Citizen Cloud: towards a more decentralized Internet ?

Thierry Priol – September 2015

The Internet ecosystem as it is today
massivelly centralized !

Side effects of centralization

- Datacenters and cloud providers make the Internet centralized
  - Which was not the Internet design in mind, … reliability problems…

- Citizens are loosing control of their own private data
  - Vendor lock-in from hardware and software providers
  - You buy a device, the company goes out of business, the device is useless, and you loose your private data…
  - You have to accept the "terms of use" for a service or you cannot use it
  - You are loosing control of your private data, someone is making business on your shoulders and you do not know how much they got from them and what they are doing for or against you.

- Centralization is very attractive for hackers (see next slides) and has a huge effect in case of failures

Reliability…

Ínría

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By Alorie Gilbert
Staff Writer, CNET Ne

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Lightning strikes Amazon cloud (h
The dangers of sky-high computing

By **Cade Metz** • Get more from this auth

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Amazon's cloud was struck by lightning ea

On Wednesday evening at about 6:30pm
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February 24, 2009, 9:47
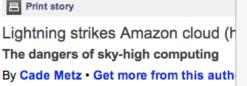
Four Hours
By SAUL HANSELL

Gmail

Upd

of the cause of the failure.

Google's Gmail service froze Tuesday at 9:30 a.m. London time,
leaving millions of users in Europe without access to e-mail for
four prime working hours. (The service was also out for after-work e-mailers
in Asia and night owls in the Americas.)

Tuesday evening, Google posted an explanation of the problem on its blog. It
appears to be the digital equivalent of the rolling blackouts that happen when
some minor glitch at a power plant short-circuits the power grid for half the
country. In this case, Google shut down one data center for a software update,
which overburdened other data centers that were supposed to cover for it.

This morning, there was a routine maintenance event in one
of our European data centers. This typically causes no
disruption because accounts are simply served out of

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Amazon Web Services Goes Down, Takes Many Startup Sites With It

by Erick Schonfeld on February 15, 2008   116 Comments   1   retweet

Amazon Web Services suffered a major outage this morning, affecting
the thousands of Websites that rely on its storage (S3) and cloud
computing (EC2) services. Startups including Twitter, SmugMug,
37Signals, and AdaptiveBlue, for instance, use Amazon's S3 storage
service to store all the data for their Websites. Reports started
coming in across the Web, email, and Twitter about the outage
(Twitter only uses S3 for file hosting, not its main messaging application). The major difficulties
seem to have been fixed, but some issues persist. The outage started at around 4:30 AM PT.

amazon
webservices™

This could just be growing pains for Amazon Web Services, as more startups and other companies
come to rely on it for their Web-scale computing infrastructure. But even if the outage only lasted
a couple hours, it is unacceptable. Nobody is going to trust their business to cloud computing
unless it is *more* reliable than the data-center computing that is the current norm. So many
Websites now rely on Amazon's S3 storage service and, increasingly, on its EC2 compute cloud as
well, that an outage takes down *a lot* of sites, or at least takes down some of their functionality.
Cloud computing needs to be 99.999 percent reliable if Amazon and others want it to become
more widely adopted.

Vendor lock-in problem

- In march 2013, Zeo Inc went out of business, the device became useless due to the shutdown of the synchronization service hosted in the cloud

Sleep Tracking Startup Zeo Says Goodnight

Posted May 22, 2013 by *Jon Orlin* (*@jonorlin*)

One of the early pioneers in the Quantified Self movement has quietly gone out of business. Zeo, a leading maker of hardware and software used by consumers to track sleep and improve their health, has not been operating since the end of last year. A trustee has nearly completed the sale of all company assets. Zeo has been very quiet about the news up until now. In fact, Zeo's website is still up and doesn't mention the news.

Zeo was founded by three students at Brown University who had a passion for using the science of sleep and technology to improve people's lives. The company introduced its first product, the Zeo Personal Sleep Coach, in June 2009.

The following week, the first article mentioning the term "Quantified Self" was published in Wired magazine. While the article didn't mention Zeo, it did claim "a new culture of personal data was taking shape." And that every facet of life from sleep to mood to pain was becoming trackable. "Even sleep – a challenge to self-track, obviously, since you're unconscious – is yielding to the skill of the widget maker."

In 2011, the widget maker Zeo introduced a mobile version to its Sleep Manager product line. By wearing a special headband, with sensors to measure electrical current, the Zeo could track different phases of sleep, such as Light, Deep and REM sleep, in addition to awake time. This data was then sent to an iPhone, iPod, or Android phone, and could be automatically uploaded to a personal and private online sleep database. This data along with some analytical tools could then be used to help improve your sleep and health.
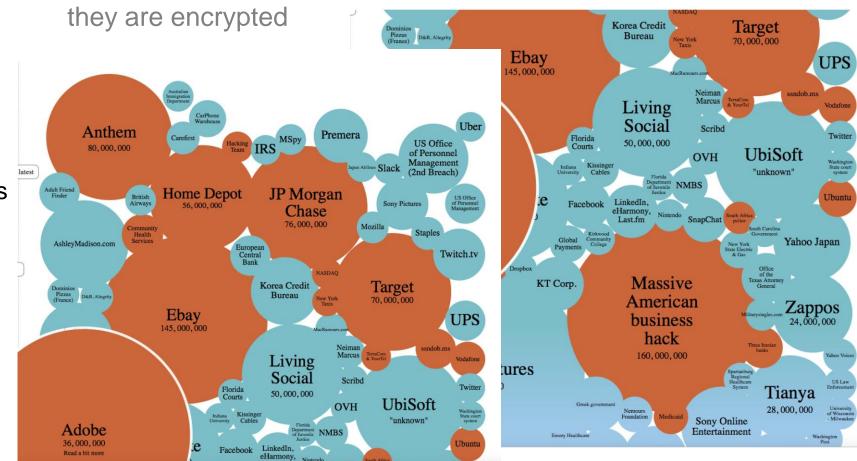
What Went Wrong

When there is a leak, it is a massive leak !

- Data mining the leaks allows you to discover passwords even if they are encrypted

World's Biggest Data Breaches

What about a more decentralized Internet *?*

Why decentralization has failed ?

"A Critical Look at Decentralized Personal Data Architectures". A. Narayanan et al. Feb 22, 2012

- No unified view of the data making difficult certain types of computations (data analytics)
- Slow time responses and failures are the rules
- Restricted connectivity (asymmetric comm., NAT, firewall)
- Very few always-on devices
- Lack of economy of scale (infrastructure, development, maintenance, monitoring, threat management)
- Some cognitive factors: software installation, users' involvement to take decisions, lack of expertise in software configuration and security issues

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What about software installation on Smartphones ? Is it a problem ? No !

Why decentralization could come back ?

- Public awareness of surveillance by national security agencies (not only the NSA) and privacy issues
- Massive leaks of private data from services providers
- Better connectivity (FTTH) at home
- New technologies for Always-on devices
  - Personal programmable NAS
  - Next generation of programmable DSL set-top boxes (Android), but deployment is rather slow due to cost issues
  - Smart home controller
  - Smartphone performance is increasing very rapidly due to a very competitive market making possible always-on devices with a very low power consumption (**mini/nano-PC**)
  - New technologies such as non volatile memories that will replace DRAM

Mini/nano-PC…

…

Citizen Clouds: towards a more decentralized Internet

Agenda

- MAKING THE CLOUD PERSONAL
  by TRISTAN NITOT

- SELF DATA: EMPOWERING PEOPLE WITH THEIR OWN PERSONAL DATA
  by DANIEL KAPLAN

- DESCENT: PLUG-BASED DECENTRALIZED SOCIAL NETWORK
  by PASCAL MOLLI

- FRAMABAG, WALLABAG, TOGETHER LET'S DECENTRALIZE INTERNET
  !By NICOLAS LOEUILLET

- DEBATE : CITIZEN CLOUDS ? TOWARDS A MORE DECENTRALIZED
  INTERNET ?
  Animated by DANIEL KAPLAN