



Performance for the next billion

Bruce Lawson, Opera Software



Opera

Where will your next
customers come from?



4 billion





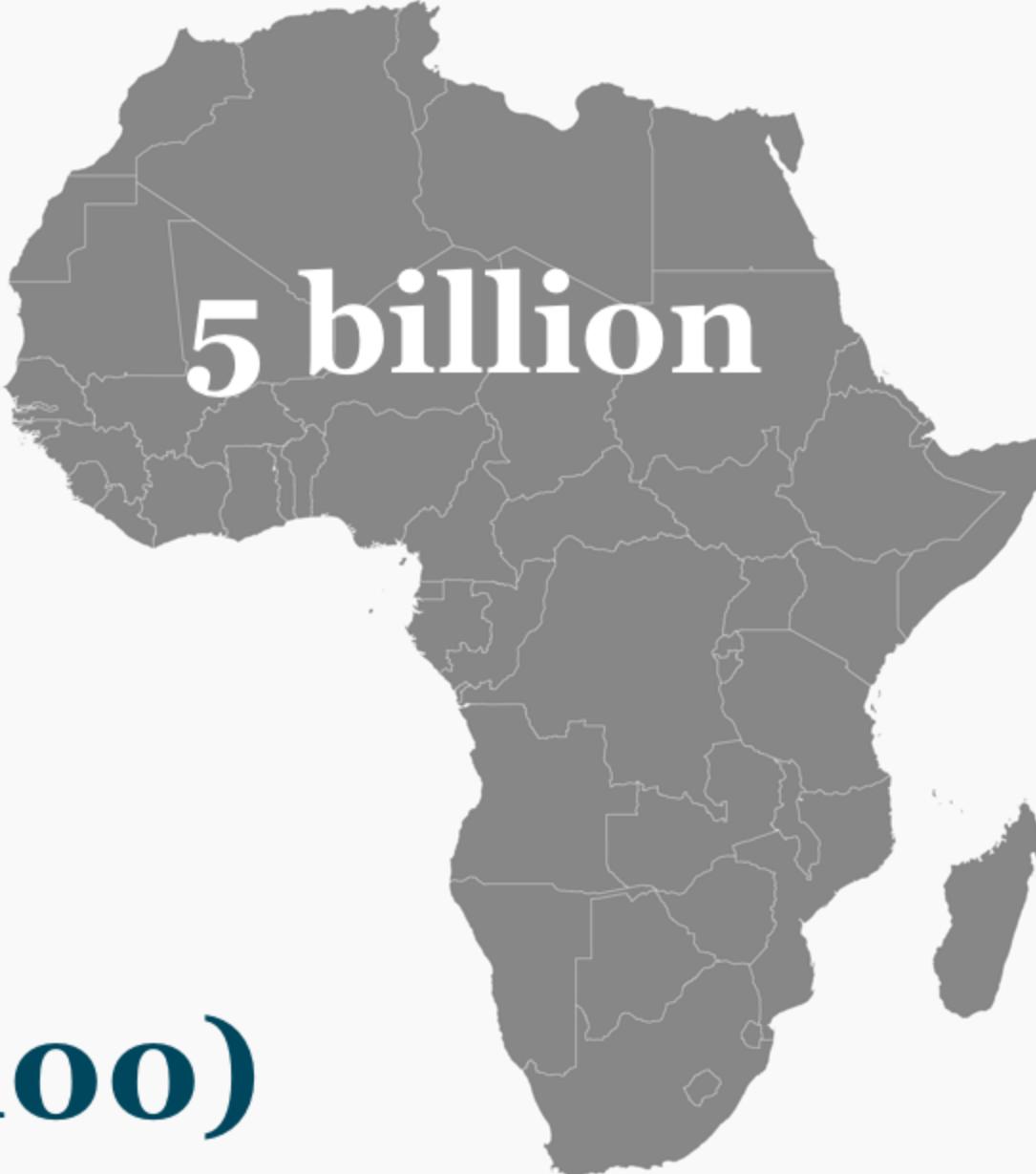
5 billion

(2050)



2 billion

(2050)



5 billion

(2100)



Population: 1.3 bn



GDP growth: 7.7%

Ecommerce (top sales day)

Black Friday + Cyber Monday: \$2.9 Bn

Double 11 Day: \$9.2 Bn

Sources: Nanjing Marketing Group Date: Q4 2014

\$1 trillion by 2019

“

Total online retail spending in China reached \$307 billion in 2013 and is forecast to grow at a compound annual rate of nearly 20% until 2019, when it should exceed \$1 trillion.

China Online Retail Forecast - Forrester

Population: 250m



GDP growth: 5.8%

Indonesia

“

in Indonesia 75% of users are on older 2G, or GSM/EDGE, networks, and the nation's geography (it is made up of thousands of islands) presents additional challenges... more than half of Indonesian smartphone users said they experienced network problems daily.

[Measuring and improving network performance](#) - Ericsson,

September 2014

Population: 157m



GDP growth: 7%

“

in 1993, Bangladesh became the first South Asian country to adopt cellular technology ... household ownership of at least 1 working mobile phone grew from 29.85% in [2008] to 56.07% in [2011].

Johns Hopkins Bloomberg School of Public Health - Feb

2015

Population: 53m



GDP growth: 13.6%

SIM: was \$2,000 now \$1.50

“

Five years ago, buying a cell phone SIM card in Myanmar could set you back more than \$2,000... In August [2014], Qatar's Ooredoo began selling data-enabled cards with a 3G connection for \$1.50.

[When a SIM Card Goes From \\$2,000 to \\$1.50 - Bloomberg \(29 Sept '14\)](#)

Population: 1.2 bn



GDP growth: 6.9%

“

we expect the number of Internet users to at least double, from 190 million in 2014 to 400 million in 2018 ... We expect the Internet to contribute \$200 billion to India's GDP (5% of total GDP) by 2020.

[Boston Consulting Group \(BCG\)](#), 23 April 2015

What do these nations have
in common?

4

3

2

1

0

0.01

0.0

1995

0.50

2000

0.0

3.00

2.0

4.00

4.0

2014

2020

People online / Smartphones

Source: ITU, a16z

Top domains: USA

1. google.com
2. facebook.com
3. youtube.com
4. wikipedia.org
5. yahoo.com
6. twitter.com
7. wordpress.com
8. amazon.com
9. tumblr.com
10. blogspot.com

Top handsets: USA

1. Apple iPhone
2. Apple iPad
3. Samsung GT-S7582
4. Samsung GT-I9300
5. BlackBerry 8520
6. Apple iPod
7. BlackBerry 9320
8. Samsung GT-S7562
9. LG 306G
10. Samsung GT-I8190

Top domains: India

1. facebook.com
2. google.com
3. google.co.in
4. youtube.com
5. wikipedia.org
6. cricbuzz.com
7. twitter.com
8. in.com
9. wordpress.com
10. ndtv.com

Top handsets: India

1. Nokia X2-01
2. Samsung GT-E1282T
3. Nokia 2690
4. Nokia C1-01
5. Micromax A106
6. Nokia 2700c-2
7. Samsung GT-S7262
8. Nokia C2-00
9. Nokia 5130c-2
10. Samsung SM-B312E

Top domains: Nigeria

1. google.com
2. facebook.com
3. news24.com
4. www.bbc.co.uk
5. youtube.com
6. wikipedia.org
7. livescore.com
8. google.com.ng
9. goal.com
10. naij.com

Top handsets: Nigeria

1. Nokia X2-01
2. Nokia 200
3. Nokia C3-00
4. TECNO P5
5. Nokia C1-01
6. TECNO M3
7. Nokia 2700c-2
8. Nokia C2-00
9. Nokia 210
10. TECNO H5

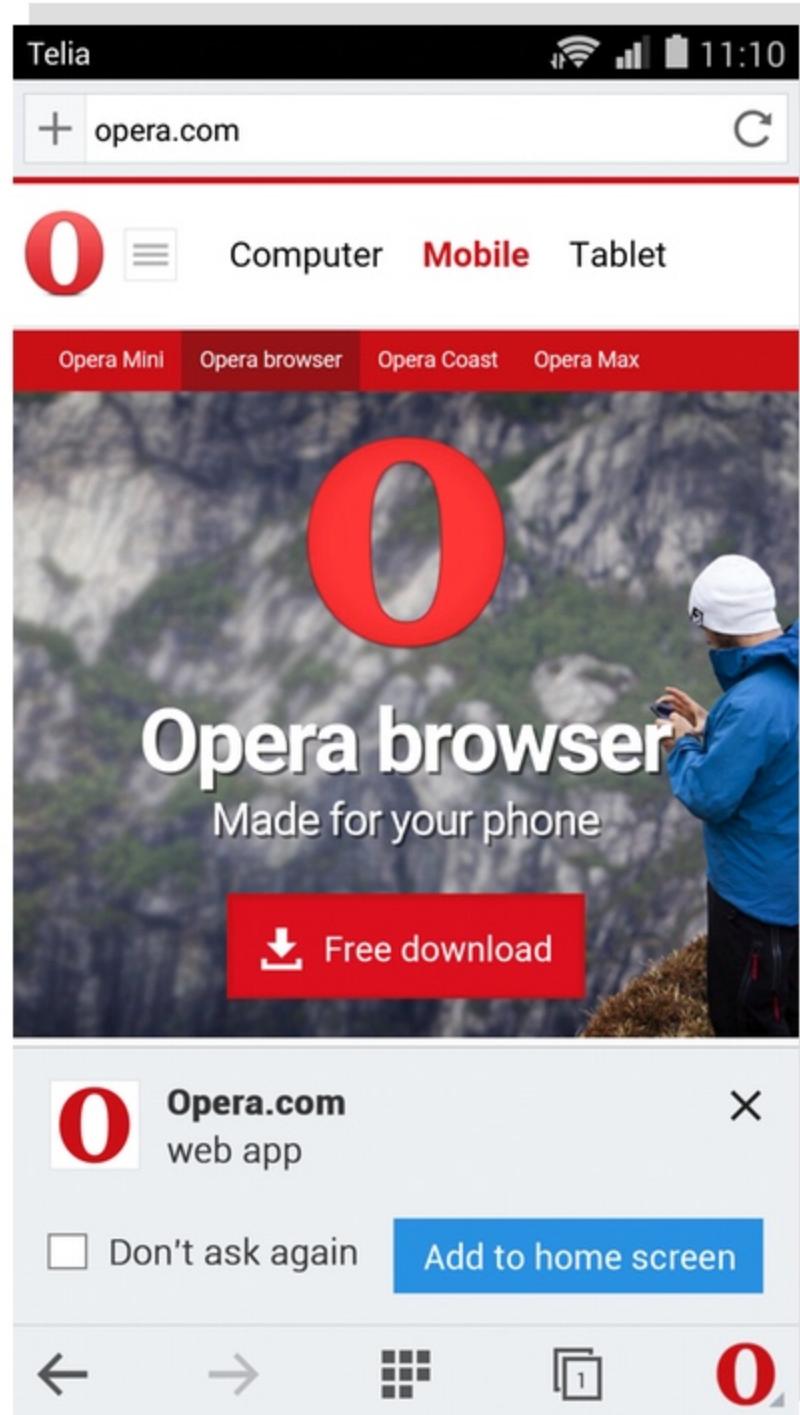


Making the web work on
lower-spec devices

Installable Web Apps

- A new manifest file with light metadata and icon
- Icon saved to homescreen
- On tap, goes full-screen to site
- Chrome for Android, Opera for Android
- Safari iOS (Non-standard)
- [The Web Manifest specification](#) tutorial

(HTML5Doctor.com)





Responsive images

Bruce Lawson

[skip to main content](#)

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Notes on Adaptive Images (yet again!)

Thursday 8 December 2011

All the cool kids are doing responsive design, it seems. This means fluid designs, having some hot media query action to reformat your layout depending on screen size, and ensuring your images are flexible so they don't break out of container, generally by setting them to `{max-width:100%;}`.

Having images scaling down presents a problem though, if you're a performance-minded sort of chap(ette). Why send a 300K 400 x 800 image that would look lovely on tablet device attached to wifi, but which takes ages to download on a 3G phone, and which gets resized by the browser to fit a 320px wide screen? Not only are you wasting your user's bandwidth and time, but not every browser is created equal and not every resize algorithm makes pleasing end results. The CSS 4(!) [image-rendering property](#) can help with this but it only hints to the browser.

Sending the right-sized image to devices without wasting bandwidth is one of the knottiest problems in cross-device and responsive design at the moment. In the 24ways advent calendar series of articles, the subject has been discussed twice in eight articles (by [Matt Wilcox](#) and [Jake Archibald](#)). There are numerous other techniques, as well, such as [tinySrc](#) and the Filament Group's [Responsive Images](#).

All these are very clever, different solutions to solve the same problem, and they all rely on scripts, or cookies, or server-side cleverness or (in the case of Jake's ideas) dirty hacks and spacer GIFs. I'm reminded of [Image Replacement techniques](#) from more than 6 years ago, which were over-engineered solutions to the problem better solved by CSS web fonts.

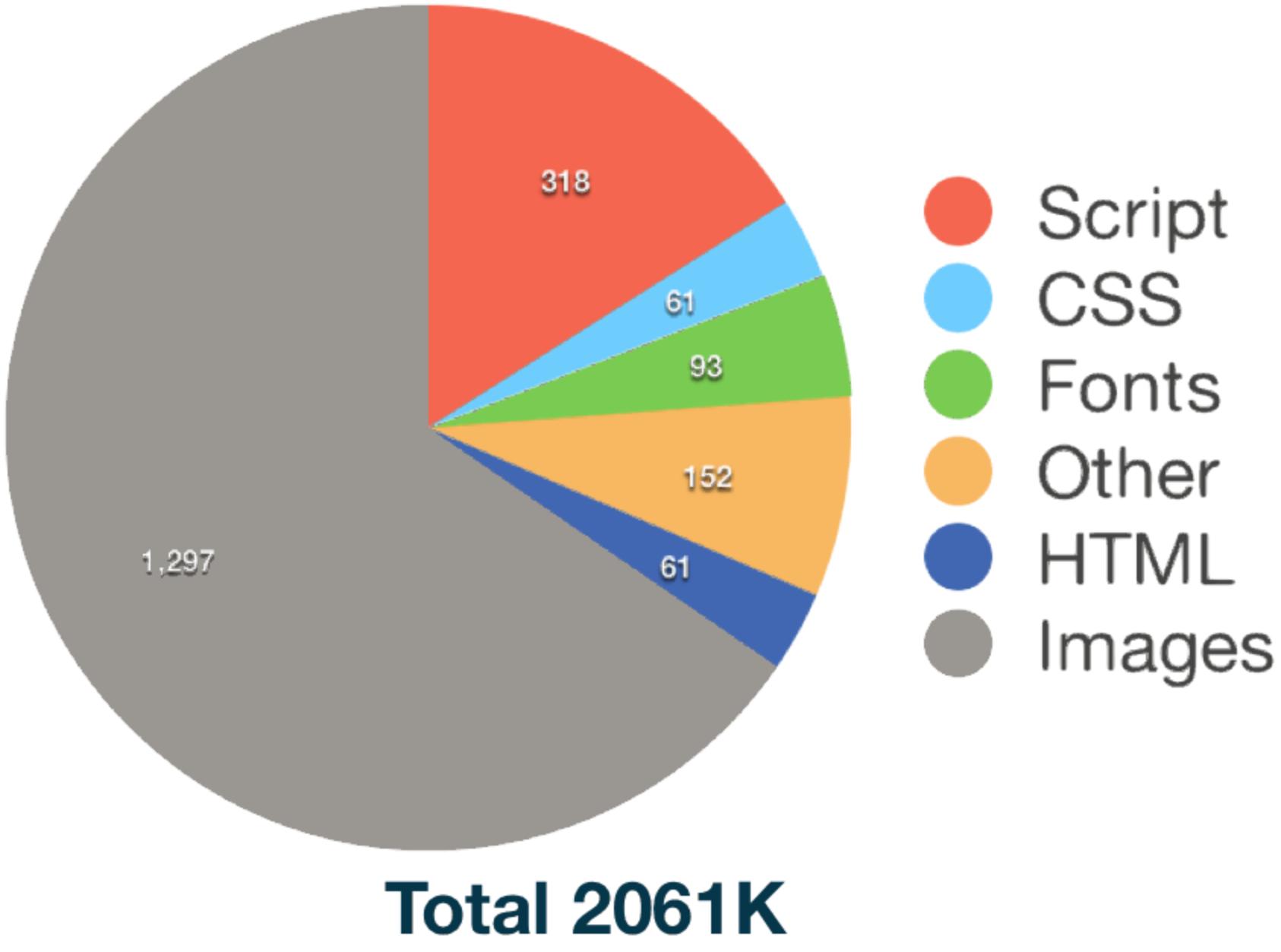
Let's recap. We have several images, of different sizes, and want to send only the most appropriately-sized image to the browser. The circumstances differ. The canonical use case is to send smaller, lower-resolution images to smaller screen-sizes on the assumption that connection speed is slow and they have low-resolution displays. This isn't the case, though. Some

New HTML thingies

- <picture>
- **srcset** attribute
- x descriptor
- w descriptor
- **sizes** attribute

[Video, tutorials](#)

Average Bytes per page by content type



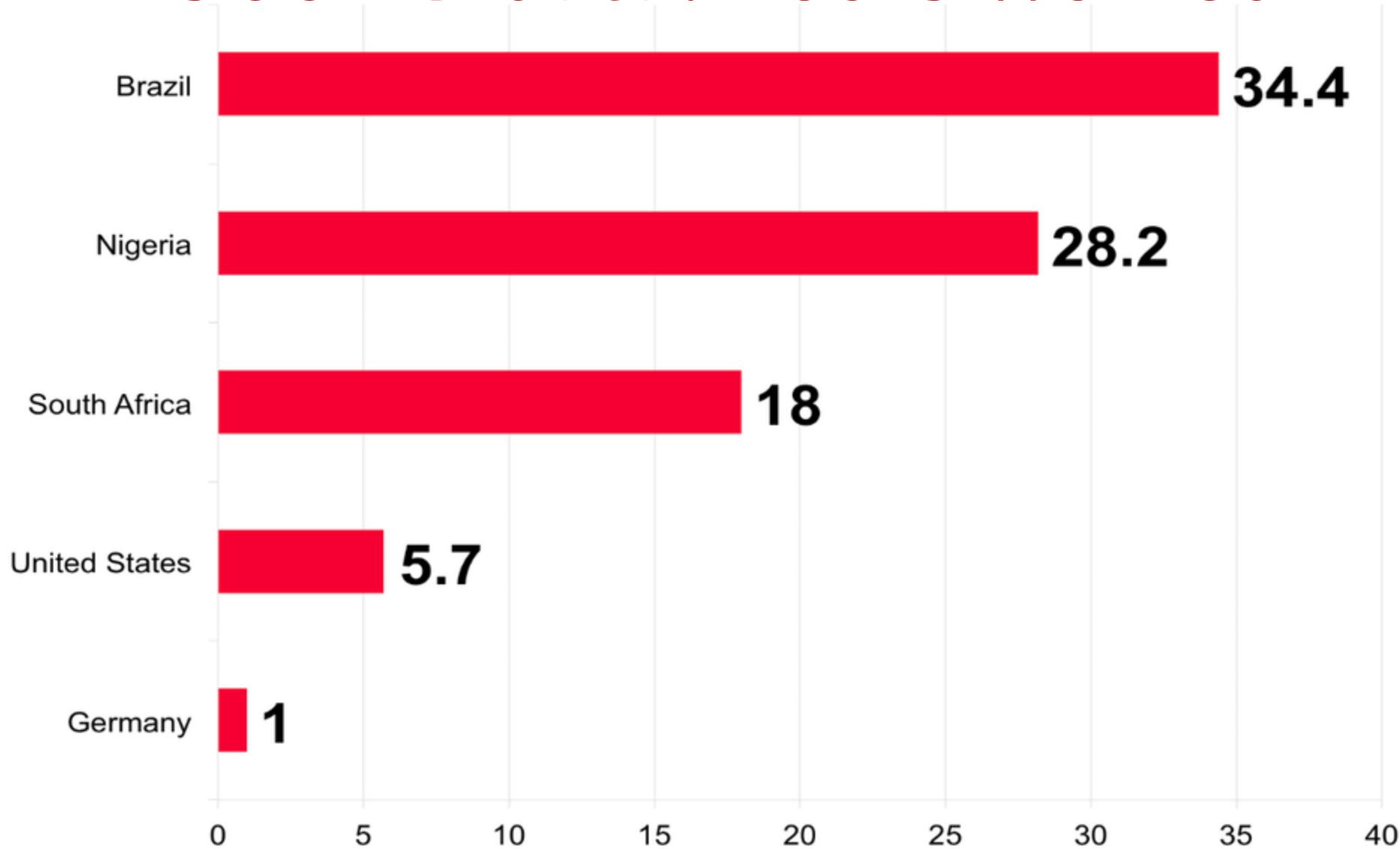
Affordability of access

“

Citizens of rich nations pay on average just 1-2% of their monthly income to connect. In the 51 countries we analysed ... the price for an entry-level mobile broadband package hovers at just above 10% of monthly incomes.

The Affordability Report, 2014

500MB data: hours worked



What are proxy browsers?

Other proxy browsers are available

- QQ
- UC browser
- Puffin
- ~~Nokia Microsoft Xpress~~

RECENT NEWS

Opera signs licensing agreement with Microsoft

Oslo, Norway - August 21, 2014

Opera Mini will become the default web browser for Microsoft's existing feature phones and Asha phones portfolio, Opera Software today announced.

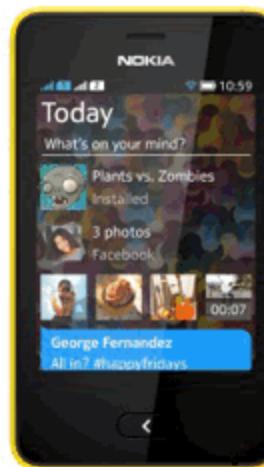
The licensing agreement applies to mobile phones based on the Series 30+, Series 40 and Asha software platforms.

As part of the agreement, people who use the current browser for these phones, Xpress, will be encouraged to upgrade to the latest Opera Mini browser. Factory-new devices will have Opera Mini pre-installed.

Opera Mini is one of the world's most popular web browsers that works on almost any phone. It has a built-in compression technology that allows people to save on mobile data. Opera Mini currently has around 250 million users, over 100 million of these on Android smartphones.

Microsoft first feature and Asha phones are popular with people seeking affordable, well-designed and reliable devices capable of internet browsing, apps and more.

"We continue to sell and support classic first and feature phones as well as the Asha range, which have performed well with millions of people who want new mobile experiences at lower price points," said Rich Bernardo, head of legacy business, Phones, Microsoft. "The agreement with Opera will enable us to provide continuity of service as we transition from Xpress Browser to Opera Mini."



Opera Mini web browser to land on Microsoft feature phones

Media contacts

Choose region:

- Norway (Headquarters)
- United States
- Central Europe
- Russia and CIS
- India and SAARC
- Sub-Saharan Africa
- Asia Pacific
- Indonesia / Philippines / Thailand

For a media inquiry, click [here](#).

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FROM OUR BLOGS

Opera Coast named a nominee in the 2015 Tabby Awards

[» Read more](#)

Mother's Day is here: 3 Ways to sync up with mom on Mother's Day

[» Read more](#)

New Opera Mini tops Google Play charts worldwide!

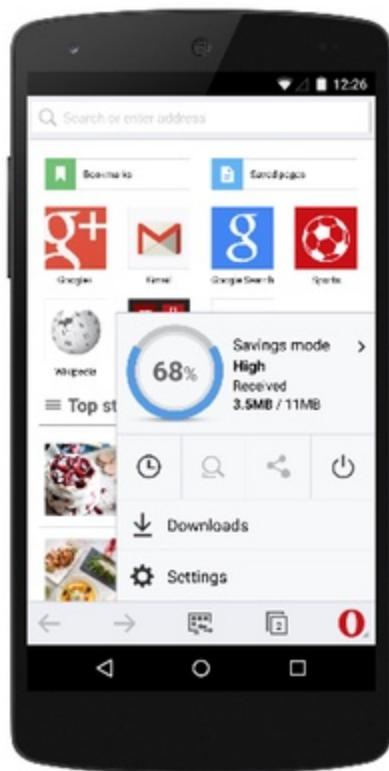
[» Read more](#)

MORE

Meet Thor

 Opera Mini

=



+



Stop! Hammer Time



150kb



Up to **90%**
compression

1 MB

INTERNET

Testing in India

“

*Opera Mini consumes on an average **14% less battery** and
89% less data when compared to other mobile browsers.*

Cigniti Technologies

(Chrome, UC browser, CM browser and UC Mini on Wi-Fi,
2G and 3G networks in India, March - April 2015)

120k transactions/second
23 PB last month



“

Approximately 600 million times per second, particles collide within the Large Hadron Collider (LHC)...Electronic circuits record the passage of each particle ...and send the data to the CERN Data Centre... Physicists must sift through the 30 petabytes or so of data produced annually.

CERN - computing

50
million

India

20+
million

Indonesia

Nigeria

Bangladesh

Russia

10+
million

China

Ukraine

5+
million

Brazil

Mexico

Philippines

South Africa

Vietnam

Pakistan





Single connection

In India, only 96k of the 736k cell towers are 3G enabled, but more critically, only 35k of those towers have a fiber-optic connection to the backbone, which results in inconsistent connection.

India's mobile Internet: The revolution has begun -

Avdendus (2013)



60
fetches

Design considerations for developing markets



Welcome back, Bruce!

Last logged on: May 25, 2015, 3pm.

Given name (*required*)

Family name (*required*)

#OperaRun f

DELTA Run

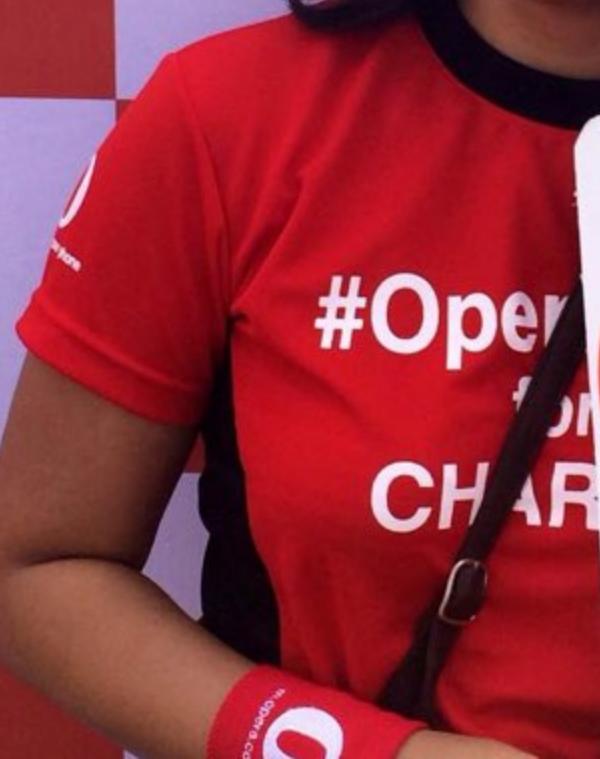
RMR
#marimena
• KRISTI

Indra @Indorunners Sda

X
IPAT
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www.oper

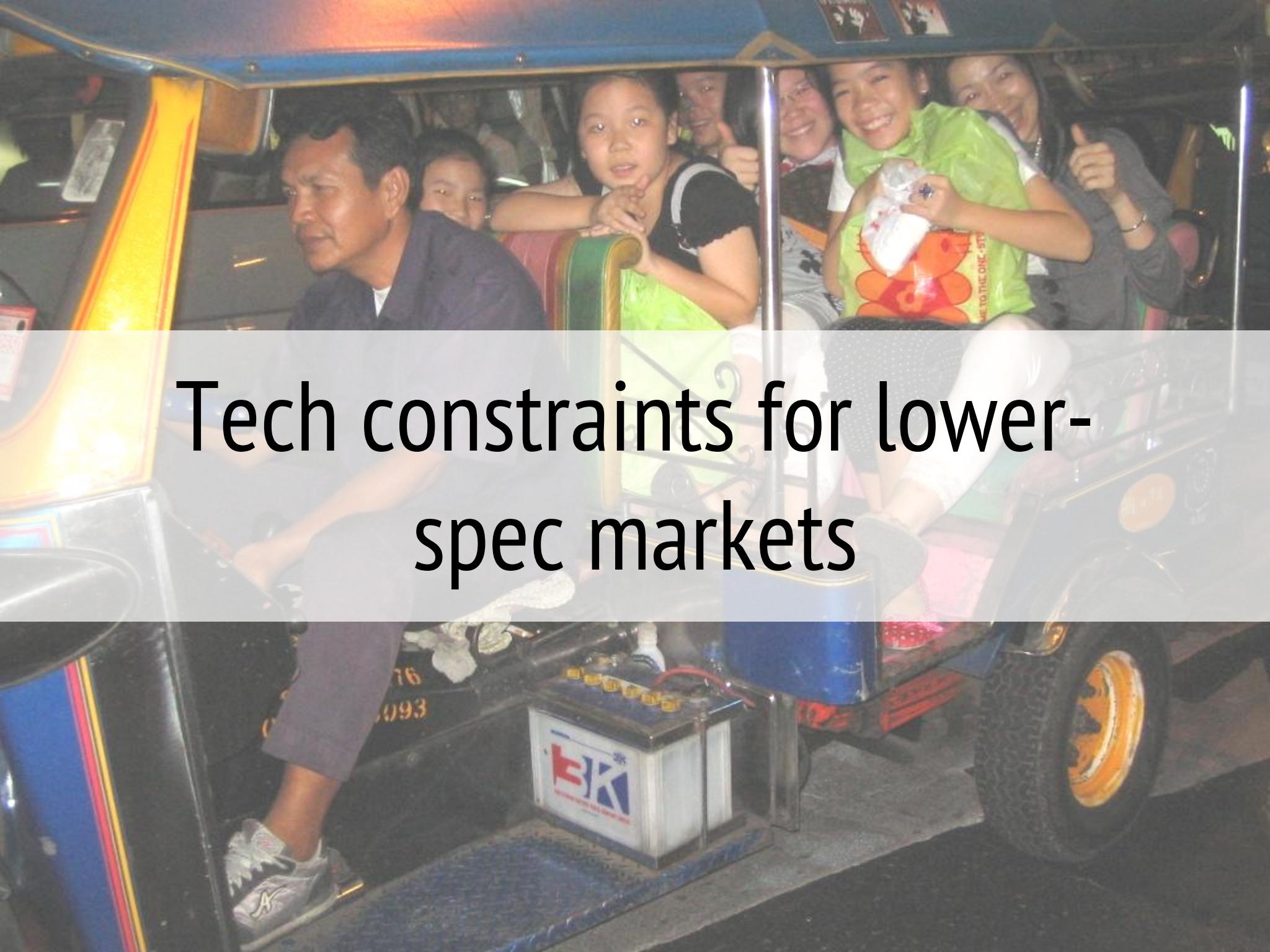
www.oper



www.oper

www.oper

Ojo
Nelly F.
@IR SIDOARJO



Tech constraints for lower-spec markets

Everything happens on the server

- Everything needs user interaction
- Everything needs a server round-trip
- JS on page load runs for 5 seconds
- JS-only APIs do NOT work

More: [Opera Mini and JavaScript.](#)

Design won't always be preserved

- No CSS rounded corners or gradients
- Animations (CSS/ SVG) show only first frame
- No web fonts
- Don't use icon fonts; use SVG

Make SVG icons (even more!) responsive.

Progressive



Enhancement

Ooops, your browser is no longer supported.

You can always join the mainstream and download one of these. If you love your browser no matter what, it's OK with us. Just don't say we didn't warn you.



Chrome
by Google



Firefox
by Mozilla

Holy Grail App

“

we've launched our first Holy Grail app into production! ...

It looks exactly the same as the app it replaced, however

initial pageload feels drastically quicker

AirBnB

Holy Grail App #2

“

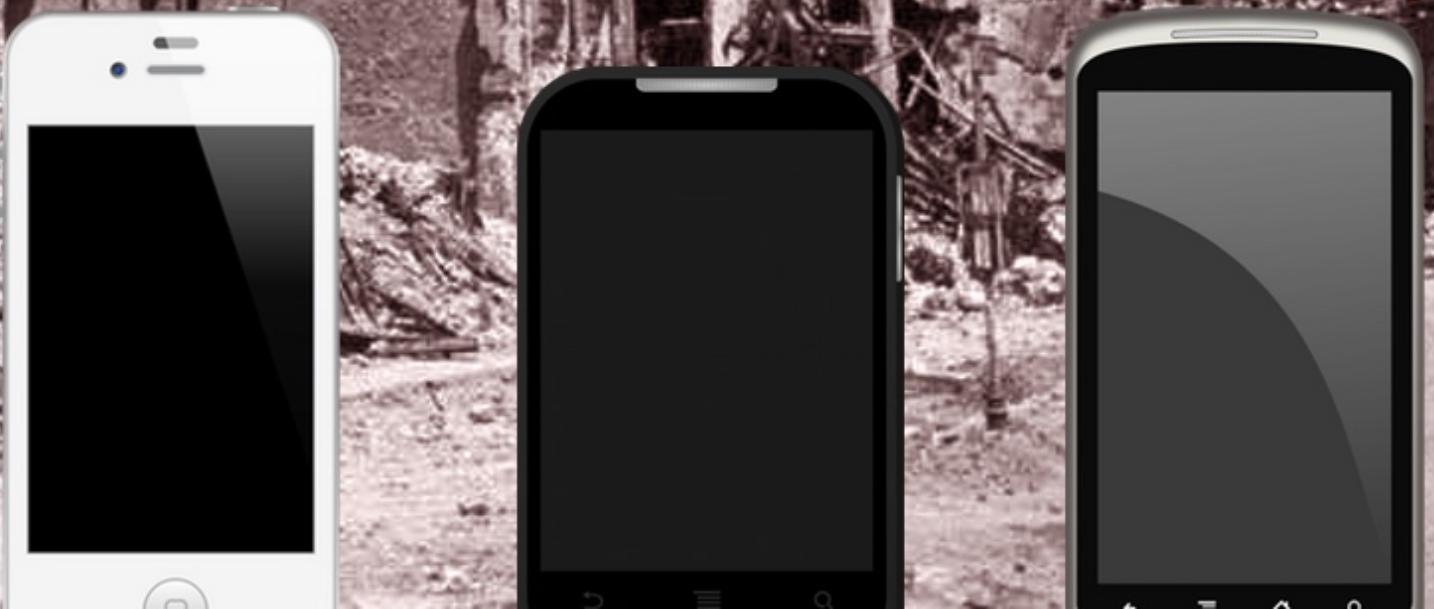
*because we serve up **real HTML instead of waiting for the client to download JavaScript before rendering.***

Plus, it is fully crawlable by search engines. ... It feels 5x faster.

AirBnB



Rise of The Smartphones



“

India emerged as the world's third-largest smartphone market after the U.S. and China. Total smartphone shipments are expected to increase to reach more than 150 million units in 2018.

Business Korea (8 May '15)

“

Smartphone shipments to the Middle East and Africa saw unprecedented year-on-year growth of 83% in 2014... Feature phones have been hit hard ... with shipments down 4.5% year on year in 2014.

[International Data Corporation \(IDC\)](#) (26 Apr '15)

Karbonn Smart A4+ Karbonn Smart A7 Star Karbonn Smart A50 Karbonn Smart A26 Karbonn Smart A1* Karbonn Titanium S2 Karbonn Smart TA-FONE A34-Kommunicate 3G Tablet Karbonn Smart TA-FONE A37 HD Tablet Karbonn Smart A27+ Karbonn Smart TA-FONE A39 HD Tablet Karbonn A11+ Karbonn Smart A29 Karbonn Smart A10 Karbonn A9*

Celkon A9+ Smart Phone Celkon A107 Smart Phone Celkon X65 Celkon CT910+ HD Celkon A105 Celkon A 118 HD Signature Smart Phone Celkon CT2 Celtab Celkon A98 Celkon A59 Celkon A86 Celkon A8+ Celkon A58 Celkon A200 Smartphone Celkon A79 Celkon A77 Celkon A225 Celkon A83 Celkon Signature HD A119Q Celkon Smartron A87 Celkon CT 1 Celkon CT-910 Celkon A119 Signature HD Celkon CT 888 3G Tab Celkon CT-9 Tablet Celkon A27 Celkon A62 Celkon A220 Celkon CT-3 Tablet Celkon A69 Celkon CT-7 Tablet A60 A20 A63

Lava Iris 405 Lava Iris 401e Lava Iris 349+ Lava Iris 402 Lava Iris 504Q Lava Iris 458Q Lava Iris 501 Lava Iris 356

Fly F350 Fly F51 Fly F32 Fly F41s Fly Vision F8s Android Tablet Fly F50 Fly F410

Zen Ultra Tab A100 Zen Android Full Touch Phone- U4 Zen U1 Zen Ultra Tab A900 Zen UltraTab A700 3G

Intex Aqua i5 Inext Cloud X4

iBall Performance Series 3G 7334i Tablet iBall Slide 3G 7271 Tablet iBall Andi 5Li iBall Slide 6318i iBall Performance Series Slide 3G 9728 iBall Andi 4a Radium iBall Slide Q9703

Spice Coolpad Mi-515 Spice Coolpad 2 Mi-496 Spice Stellar Glamor Mi-436

Micromax Canvas 4 A210 Micromax Canvas Doodle A240 Micromax Bolt A63 Micromax Canvas Fun A76

HCL ME Connect 2G 2.0 HCL ME Connect 3G 2.0 HCL ME U3 Sync 1.0

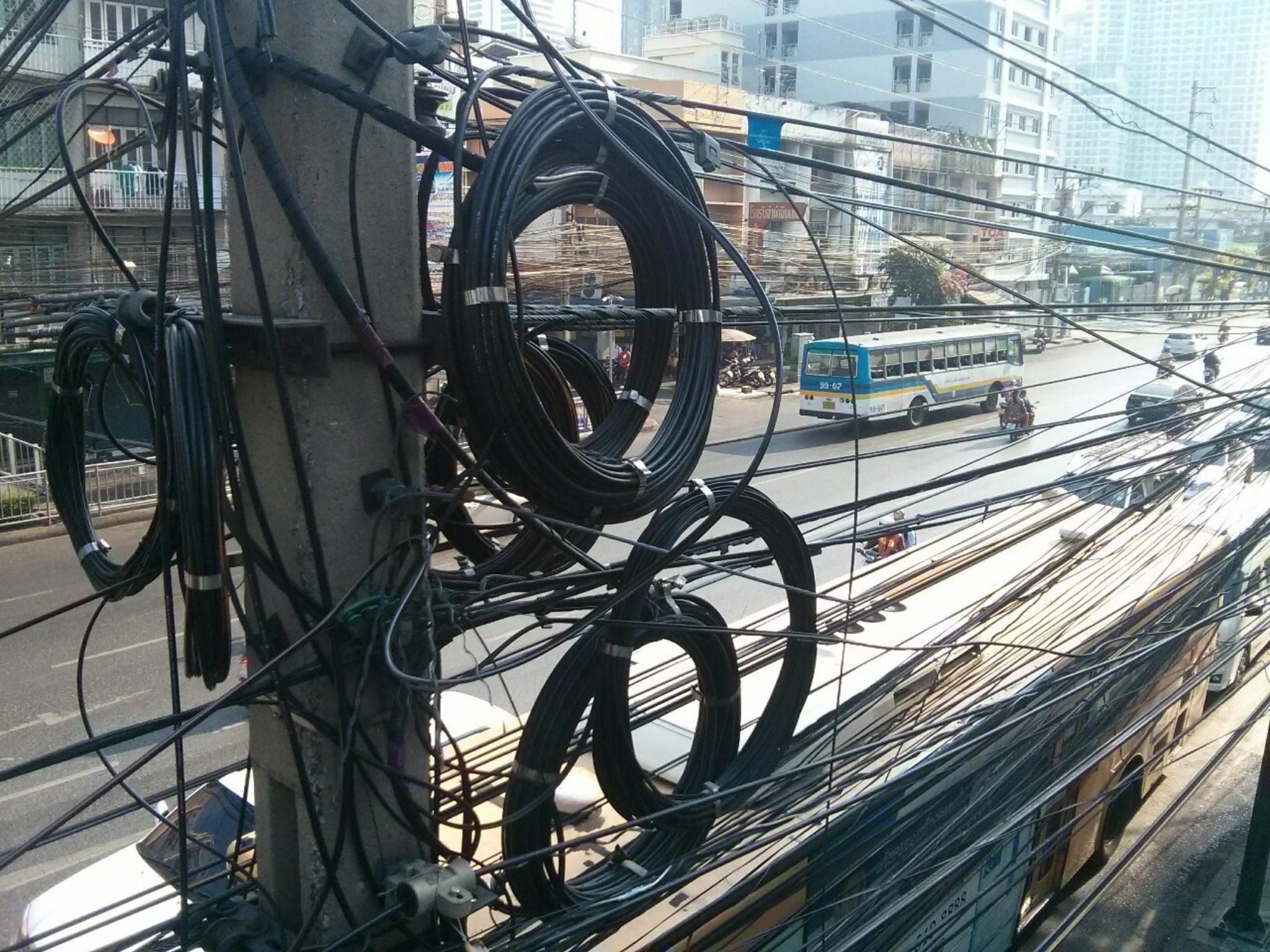
Lemon P5 Lemon P9 Aspire A1 Aspire A4

Symphony Xplorer ZII Symphony Xplorer W65 Symphony Xplorer W32 Symphony Xplorer W92 Symphony Xplorer Z1 Symphony W68 Symphony W82 Android Symphony W85

Colors X15 Colors X60 Colors XT 701 Colors XT 711

Bruce's law of Smartness™

**IT DOESN'T MATTER
HOW SMART**
your phone is,
IF YOUR NETWORK
is dumb



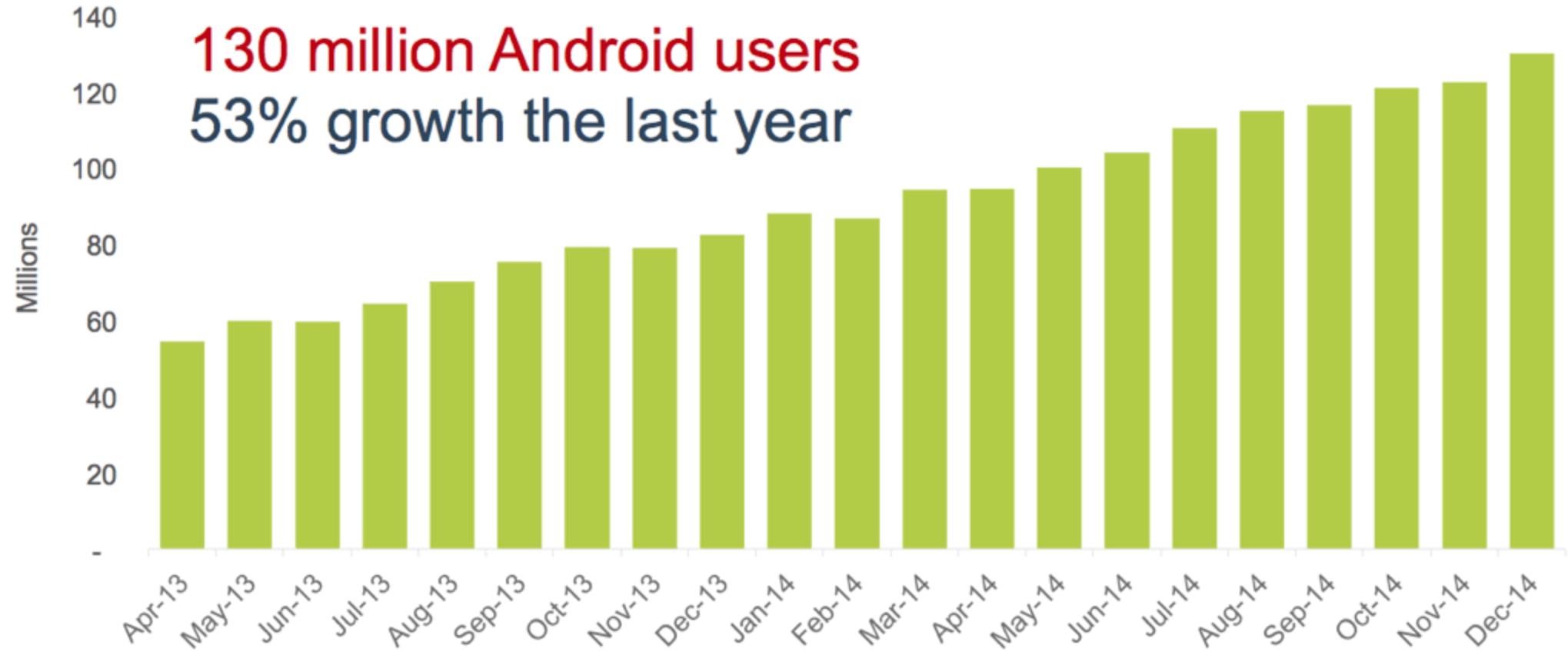
Infrastructure

91.7% live within range of a 2G network. At less than a quarter the speed of a 56K dial-up modem, 2G/ GSM (9.6 KBPS) is insufficient for practical use of the internet.

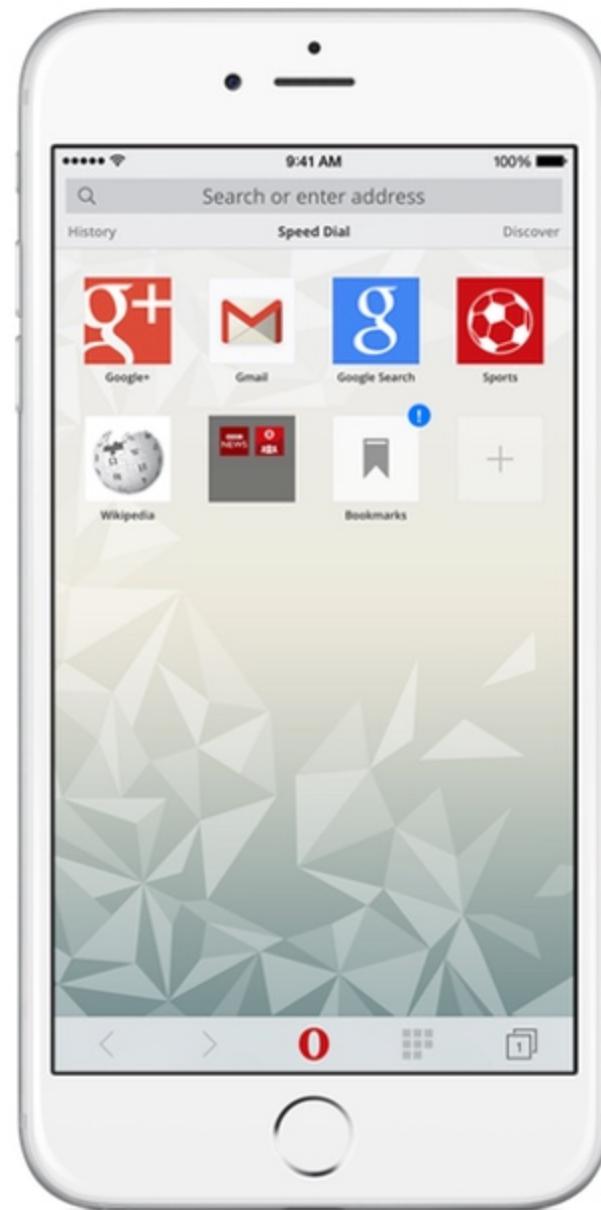
48.7% live within range of a 3G mobile network.

[State of Connectivity 2014](#) - [internet.org](#)

130 million Android users
53% growth the last year



* Includes China



Opera Mini/ iOS also compresses video

What's next?

2005 - 2015

Last 10 years have focussed on **compression** at expense
of compatibility

2015-

focusses on **compatibility**.

Bruce's law of Smartness™

**IT DOESN'T MATTER
HOW SMART**
your phone is,
IF YOUR NETWORK
is dumb

30% - 50% better compression



It's all
happening
so fast,
Mr Webb!

We're so
compatible,
Mini!

Developing countries are home to 94% of the global offline population.

[State of Connectivity 2014](#) - internet.org

Internet matters

“

an increase in Internet maturity similar to the one experienced in mature countries over the past 5 years creates an increase in real GDP per capita of \$500 on average during this period. It took the Industrial Revolution of the 19th century 50 years to produce the same result.

The Net's sweeping impact on growth, jobs, and prosperity
(McKinsey Global Institute)



Opera

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brucel@opera.com

[@brucel](https://twitter.com/brucel)

Resources

- [Population forecast video by Hans Rosling \(raw data from United Nations\)](#)
- [More than half of humanity lives within this circle \(Washington Post\)](#)
- [Hours worked for 500MB data plan](#)
- [By 2011, 56% of Bangladeshi households had access to a mobile phone](#)
- [Indonesia: social media capital of the world](#) - Indonesia #3 nation on Twitter, #4 on Facebook
- Myanmar: [When a SIM Card Goes From \\$2,000 to \\$1.50](#)
- Population and GDP figures from [CIA World Fact Book](#)
- Stats on page size/ images ratio from [httparchive.org](#)
- [Opera's work to reduce Chromium's memory use](#)
- [Opera signs licensing agreement with Microsoft](#)
- Average app user has 36 apps on smartphone. 25% used daily (social/ comms/ gaming); 25% never used. [Google, May 2015. PDF.](#)
- [Opera and Wordreader provide 15,000 free digital books to African Opera Mini users \(and tech "how-to" interview\)](#)

Thanks

- Me by HTML sign in Tokyo by Doug Schepers (@shepazu)
- Opera's [Blink commits](#) cake photographed by Andreas Bovens
- [Opera Mini and Angular](#) by Jeremy Keith.
- Kiss from [National Library of Norway](#).
- Clip art - [openclipart.org](#)
- Overloaded truck, monks buying phones, packed tuk-tuk, Bangkok cables - Bruce Lawson. All rights reserved.
- Putri photo used with Putri's permission; all rights reserved.
- HTML/ CSS Presentation Framework: [Shower](#) by Vadim Makeev.

Maps

- [True size of Africa](#) by Kai Krause (Public Domain)
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