

User Interaction: Ubiquitous and Cloud Computing

Assoc. Professor Donald J. Patterson
INF 133 Fall 2012



Cloud computing

is several

{visions, architectures, infrastructures}

that transform computing from a

{capital investment, product}

into a

{utility, service}

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Why now? What has changed?

- Connectivity
- Smart phones
- System Virtualization
- Security Threats
- Sentient browser applications

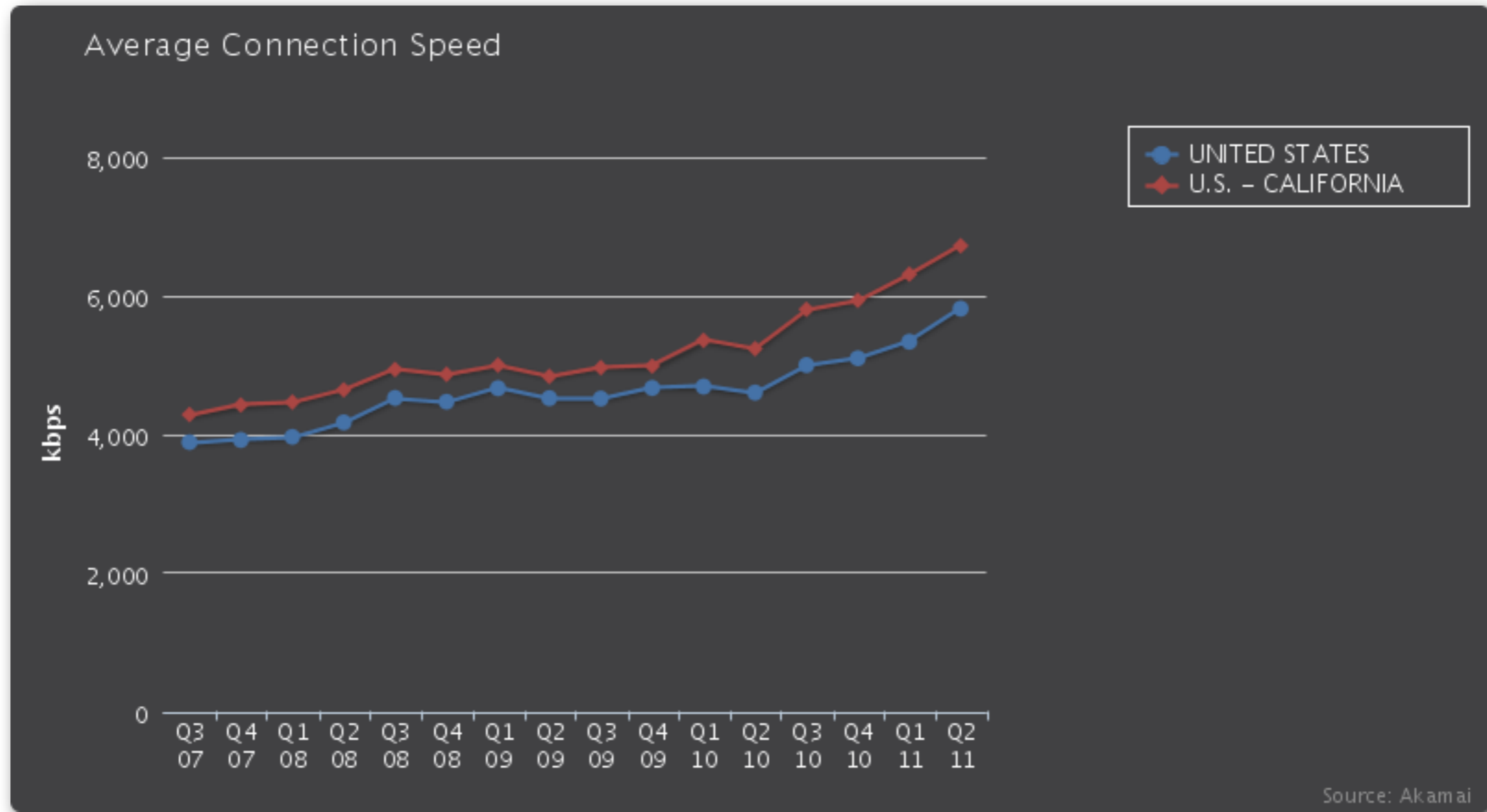


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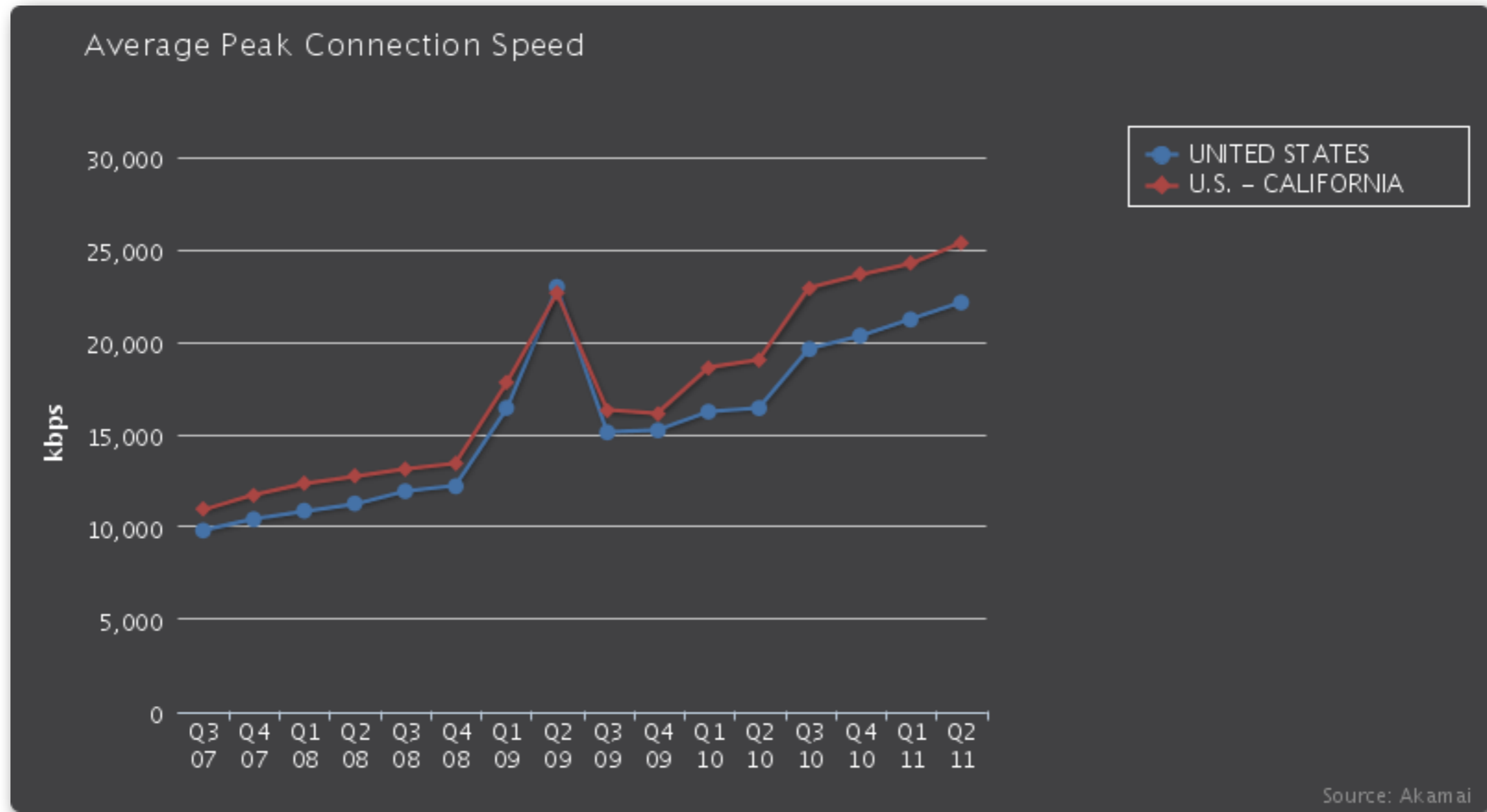
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Connectivity



Connectivity



Which country has the fastest mobile broadband?

Which country has the fastest mobile broadband?

Greece

(5.3 mbps average)

Which country has the fastest mobile broadband?

Greece

(5.3 mbps average)

Austria

(23.4 mbps highest average peak connection speed)

Which country has the fastest mobile broadband?

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“average connection speeds increased by more than 100% year-over-year at 22 mobile providers”

-akamai

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The mobile penetration divide

In some parts of Africa, five people share the same phone. In Italy, almost every adult has at least two mobile devices. How penetration varies by region, data represents the average number of people per SIM card subscription in 2010¹.

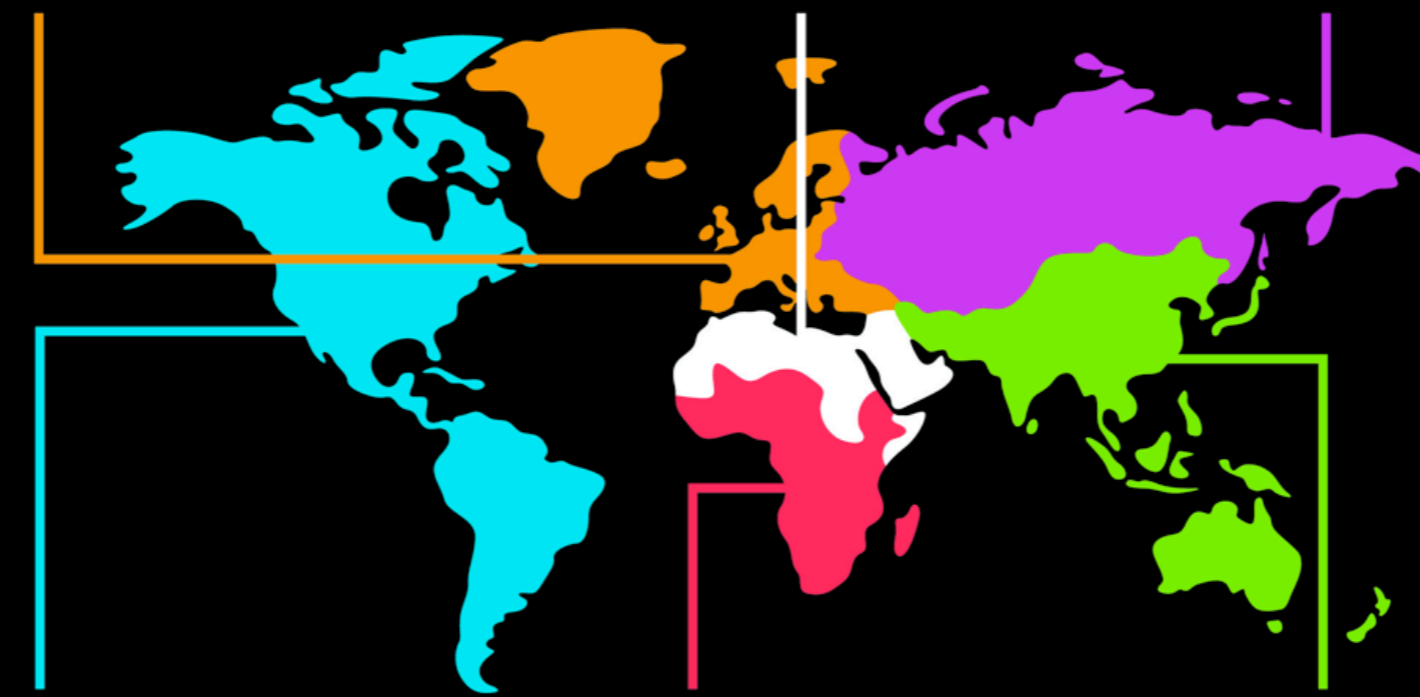
Europe: 0.8



Arab States: 1.3



CIS²: 0.8



The Americas: 1.1



Africa: 2.4



Asia & Pacific: 1.5



blog.nokia.com

SOURCE: International Telecommunications Union (<http://www.itu.int>)
Notes: 1. Estimate 2. Commonwealth of Independent States

Nokia Conversations
The Official Nokia Blog



The mobile penetration divide

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Europe: 0.8



Arab States: 1.3



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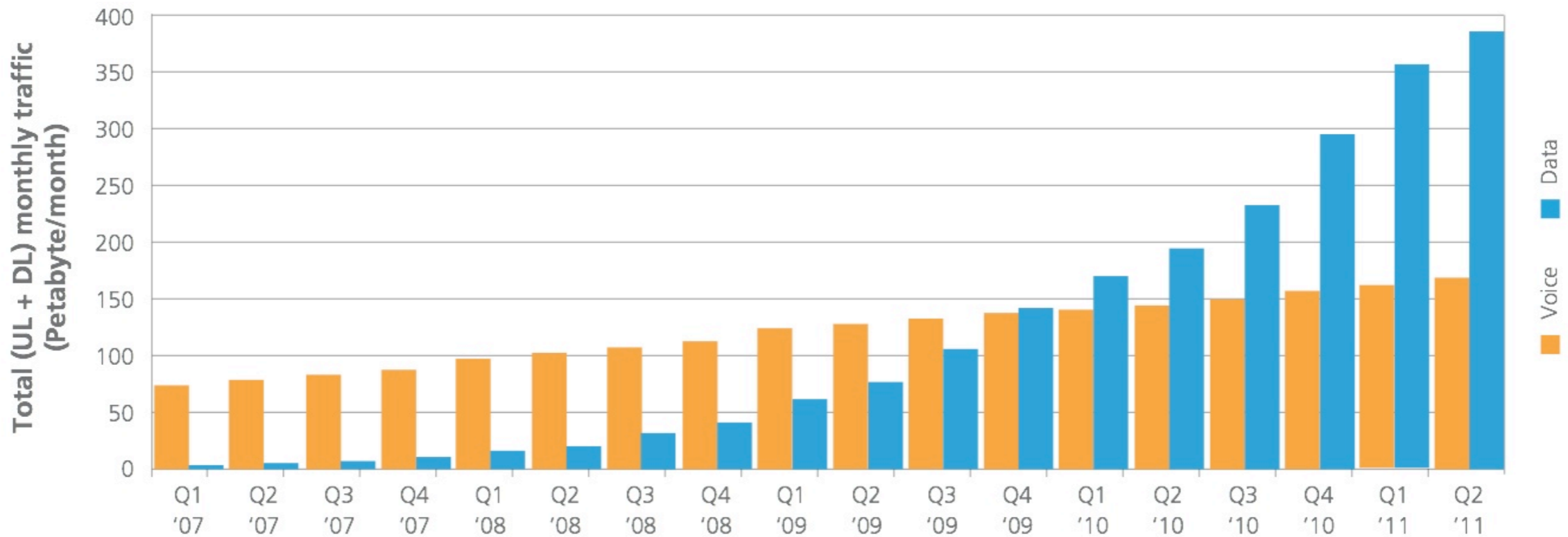


Figure 40: Total Monthly Mobile Voice and Data as Measured by Ericsson [Source: Ericsson]

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Virtualization Technology



Windows 7 Running in a Virtual Machine on a Mac

Virtualization Technology

Commercial



Open Source



Powers Amazon,
Rackspace, Linode, etc.

What is virtualization good for?

- Efficiency
 - Fully utilize “bare-metal” host hardware
 - Suddenly 8 cores seems reasonable
- Portability
 - Move a virtual machine to another host
 - Perhaps without telling anyone
- Isolation
 - One machine doesn't effect another
- Run multiple OS's at the same time
- Supports disposal computers

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Security Threats

Security Threats





- **Pros**

- Nation states
- Very smart people
- Unlimited Resources
- Motivated by political/military goals

- **Semi-pros**

- Organized crime
- Motivated by money

- **Amateurs**

- Motivated by bragging rights

China, U.S., Israel



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China, U.S., Israel

- Pros

- Nation states
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- Semi-pros

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Anonymous,
LulzSec

- Amateurs

- Motivated by bragging rights

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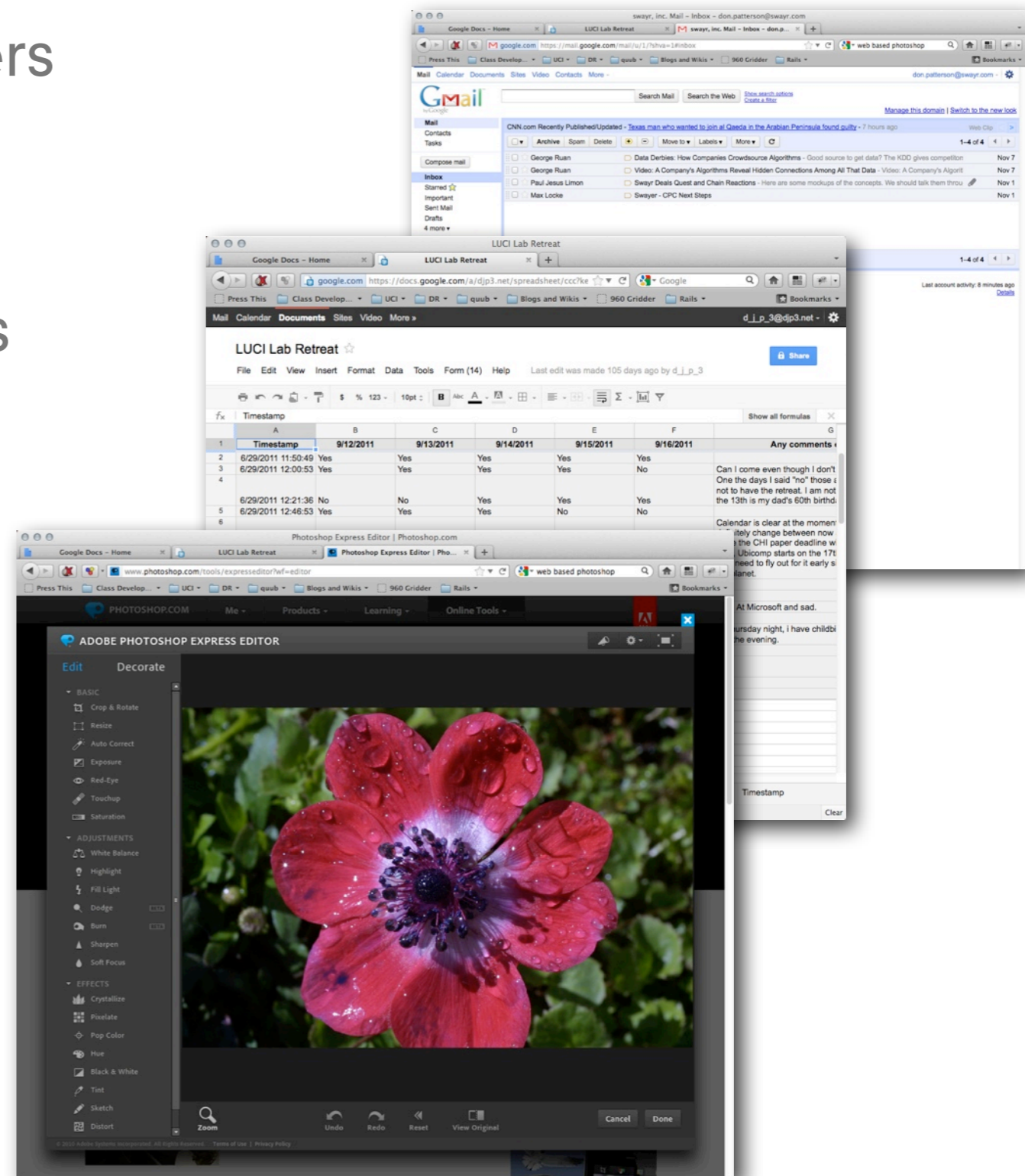
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Sentient browser applications

- Sentient Applications
 - Programs that people spend time working with
- Enabled by modern browsers
 - Offline storage
 - Web sockets
 - Real-time push updates
 - Real-time collaboration
 - Fast client-side Javascript
- Examples
 - Hotmail
 - Google Docs
 - Photoshop Express



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So, now the landscape has changed



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So, now the landscape has changed



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I can always reach any computer in the world at high-speed wirelessly

So, now the landscape has changed



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I have a device in my pocket that can be a decent interface to any other computer in the world

So, now the landscape has changed



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It is very cheap to run powerful computers in consolidated data centers

So, now the landscape has changed



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It requires professionals to keep computers and data secure when being attacked by sophisticated enemies

So, now the landscape has changed



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I don't need to be able to run a program natively. I'd rather run the latest program released every day.

So, now the landscape has changed



Why now? What has changed?

- First wave
 - It was cheaper to share a mainframe
- Second wave
 - It was cheaper to have your own desktop
- Third wave
 - It is cheaper to rent computation from the cloud



What are the visions?

- **Consumer**
 - Don't think about the cloud
- **Services**
 - Always available apps
- **Infrastructure**
 - Build with our tech services
 - Virtual Machines
 - Rent a cloud computer



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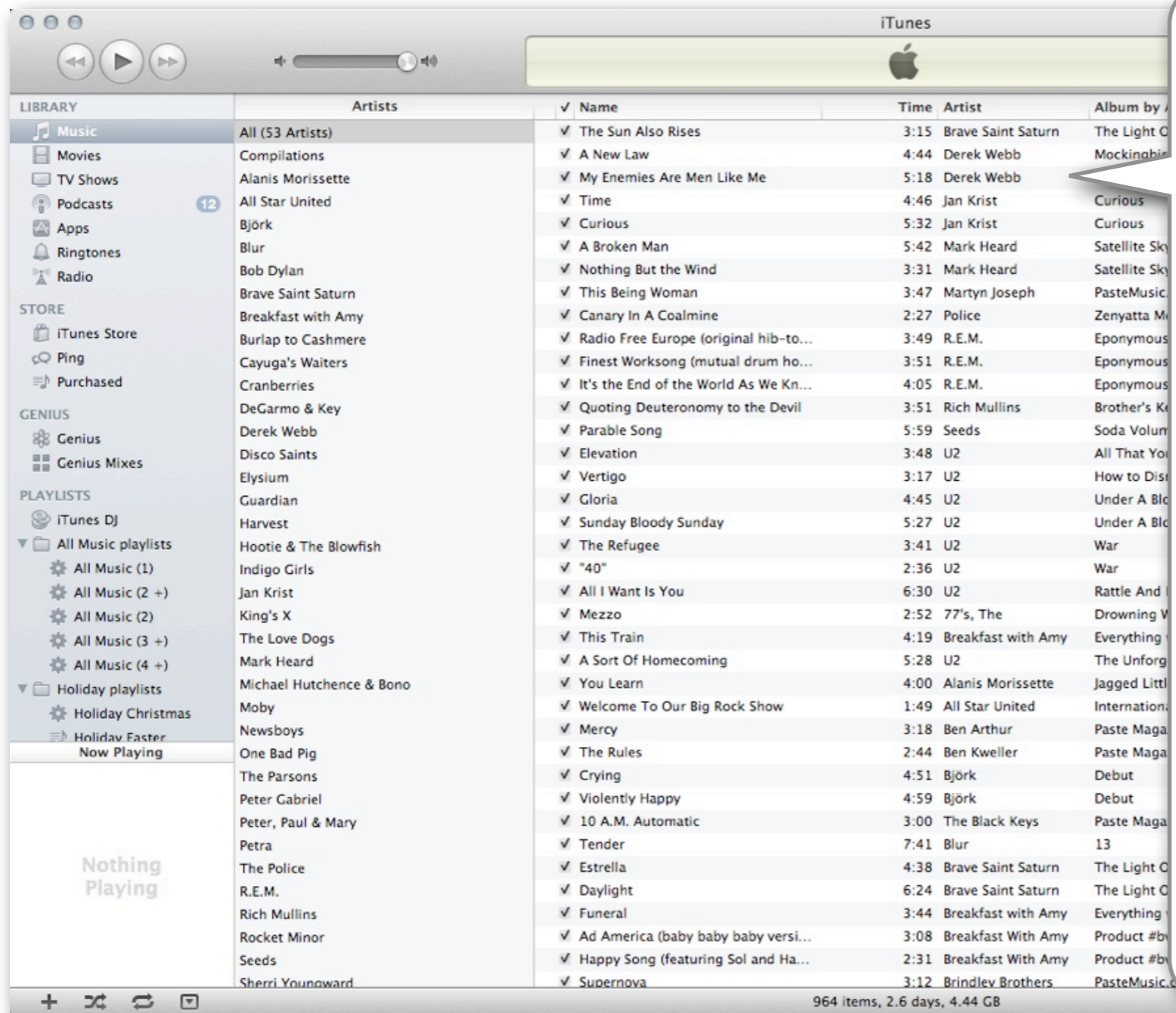
Consumer vision : iTunes Match

The screenshot shows the iTunes application window. At the top, there are playback controls (play/pause, stop, next, previous) and a volume slider. The main window is divided into several sections:

- LIBRARY:** A sidebar on the left containing categories like Music, Movies, TV Shows, Podcasts, Apps, Ringtones, and Radio. Below these are sections for STORE (iTunes Store, Ping, Purchased), GENIUS (Genius, Genius Mixes), and PLAYLISTS (iTunes DJ, All Music playlists, Holiday playlists, Holiday Christmas, Holiday Easter, Now Playing).
- Artists:** A list of artists including All (53 Artists), Compilations, Alanis Morissette, All Star United, Björk, Blur, Bob Dylan, Brave Saint Saturn, Breakfast with Amy, Burlap to Cashmere, Cayuga's Waiters, Cranberries, DeGarmo & Key, Derek Webb, Disco Saints, Elysium, Guardian, Harvest, Hootie & The Blowfish, Indigo Girls, Jan Krist, King's X, The Love Dogs, Mark Heard, Michael Hutchence & Bono, Moby, Newsboys, One Bad Pig, The Parsons, Peter Gabriel, Peter, Paul & Mary, Petra, The Police, R.E.M., Rich Mullins, Rocket Minor, Seeds, and Sherri Younoward.
- Table:** A table with columns for Name, Time, Artist, Album by Artist, and Genre. It lists various songs such as "The Sun Also Rises" by Brave Saint Saturn, "A New Law" by Derek Webb, "My Enemies Are Men Like Me" by Derek Webb, "Time" by Jan Krist, "Curious" by Jan Krist, "A Broken Man" by Mark Heard, "Nothing But the Wind" by Mark Heard, "This Being Woman" by Martyn Joseph, "Canary In A Coalmine" by Police, "Radio Free Europe (original hib-to...)" by R.E.M., "Finest Worksong (mutual drum ho..." by R.E.M., "It's the End of the World As We Kn..." by R.E.M., "Quoting Deuteronomy to the Devil" by Rich Mullins, "Parable Song" by Seeds, "Elevation" by U2, "Vertigo" by U2, "Gloria" by U2, "Sunday Bloody Sunday" by U2, "The Refugee" by U2, "40" by U2, "All I Want Is You" by U2, "Mezzo" by 77's, The, "This Train" by Breakfast with Amy, "A Sort Of Homecoming" by U2, "You Learn" by Alanis Morissette, "Welcome To Our Big Rock Show" by All Star United, "Mercy" by Ben Arthur, "The Rules" by Ben Kweller, "Crying" by Björk, "Violently Happy" by Björk, "10 A.M. Automatic" by The Black Keys, "Tender" by Blur, "Estrella" by Brave Saint Saturn, "Daylight" by Brave Saint Saturn, "Funeral" by Breakfast with Amy, "Ad America (baby baby baby versi..." by Breakfast With Amy, "Happy Song (featuring Sol and Ha..." by Breakfast With Amy, and "Supernova" by Brindley Brothers.
- iTunes Sidebar:** A section on the right titled "iTunes Sidebar" with a search bar containing "rock". It includes "Genius Recommended Albums" (e.g., "The Rising" by Bruce Springsteen, "Porgy and Bess" by Ella Fitzgerald & Louis Armstrong, "The Champion" by Carman, "In the Making..." by Sammy Ward) and "Genius Recommended Songs" (e.g., "Maria (Pablo Flores Spanglis..." by Ricky Martin, "Roll the Woodpile Down" by The Dreadnoughts, "Careful" by Guster, "Why Don't You Look Into Je..." by Larry Norman, "Starts With One" by Shiny Toy Guns, "Lois Lane" by Kenny Meeks).

At the bottom of the window, it says "Nothing Playing" and "964 items, 2.6 days, 4.44 GB".

Consumer vision : iTunes Match



Your music, movies, television are always there on every Apple device.

Consumers don't know how it gets there.

(It is all backed by an Apple data center)

And now that it is in the cloud there is no more syncing, no more worrying about disk space, no more worrying about back ups.

\$25.00 a year



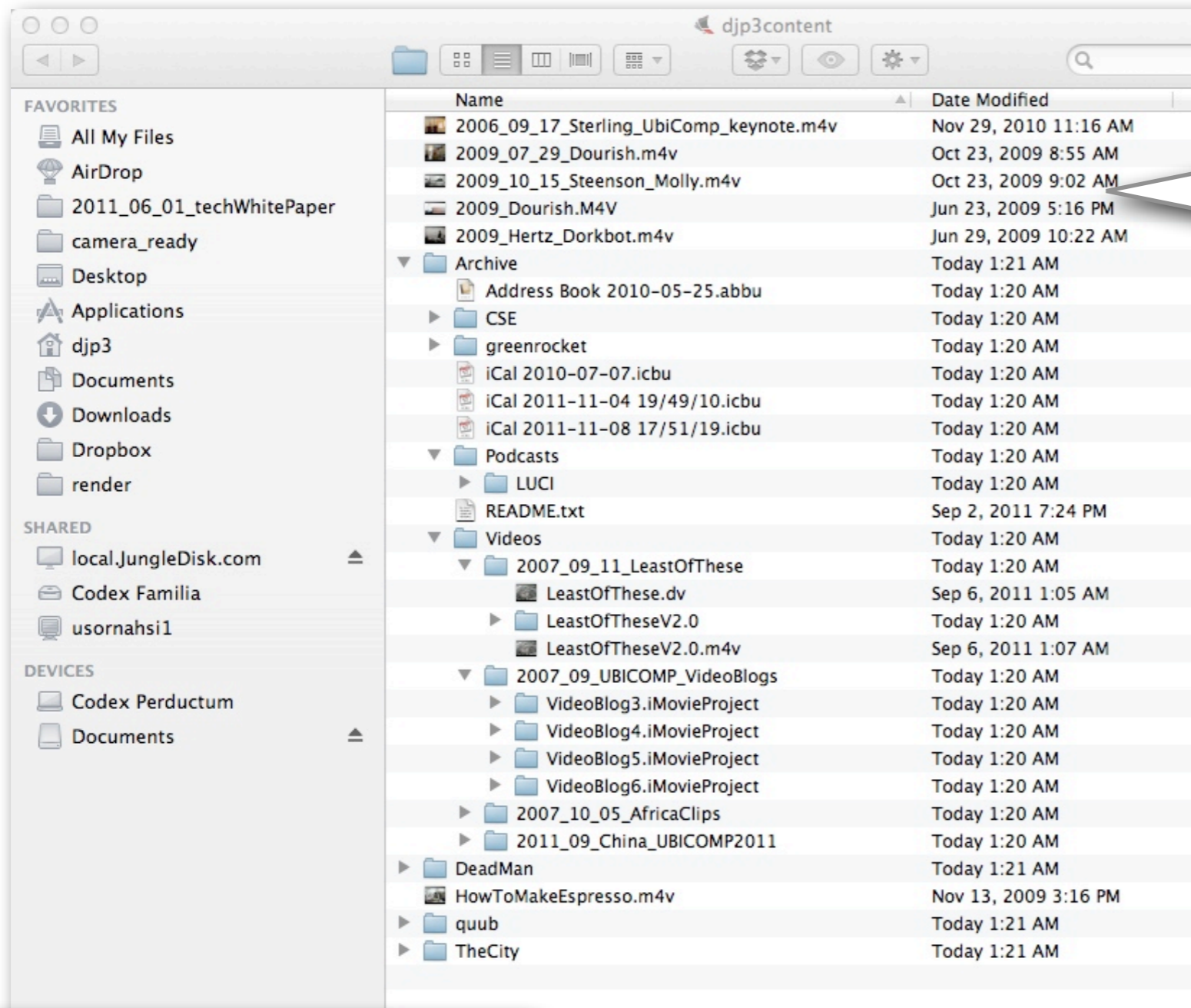
Consumer vision : JungleDisk

The screenshot shows a Mac OS X file browser window titled 'djp3content'. The left sidebar contains sections for 'FAVORITES', 'SHARED', and 'DEVICES'. The main pane displays a file tree with columns for 'Name', 'Date Modified', 'Size', and 'Kind'. The tree structure is as follows:

- 2006_09_17_Sterling_UbiComp_keynote.m4v (419.2 MB, MPEG-4 File)
- 2009_07_29_Dourish.m4v (284 MB, MPEG-4 File)
- 2009_10_15_Steenson_Molly.m4v (569.1 MB, MPEG-4 File)
- 2009_Dourish.M4V (616.7 MB, MPEG-4 File)
- 2009_Hertz_Dorkbot.m4v (99.9 MB, MPEG-4 File)
- Archive (Folder)
- Address Book 2010-05-25.abbu (Address...ve File)
- CSE (Folder)
- greenrocket (Folder)
- iCal 2010-07-07.icbu (iCal Backup file)
- iCal 2011-11-04 19/49/10.icbu (iCal Backup file)
- iCal 2011-11-08 17/51/19.icbu (iCal Backup file)
- Podcasts (Folder)
- LUCI (Folder)
- README.txt (233 bytes)
- Videos (Folder)
- 2007_09_11_LeastOfThese (Folder)
- LeastOfThese.dv (808.1 MB)
- LeastOfTheseV2.0 (Folder)
- LeastOfTheseV2.0.m4v (43.6 MB)
- 2007_09_UBICOMP_VideoBlogs (Folder)
- VideoBlog3.iMovieProject (Folder)
- VideoBlog4.iMovieProject (Folder)
- VideoBlog5.iMovieProject (Folder)
- VideoBlog6.iMovieProject (Folder)
- 2007_10_05_AfricaClips (Folder)
- 2011_09_China_UBICOMP2011 (Folder)
- DeadMan (Folder)
- HowToMakeEspresso.m4v (53.9 MB, MPEG-4 File)
- quub (Folder)
- TheCity (Folder)



Consumer vision : JungleDisk



An infinitely large hard-drive
that never crashes

Consumers don't know where
the data is kept.

(It is all backed by an Amazon
data center)

Any data that you need is
available on demand. Caching
supports fast access

\$0.14 GB/month + txfr



What are the visions?

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Services vision : Google Apps

The screenshot shows the Google Apps admin dashboard for the domain djp3.net. The browser window has several tabs open, including Amazon Simple Storage Service, Jungle Disk, and Donald J. Patterson III Mail. The dashboard header includes the Google Apps logo, search bars for accounts and help, and the user's email address d_j_p_3@djp3.net with links for inbox, calendar, help, and sign out. A navigation menu contains links for Dashboard, Organization & users, Groups, Domain settings, Reports, Advanced tools, Setup, Support, Settings, and Help. The main content area features several sections: a yellow banner about adding Chromebooks, a blue box for the user Donald J. Patterson III with account management links and a status indicator that all services are running smoothly, a section for seven-day active users with a small line graph showing 0 current, 0 min, and 1 max users, and a yellow box for Google Apps Marketplace with a 'Shop the marketplace' link. Below these are links for core Google Apps suite services: Email, Calendar, Google Wave Labs, Video, Mobile, Docs, Sites, Chat, Postini Services, and Start Page. A tip at the bottom suggests connecting with other admins in the community. The footer contains links for Terms of Service, Privacy policy, Suggest a feature, and Google Home, along with a copyright notice for 2011 Google Inc.

Google Apps for djp3.net - Google Apps for Business d_j_p_3@djp3.net [Inbox](#) [Calendar](#) [Help](#) [Sign out](#)

Search accounts Search Help Center

Dashboard Organization & users Groups Domain settings Reports Advanced tools Setup Support Settings Help

Add Chromebooks to your Google Apps domain.
Fast, intuitive, and easy-to-manage laptops. Chromebooks are designed to protect data and users while increasing user productivity and dramatically reducing total cost of ownership. [Learn more](#)

Over the next few months, Google Apps is getting a new look and feel! [Learn more](#)

Donald J. Patterson III
djp3.net
[Manage account information](#) [domain names](#)
3 users
You have reached the 3 user limit for this organization.

✓ All Google Apps services are running smoothly. [Learn more](#)

Seven-day active users over the last 90 days current min max
0 0 1
Current as of November 14, 2011 [Learn more](#)

Service settings [Add more services](#)

Google Apps Marketplace New [Shop the marketplace »](#)
Get more apps including accounting, CRM, marketing, project management and admin tools.

Core Google Apps suite

Email
<http://mail.google.com/a/djp3.net>

Docs
<http://docs.google.com/a/djp3.net>

Calendar
<http://www.google.com/calendar/hosted/djp3.net>

Sites
<http://sites.google.com/a/djp3.net>

Google Wave Labs
<http://wave.google.com/a/djp3.net>

Chat
Users can sign in by [downloading Google Talk](#)

Video
<http://video.google.com/a/djp3.net>

Postini Services
Postini Services let you set up email policies and filters.
[Postini Services console](#)

Mobile
Get Google Apps on your mobile device

Start Page
<http://partnerpage.google.com/djp3.net>

Tip: Connect with other Google Apps admins in the Google Apps admin community. [Learn more](#)

[Terms of Service](#) - [Privacy policy](#) - [Suggest a feature](#) - [Google Home](#)
©2011 Google Inc.

Services vision : Google Apps

The screenshot shows the Google Apps admin dashboard for the domain djp3.net. The browser tabs include Amazon Simple Storage Service, Jungle Disk - My Account, Donald J. Patterson III Mail - I..., and Google Apps. The dashboard header shows the user d_j_p_3@djp3.net with links for Inbox, Calendar, Help, and Sign out. A navigation menu includes Dashboard, Organization & users, Groups, Domain settings, Reports, Advanced tools, Setup, Support, Settings, and Help. The main content area features several sections: a yellow banner about adding Chromebooks, a blue box for the user Donald J. Patterson III (3 users, 3 user limit reached) with a status indicator that all services are running smoothly and a seven-day active users chart (current: 0, min: 0, max: 1), a yellow box for Google Apps Marketplace, and a 'Core Google Apps suite' section listing Email, Calendar, Google Wave Labs, Video, Mobile, Docs, Sites, Chat, Postini Services, and Start Page with their respective URLs. A tip at the bottom suggests connecting with other admins in the community. Footer links include Terms of Service, Privacy policy, Suggest a feature, Google Home, and ©2011 Google Inc.

A suite of collaborative business apps including email, calendar, word processing, spreadsheet, "powerpoint", chat

No limit on storage, no ads, no software updating, no security management, no downtime

(It is all backed by Google's data center)

Always on, available from any browser

\$50.00 per user/per year



Services vision : Quicken Online

Quicken ONLINE

Welcome be121307 | My Profile | Sign Out | User Community | Blog | Support | Send

Home | My Accounts | Track Spending

First visit December 20, 2007 3:28 PM PST | Welcome to your financial life. Thursday December 20, 2007

My Finances

Show Custom range | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May

My Accounts

+ Add | Edit | Delete

Bank Accounts

Customer Central Bank

- My Checking \$257.14
- My Savings \$100,000.00

Total \$100,257.14

Credit Cards

Customer Central Bank

- Credit Card -\$2,436.50

Total -\$2,436.50

Total Balance \$97,820.64

Am I living within my means?

Have a question about these totals? | Ask the Community

- + Money In** Nov 20 - Dec 20: **\$108.99**
- Money Out** Nov 20 - Dec 20: **\$354.80**
- = So, I Overspent...** Nov 20 - Dec 20: **-\$245.81**

Manage bill reminders (for all accounts and dates)

Stop Reminders for this Payee | Mark as Paid | Send to Email/Phone

| Next Due Date | Frequency | Payee | Next Payment |
|---------------|-----------|---------------------------|--------------|
| 12-07-2007 | Monthly | ING Direct | 11.00 |
| 12-07-2007 | Monthly | Nameste plaza fremont; S | 11.00 |
| 12-08-2007 | Monthly | Bharat Bajar Fremont; Sta | 11.00 |
| 12-08-2007 | Monthly | Comcast | 11.00 |
| 12-08-2007 | Monthly | Morgan Keegan | 11.00 |

What am I spending money on?

Nov 20 - Dec 20

Have a question about the pie chart?

Services vision : Quicken Online

Quicken ONLINE
Welcome be121307 My Profile Sign Out

Home My Accounts Track Spending

First visit December 20, 2007 3:28 PM PST

My Finances

Show Custom range

My Accounts

+ Add Edit Delete

Bank Accounts

Customer Central Bank

- My Checking \$257.14
- My Savings \$100,000.00

Total \$100,257.14

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Customer Central Bank

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Not sure where to start?

Manage your money and finances online. Quicken connects to banks for you.

No backups, no hacker break-ins.

(It is all backed by ?'s data center)

Always on, available from any browser

\$2.99/per year



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Infrastructure: Amazon web services

AWS Management Console | Amazon **EC2**

Region: US East (Virginia)

Navigation

- EC2 Dashboard
 - INSTANCES
 - Instances
 - Spot Requests
 - Reserved Instances
 - IMAGES
 - AMIs
 - Bundle Tasks
 - ELASTIC BLOCK STORE
 - Volumes
 - Snapshots
 - NETWORK & SECURITY
 - Security Groups
 - Elastic IPs
 - Placement Groups
 - Load Balancers
 - Key Pairs

Amazon EC2 Console Dashboard

Getting Started

To start using Amazon EC2 you will want to launch a virtual server, known as an Amazon EC2 instance.

[Launch Instance](#)

Note: Your instances will launch in the US East (Virginia) region.

Service Health

Service Status

| Current Status | Details |
|------------------------------------|---|
| Amazon EC2 (US East - N. Virginia) | Service is operating normally View complete service health details |

Availability Zone Status

| Current Status | Details |
|----------------|---|
| us-east-1a | Availability zone is operating normally |
| us-east-1b | Availability zone is operating normally |
| us-east-1c | Availability zone is operating normally |
| us-east-1d | Availability zone is operating normally |

My Resources

You are using the following Amazon EC2 resources in the US East (Virginia) region: [Refresh](#)

- 0 Running Instances
- 0 Elastic IPs
- 0 EBS Volumes
- 0 EBS Snapshots
- 1 Key Pair
- 2 Security Groups
- 0 Load Balancers
- 0 Placement Groups

Related Links

- Documentation
- All EC2 Resources
- Forums
- Feedback
- Report an Issue

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Infrastructure: Amazon web services

AWS Management Console - Amazon EC2

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Create a computer in 2 minutes

Use it for as long as you want,
then shut it down.

\$0.085 per hour
(\$744 per year)

Infrastructure: Amazon web services

AWS Management Console | Amazon **EC2**

Region: US East (Virginia)

Amazon EC2 Console Dashboard

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AWS Management Console

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 - Key Pairs

My Resources

You are using the following Amazon EC2 resources in the US East (Virginia) region:

- 0 Running Instances
- 0 Elastic IPs
- 0 EBS Volumes
- 0 EBS Snapshots
- 1 Key Pair
- 2 Security Groups
- 0 Load Balancers
- 0 Placement Groups

Related Links

- Documentation
- All EC2 Resources
- Forums
- Feedback
- Report an Issue

Availability Zone Status

| Current Status | Details |
|----------------|---|
| ✓ us-east-1a | Availability zone is operating normally |
| ✓ us-east-1b | Availability zone is operating normally |
| ✓ us-east-1c | Availability zone is operating normally |
| ✓ us-east-1d | Availability zone is operating normally |

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Create an auto-scaling Tomcat environment in 2 minutes

“easy to begin, impossible to outgrow”

\$35.27/month for basic usage

Infrastructure: Amazon web services

AWS Management Console | Amazon **EC2**

Region: US East (Virginia)

Amazon EC2 Console Dashboard

Getting Started

To start using Amazon EC2 you will want to launch a virtual server, known as an Amazon EC2 instance.

[Launch Instance](#)

Note: Your instances will launch in the US East (Virginia) region.

Service Health

Service Status

| Current Status | Details |
|------------------------------------|---|
| Amazon EC2 (US East - N. Virginia) | Service is operating normally View complete service health details |

Availability Zone Status

| Current Status | Details |
|----------------|---|
| us-east-1a | Availability zone is operating normally |
| us-east-1b | Availability zone is operating normally |
| us-east-1c | Availability zone is operating normally |
| us-east-1d | Availability zone is operating normally |

My Resources

You are using the following Amazon EC2 resources in the US East (Virginia) region: [Refresh](#)

- 0 Running Instances
- 0 Elastic IPs
- 0 EBS Volumes
- 0 EBS Snapshots
- 1 Key Pair
- 2 Security Groups
- 0 Load Balancers
- 0 Placement Groups

Related Links

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Infrastructure: Amazon web services

The screenshot shows the AWS Management Console interface for the Amazon EC2 console dashboard. The page title is "AWS Management Console" and the URL is "https://console.aws.amazon.com/ec2/home?region=us-east-1". The navigation pane on the left shows the "EC2 Dashboard" with options for INSTANCES, IMAGES, ELASTIC BLOCK STORE, and NETWORK & SECURITY. The main content area is titled "Amazon EC2 Console Dashboard" and includes a "Getting Started" section with a "Launch Instance" button. A callout box is overlaid on the page, containing the text "Create an infinitely large database instantly" and "\$0.11/hour". The "Service Health" section shows that Amazon EC2 (US East - N. Virginia) is operating normally, and the "Availability Zone Status" section shows that all four availability zones (us-east-1a, us-east-1b, us-east-1c, and us-east-1d) are operating normally.

Navigation

Region: US East (Virginia)

EC2 Dashboard

- INSTANCES
 - Instances
 - Spot Requests
 - Reserved Instances
- IMAGES
 - AMIs
 - Bundle Tasks
- ELASTIC BLOCK STORE
 - Volumes
 - Snapshots
- NETWORK & SECURITY
 - Security Groups
 - Elastic IPs
 - Placement Groups
 - Load Balancers
 - Key Pairs

Amazon EC2 Console Dashboard

Getting Started

To start using Amazon EC2 you will want to launch a virtual server, known as an Amazon EC2 instance.

[Launch Instance](#)

Note: Your instances will launch in the US East (Virginia) region.

Service Health

Service Status

| Current Status | Details |
|------------------------------------|---|
| Amazon EC2 (US East - N. Virginia) | Service is operating normally View complete service health details |

Availability Zone Status

| Current Status | Details |
|----------------|---|
| us-east-1a | Availability zone is operating normally |
| us-east-1b | Availability zone is operating normally |
| us-east-1c | Availability zone is operating normally |
| us-east-1d | Availability zone is operating normally |

0 Load Balancers

0 Placement Groups

Related Links

- Documentation
- All EC2 Resources
- Forums
- Feedback
- Report an Issue

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Infrastructure: Amazon web services

AWS Management Console | Amazon **EC2**

Region: US East (Virginia)

Navigation

- EC2 Dashboard
 - INSTANCES
 - Instances
 - Spot Requests
 - Reserved Instances
 - IMAGES
 - AMIs
 - Bundle Tasks
 - ELASTIC BLOCK STORE
 - Volumes
 - Snapshots
 - NETWORK & SECURITY
 - Security Groups
 - Elastic IPs
 - Placement Groups
 - Load Balancers
 - Key Pairs

Amazon EC2 Console Dashboard

Getting Started

To start using Amazon EC2 you will want to launch a virtual server, known as an Amazon EC2 instance.

[Launch Instance](#)

Note: Your instances will launch in the US East (Virginia) region.

Service Health

Service Status

| Current Status | Details |
|------------------------------------|---|
| Amazon EC2 (US East - N. Virginia) | Service is operating normally View complete service health details |

Availability Zone Status

| Current Status | Details |
|----------------|---|
| us-east-1a | Availability zone is operating normally |
| us-east-1b | Availability zone is operating normally |
| us-east-1c | Availability zone is operating normally |
| us-east-1d | Availability zone is operating normally |

My Resources

You are using the following Amazon EC2 resources in the US East (Virginia) region: [Refresh](#)

- 0 Running Instances
- 0 Elastic IPs
- 0 EBS Volumes
- 0 EBS Snapshots
- 1 Key Pair
- 2 Security Groups
- 0 Load Balancers
- 0 Placement Groups

Related Links

- Documentation
- All EC2 Resources
- Forums
- Feedback
- Report an Issue

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Infrastructure: Amazon web services

The screenshot shows the AWS Management Console interface for the Amazon EC2 service. The main content area displays the 'Getting Started' section with a 'Launch' button and a note: 'To start using Amazon EC2 you will act as an Amazon EC2 instance.' Below this is the 'Service Health' section, which includes a table for 'Current Status' and 'Details' for the Amazon EC2 service in the US East - N. Virginia region, showing it is operating normally. There is also a table for 'Availability Zone Status' showing four zones (us-east-1a, us-east-1b, us-east-1c, us-east-1d) all operating normally. A callout box is overlaid on the 'Launch' button, containing the text 'Create a data-flow process to compute on massive data sets' and '\$0.015/hour'.

Navigation Region: US East (Virginia)

EC2 Dashboard

- INSTANCES
 - Instances
 - Spot Requests
 - Reserved Instances
- IMAGES
 - AMIs
 - Bundle Tasks
- ELASTIC BLOCK STORE
 - Volumes
 - Snapshots
- NETWORK & SECURITY
 - Security Groups
 - Elastic IPs
 - Placement Groups
 - Load Balancers
 - Key Pairs

Getting Started

To start using Amazon EC2 you will act as an Amazon EC2 instance.

Launch

Note: Your instances will launch in the selected Availability Zone.

Service Health

Service Status

| Current Status | Details |
|------------------------------------|---|
| Amazon EC2 (US East - N. Virginia) | Service is operating normally View complete service health details |

Availability Zone Status

| Current Status | Details |
|----------------|---|
| us-east-1a | Availability zone is operating normally |
| us-east-1b | Availability zone is operating normally |
| us-east-1c | Availability zone is operating normally |
| us-east-1d | Availability zone is operating normally |

EC2 resources in the US East [Refresh](#)

- 0 Elastic IPs
- 0 EBS Snapshots
- 2 Security Groups
- 0 Load Balancers
- 0 Placement Groups

Related Links

- Documentation
- All EC2 Resources
- Forums
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- Report an Issue

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Infrastructure: Heroku platform services

The screenshot shows the Heroku 'How it Works' page. At the top, there's a navigation bar with the Heroku logo and links for 'How it Works', 'Pricing', 'Add-ons', 'Dev Center', 'Support', 'Contact', and a 'Login' button. Below this is a workflow diagram with two main sections: 'Build' (containing 'Deploy', 'Connect', and 'Command') and 'Operate' (containing 'Observe', 'Scale', and 'Relax').

The main content area features a 'How it Works' section with a 3D diagram of the Heroku architecture. The diagram is a layered box with 'Control Surface APIs' on the left, 'Dyno Manifold' in the middle, and 'Logplex' at the bottom. On top of the 'Dyno Manifold' are three groups of boxes representing 'Routing Dynos' and 'Process Types'. Dotted lines connect these components to the workflow steps above.

Below the diagram are four icons: a database cylinder, a bar chart, a funnel, and a three-dot menu.

At the bottom, there's a footer with four columns of links:

| Heroku | Business | Platform | Resources |
|--------------------------------|-----------------------------------|------------------------------|-------------------------------|
| About | Why Heroku | How it Works | Documentation |
| Contact | Success Stories | Pricing | Support |
| Jobs | Partner Program | Add-ons | Status |
| Legal | News & Events | | |
| Privacy Policy | Blog | | |

Infrastructure: Heroku platform services

Heroku | How it Works

Heroku | How it Works

www.heroku.com/how

Press This Class Develop... UCI DR quub Blogs and Wikis 960 Gridded Rails

heroku

How it Works | Pricing | Add-ons | Dev Center | Support | Contact | Login

Build Operate

Deploy Connect Command Observe Scale

How it Works

Take a tour of the most productive, powerful, and scalable cloud application platform, and learn how Heroku structures and handles your app, deploys, scaling, and traffic.

Click around the diagram or the tabs above to explore.

Control Surface APIs

Dyno Manifold

Logplex

Routing Dynos

Heroku

Business

Platform

Resources

About

Contact

Jobs

Legal

Privacy Policy

Why Heroku

Success Stories

Partner Program

News & Events

Blog

How It Works

Pricing

Add-ons

Documentation

Support

Status

Create web applications with separation of concerns on demand (app/database/asset servers)

Optimized for release engineering

Integrates with source code repositories so you can continuously deploy

price scales with demand

What are the visions?

- **Consumer**
 - Don't think about the cloud
- **Services**
 - Always available apps
- **Infrastructure**
 - Build with our tech services
 - Virtual Machines
 - Rent a cloud computer



What are the visions?

- **Consumer**
 - Don't think about the cloud
 - **Services**
 - Always available apps
 - **Infrastructure**
 - Build with our tech services
- Virtual Machines
 - Rent a cloud computer



Virtual Machines: Slicehost

The screenshot shows the SliceManager interface for a user named djp3@quub.com. The main content is a table of slices:

| Slice | Status | RAM | IP | Bandwidth | Backups | Age |
|--|--------|---------|----------------|---|---------|---------------|
| communications.quub.com ID: 31006 | active | 512 MB | 173.45.242.178 | 0.69GB of 300GB ¹ 0.26 in / 0.43 out | On | over 2 years |
| dev.quub.com ID: 31009 | active | 1536 MB | 173.45.242.181 | 2.00GB of 900GB ¹ 1.21 in / 0.80 out | On | over 2 years |
| vpn.quub.com ID: 56376 | active | 256 MB | 173.45.226.152 | 6.95GB of 150GB ¹ 3.53 in / 3.42 out | Off | over 2 years |
| swayr-stage ID: 20292436 | active | 2048 MB | 173.45.226.56 | 0.17GB of 1200GB ¹ 0.09 in / 0.09 out | Off | about 1 month |
| swayr-production ID: 20304506 | active | 2048 MB | 173.45.226.172 | 0.07GB of 1200GB ¹ 0.03 in / 0.04 out | Off | 25 days |

¹ Bandwidth included in the Slice plan
We **pool bandwidth** across Slices: Available: 3750GB, Used: 9.89GB
Bandwidth is reset at the end of your bill cycle. Your next bill date is 2011-11-24

On the left sidebar, there are navigation tabs for Slices, DNS, Help, and Account. Below these, there are links for 'My Slices' and 'Add a Slice'. A Rackspace Email Code of 75423 is also displayed.

Virtual Machines: Slicehost

The screenshot shows the SliceManager interface for a user named djp3@quub.com. The main content is a table of virtual machines (slices) with the following data:

| Slice | Status | RAM | IP | Bandwidth | Backups | Age |
|--------------------------------------|--------|---------|----------------|---|---------|--------------|
| communications.quub.com ID: 31006 | active | 512 MB | 173.45.242.178 | 0.69GB of 300GB ¹ 0.26 in / 0.43 out | On | over 2 years |
| dev.quub.com ID: 31009 | active | 1536 MB | 173.45.242.181 | 2.00GB of 900GB ¹ 1.21 in / 0.80 out | On | |
| vpn.quub.com ID: 56376 | active | 256 MB | 173.45.226.152 | 6.95GB of 150GB ¹ 3.53 in / 3.42 out | Off | |
| swayr-stage ID: 20292436 | active | 2048 MB | 173.45.226.56 | 0.17GB of 1200GB ¹ 0.09 in / 0.09 out | Off | |
| swayr-production ID: 20304506 | active | 2048 MB | 173.45.226.172 | 0.07GB of 1200GB ¹ 0.03 in / 0.04 out | Off | |

¹ Bandwidth included in the Slice plan
We **pool bandwidth** across Slices: Available: 3750GB, Used: 9.89GB
Bandwidth is reset at the end of your bill cycle. Your next bill date is 2011-11-24

Rent a computer on demand

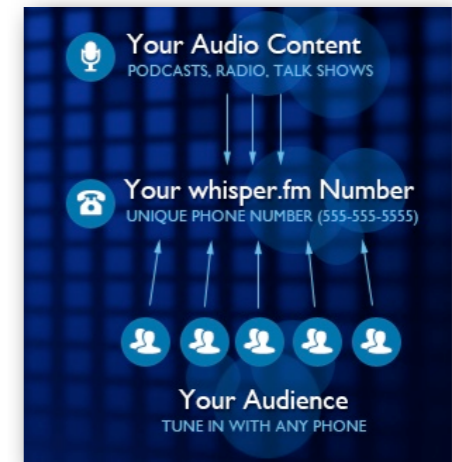
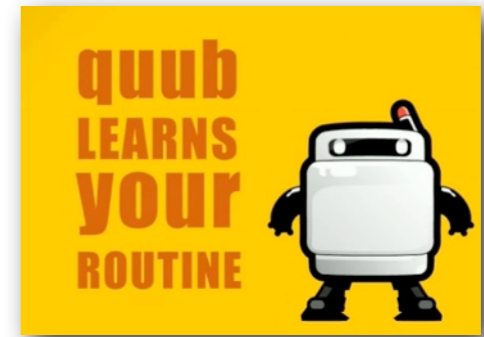
Clone an existing computer

Customer does all the admin

\$40.00 / month

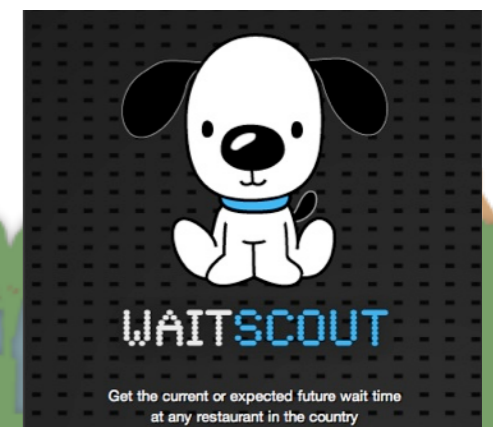
What is my experience?

- <http://www.quub.com>
- <http://whisper.fm>
- <http://swayr.com>
- <http://waitscout.com>



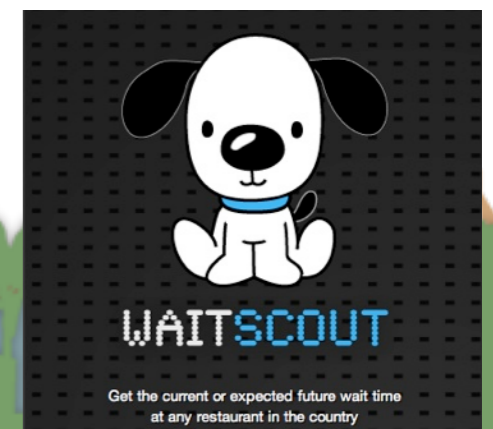
What is my experience?

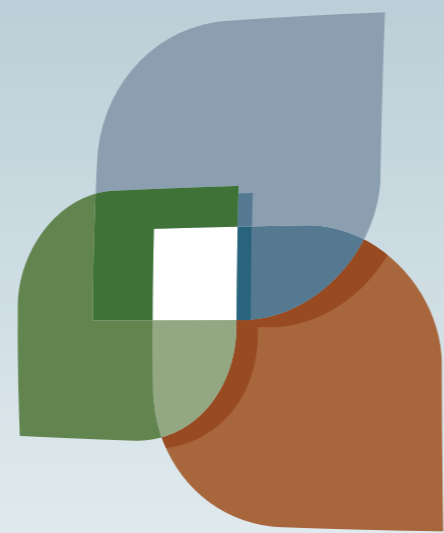
- Robustness is hard
 - Ambulance
 - Latency works against you
- Dealing with venture capitalists is rough
 - selling the future (bump)
 - “build a great company”
- Challenges of working in China
 - microblog monitoring
 - copied the product
 - car logger



What is my experience?

- “this is too futuristic for us”
- Other thoughts
 - geographical domain and legislation hasn't caught up yet with cloud abstractions
 - It's not actually a cloud - it consumes resources
 - The movie Avatar create 1 petabyte of data





L U C I

