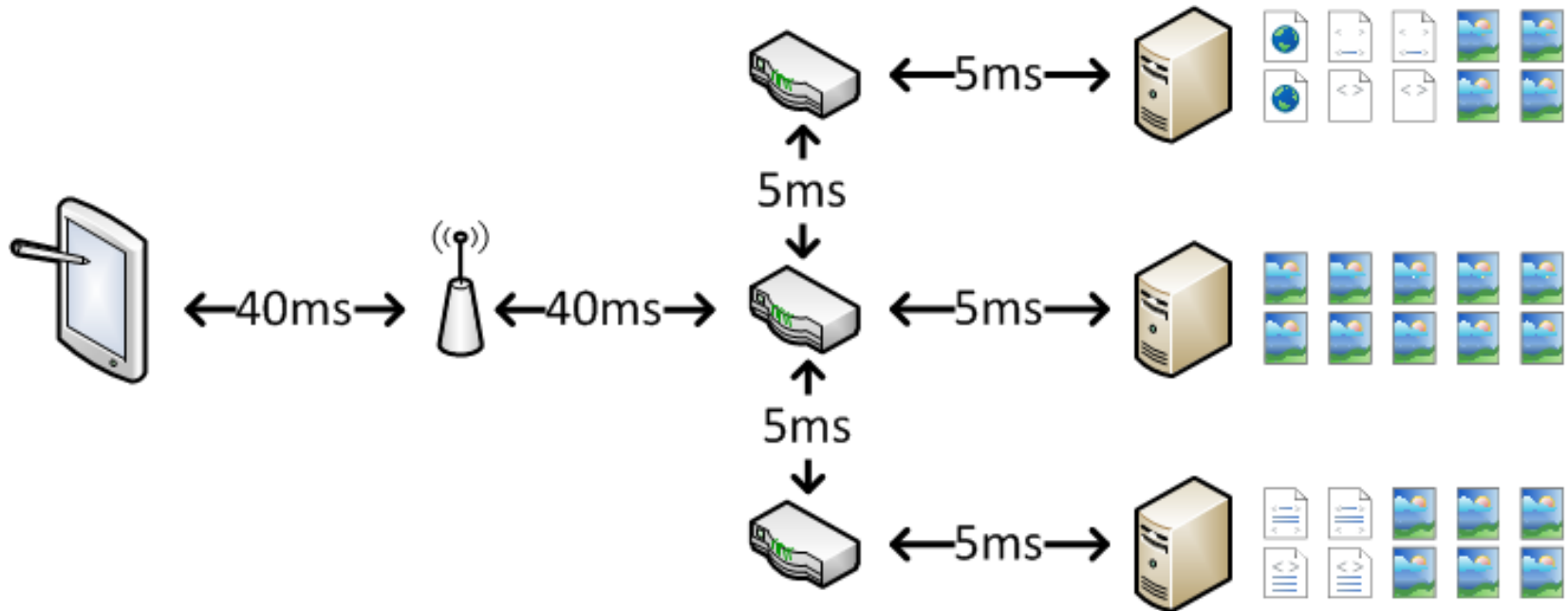


**What
Makes
Amazon Silk
Different?**

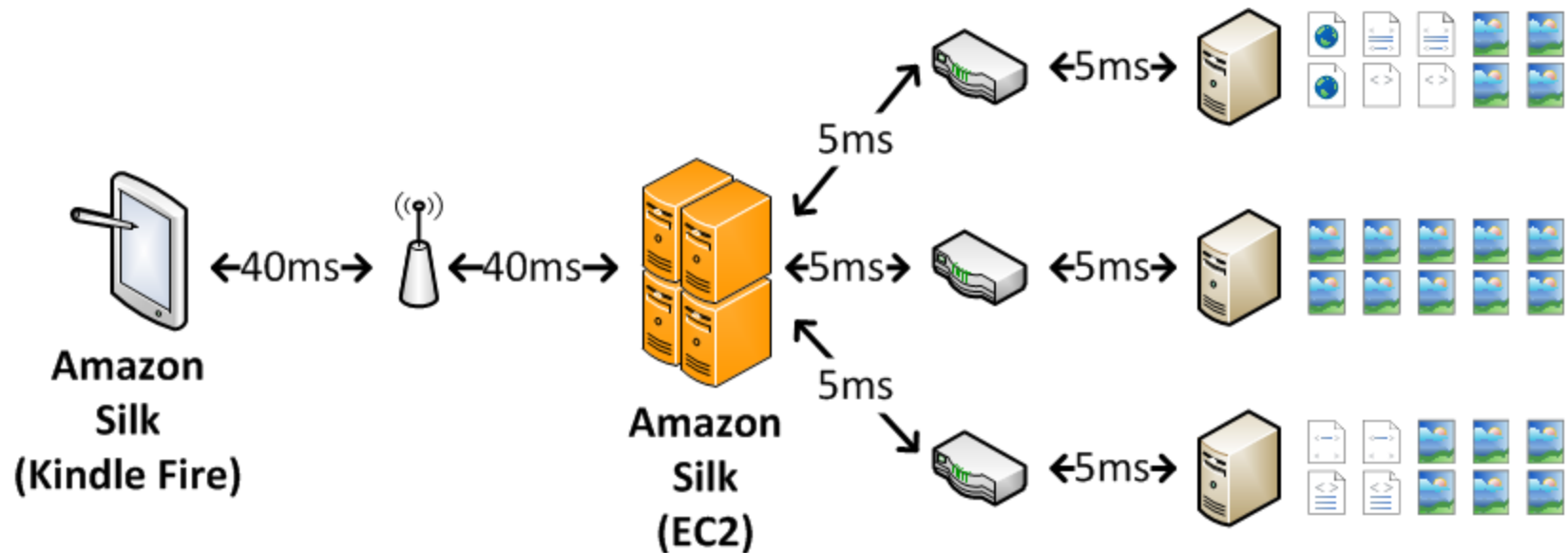
The Architecture of the Web



The Architecture of the Web



Introducing Silk



A Tale of Two Web Pages



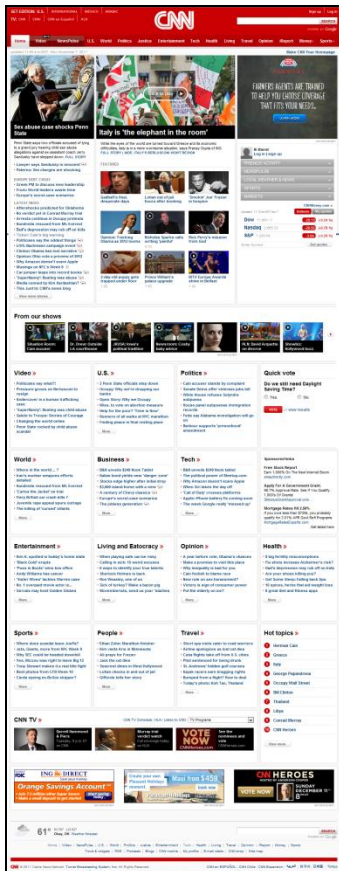
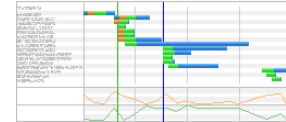
www.google.com

15 elements

2 domains

238 kilobytes

1.951 sec load time



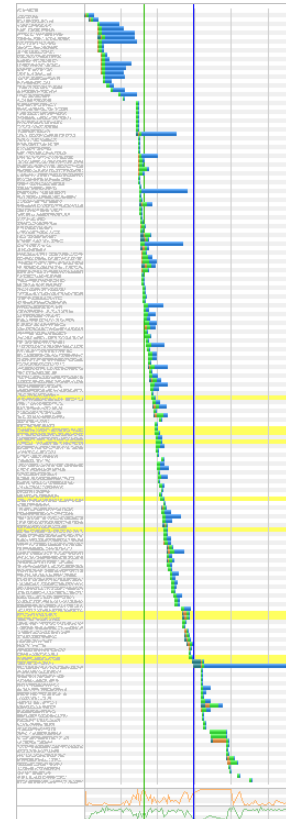
www.cnn.com

175 elements

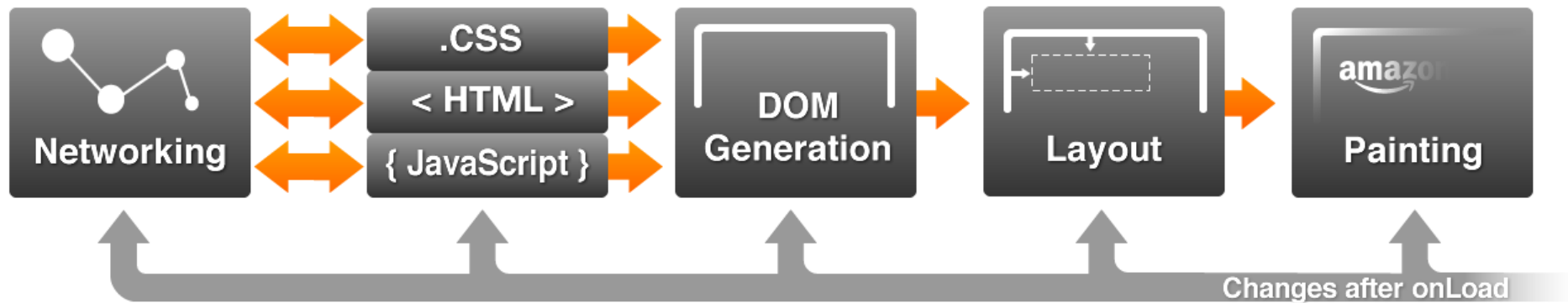
23 domains

1,737 kilobytes

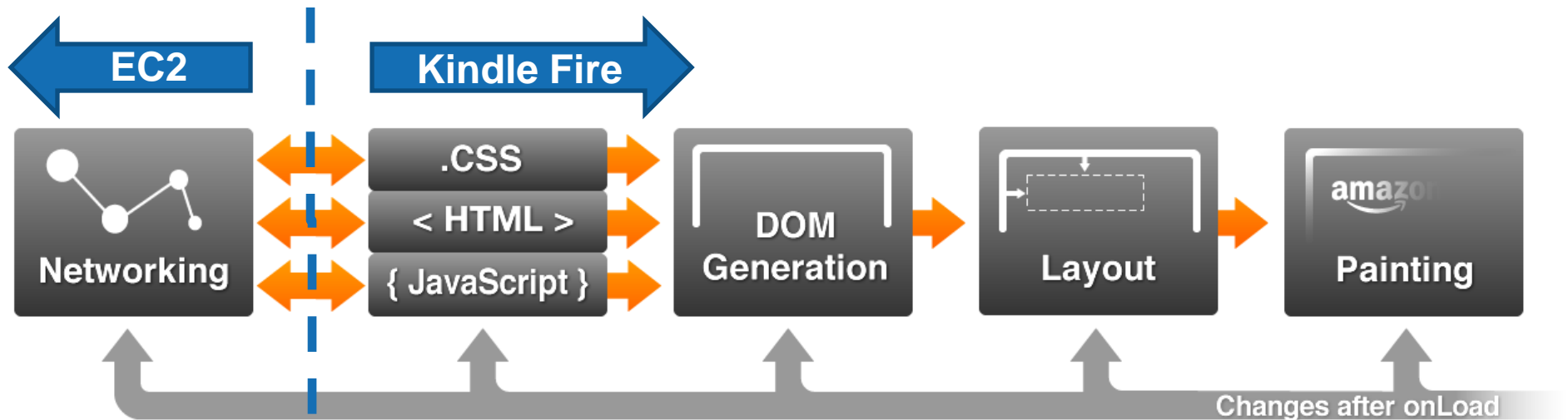
11.181 sec load time



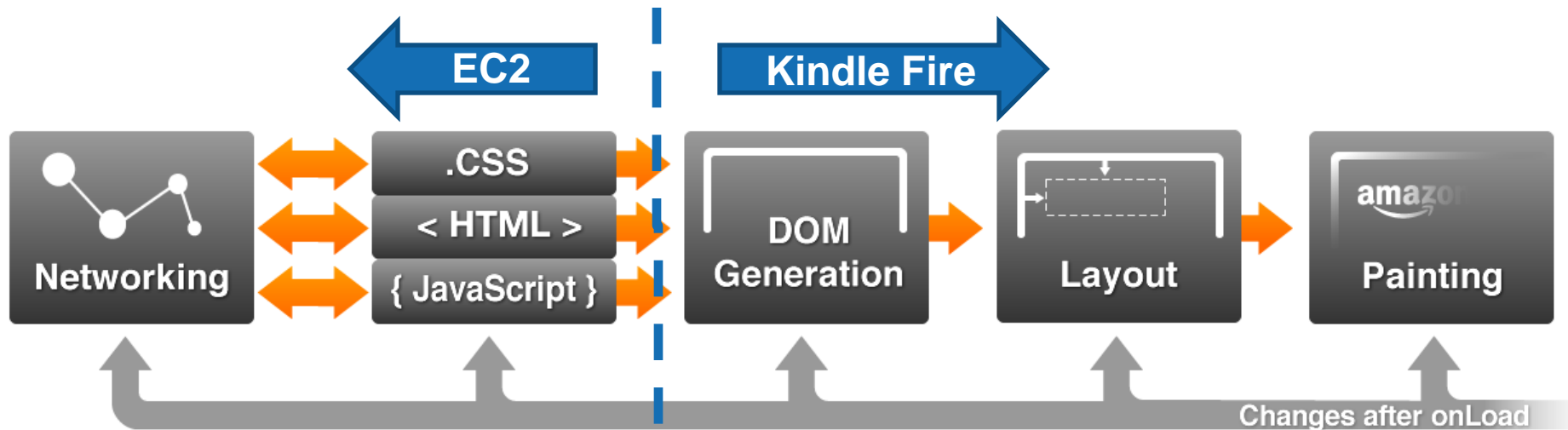
Dynamic Split



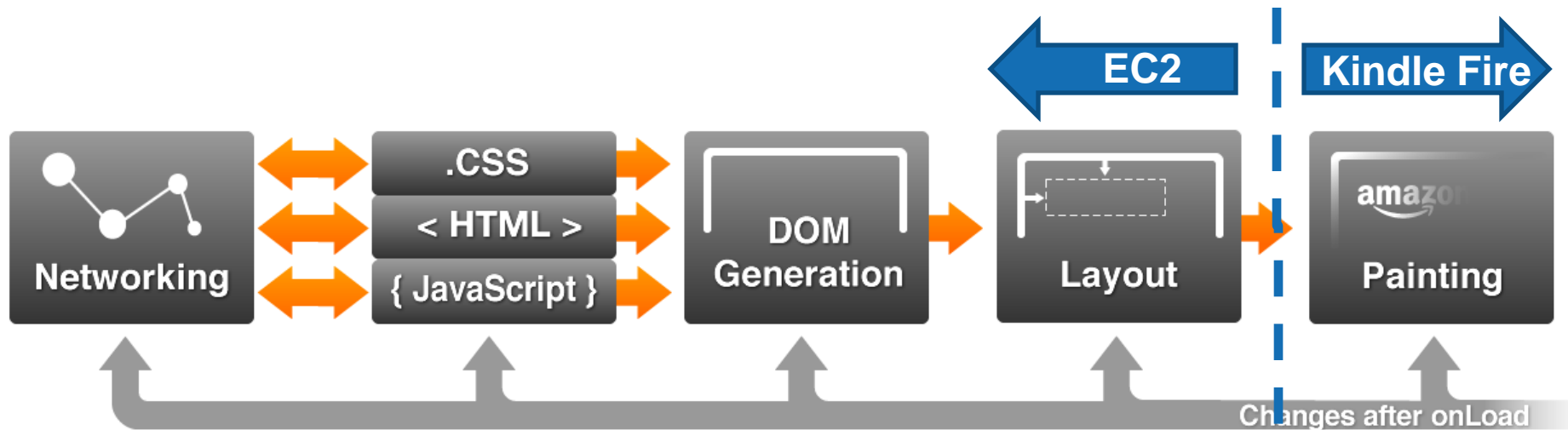
Dynamic Split



Dynamic Split

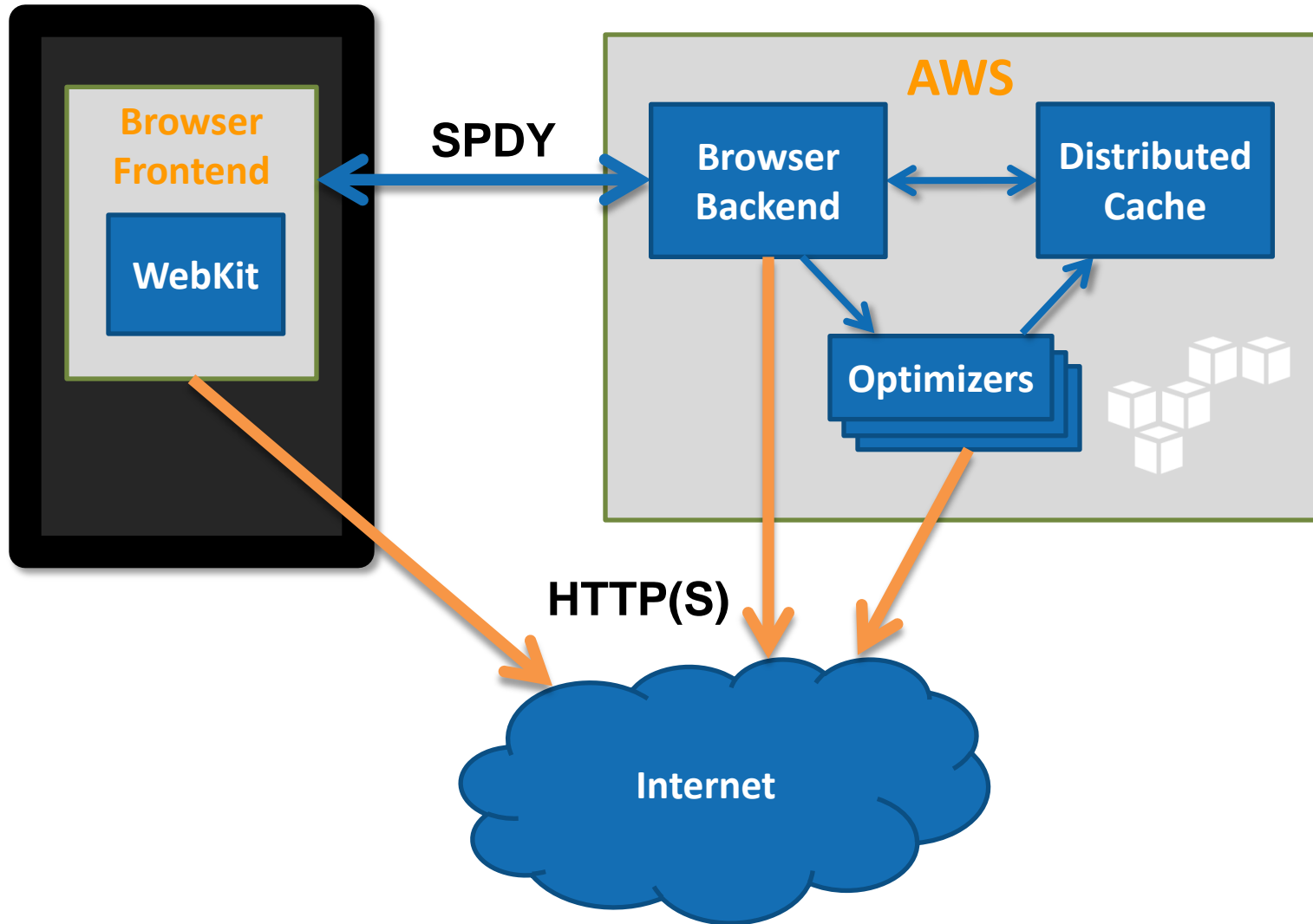


Dynamic Split



Amazon Silk Technical Details

Silk Architecture



Client Architecture

Rendering engine is Webkit

JavaScript engine is V8

The application layer is built from scratch

Automatic user agent mode

Flash 10.3 support

Falls back to local rendering on failure



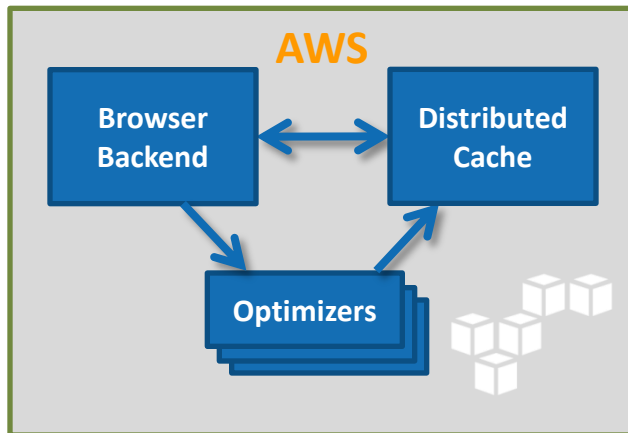
Server Architecture

Infrastructure is hosted on AWS

No user-identifiable data logged

Logs not kept for more than 30 days

Optimizers will evolve over time



Optimizers

Image optimization

Content minification



Optimizers

Content compression

Content push via page indexes

Predictive rendering

Protocols

Silk client and server communicate via SPDY

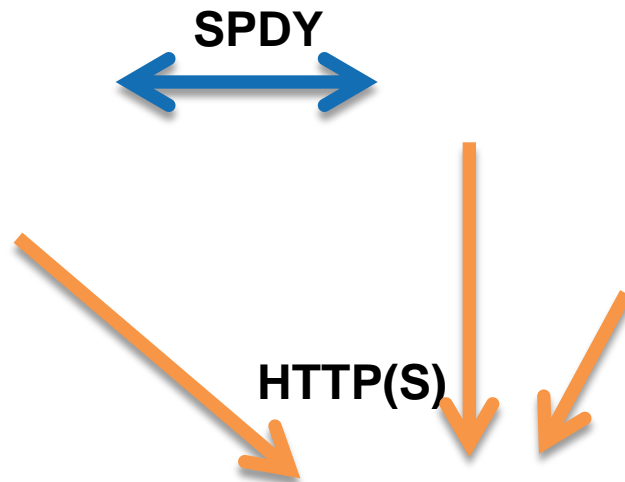
Multiplexed concurrent streams

Request prioritization

Compression

Encryption

Server push



Silk server communicates via HTTP(S)

Silk client uses HTTP(s) when turned off

SSL is always routed direct to origin

Info for Web Developers

User Agent Strings At Launch

- **Mobile**

Mozilla/5.0 (Linux; U; Android 2.3.4; en-us; Cloud9/1.0.0) AppleWebKit/533.1 (KHTML, like Gecko) Version/4.0 Mobile Safari/533.1

- **Desktop**

Mozilla/5.0 (Macintosh; U; Intel Mac OS X 10_6_3; en-us; Cloud9/1.0.0) AppleWebKit/533.16 (KHTML, like Gecko) Version/5.0 Safari/533.16

User Agent String After First Software Update

- **Mobile – Acceleration On**

Mozilla/5.0 (Linux; U; Android 2.3.4; en-us; Silk/1.1.0-72) AppleWebKit/533.1 (KHTML, like Gecko) Version/4.0 Mobile Safari/533.1 Silk-Accelerated=true

- **Desktop – Acceleration On**

Mozilla/5.0 (Macintosh; U; Intel Mac OS X 10_6_3; en-us; Silk/1.1.0-72) AppleWebKit/533.16 (KHTML, like Gecko) Version/5.0 Safari/533.16 Silk-Accelerated=true

- **Mobile – Acceleration Off**

Mozilla/5.0 (Linux; U; Android 2.3.4; en-us; Silk/1.1.0-72) AppleWebKit/533.1 (KHTML, like Gecko) Version/4.0 Mobile Safari/533.1 Silk-Accelerated=false

- **Desktop – Acceleration Off**

Mozilla/5.0 (Macintosh; U; Intel Mac OS X 10_6_3; en-us; Silk/1.1.0-72) AppleWebKit/533.16 (KHTML, like Gecko) Version/5.0 Safari/533.16 Silk-Accelerated=false

Info for Web Developers

Original IP address propagated in x-forwarded-for header

We strictly obey caching headers

Caching reduces sites bandwidth costs for site owners

Content is optimized, but never replaced

Info for Users

Everything is encrypted when in acceleration mode

Caching on Silk server saves storage on the client

Content compression saves bandwidth

Acceleration can be turned off in settings menu

Flash can be turned off in settings menu

Browser works in offline mode for local content

What AWS Services Does Silk Use?

Elastic Compute Cloud

Identity & Access Mgmt

Elastic Block Store

Route 53

Elastic Load Balancing

Simple Queue Service

Auto Scaling

Simple Storage Service

CloudWatch

Elastichache

CloudFormation

Final Thoughts

References

Wi-fi Power Saving Mode (slide 16)

<http://www.networkworld.com/research/2008/051208-wireless-power-standards.html>

Radio Resource Control (slide 16)

<http://stevesouders.com/ms/>

Data about growth of mobile (slide 14)

<http://www.onlinemarketing-trends.com/2011/06/state-of-tablet-adoption-infographic.html>

<http://www.kpcb.com/internetrends2011>

Web Page Test Data for CNN (slide 24)

http://www.webpagetest.org/result/111107_5T_23VNE/

Web Page Test Data for Google (slide 24)

http://www.webpagetest.org/result/111108_JP_23ZW2/

HTTP Archive Data (slide 6)

<http://httparchive.org/trends.php?s=intersection>

Internet Wayback Machine (slide 5)

http://wayback.archive.org/web/*/http://www.amazon.com