

# Downtime statistics of current cloud solutions

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## I. INTRODUCTION

In recent years, cloud computing has received considerable attention from global businesses and government agencies in economies. Regarding the potential and impact of cloud computing in the world, providing reliable services to meet the requirements of mission critical systems becomes more and more important. Meanwhile, the lack of reliability of cloud services is not commonly known by industry. In order to monitor and analyze cloud computing resiliency, IWGCR<sup>1</sup> presents its first short report aggregates information from press releases and provides a brief summary of availability of major cloud providers.

## II. PRESS RELEASES

We gather information from press releases. Main sources are:

- BBC,
- BGR.com,
- Bloomberg.com,
- CIO.com,
- CloudPro.co.uk,
- Computing.co.uk,
- Datacenterknowledge.com,
- DSLreports,
- FastCompany,
- Huffingtonpost.com,
- Informationweek,
- Silicon.com and
- Zdnet.com.

## III. SERVICE DOWNTIME

Table I shows all cloud services downtime we have grabbed from press releases. Belows are stories of each cloud service failure, their causes and consequences.

### A. Year 2007

- 165, 000 website hosted by NaviSite suddenly went offline and were offline during 1 full week.
- Hostway migrated several thousand servers from Miami to Tampa. This relocation resulted thousands of sites offline during 3 days.
- ServerBeach datacenters were affected by a power outage. The downtime lasted 4 hours.

<sup>1</sup>IWGCR: The International Working Group on Cloud Computing Resiliency

### B. Year 2008

- Twitter had often been down on and off for hours.

### C. Year 2009

- OVH was down for 1 full week because of ZFS failure.
- Amazon and Microsoft datacenters downed by lightning in Dublin. Some sites that rely on one of its storage services took between 24 to 48 hours to recover.
- The Gmail service was not available during 4 hours.
- Paypal was down for 5 hours. Performance problem was detected and the outage affects ebay transactions.

### D. Year 2010

- Amadeus got two failures in 3 months. This outage forced some airlines to check in manually in 1 hour.

### E. Year 2011

- A 3 days blackout interrupted email and Internet services for tens of millions of users of BlackBerry.
- Microsoft Azure was offline for 7 hours.
- Yahoo! mail went down for 6 hours. More than 1 million users were affected.
- Users were unable to access Google Docs List in 1 hour.

### F. Year 2012

- Routers failed during 2 hours in OVH.
- Major Facebook outage disrupted users worldwide during 3 hours.

## IV. CONCLUSION

Preliminary results (Table II) of cloud service availability show an average of 7.5 hours unavailable per year, or 99.9% availability. It is extremely far from the expected reliability of mission critical system (99.999%). As a comparison, the service average unavailability for electricity in a modern capital is less than 15 minutes per year. [1] The cost of these failures amounts for more than 70 millions USDs based on hourly costs accepted in industry. [2] Due to imperfect methodology, such figures are most likely underestimated, since many events are not published in the press releases and the current procedure to collect events by IWGCR leaves a lot of room for missed outages. Future work of IWGCR will focus on improving the observation of cloud service availability and better measure the economic impact.

	2007(Hour)	2008(Hour)	2009(Hour)	2010(Hour)	2011(Hour)	2012(Hour)	Total(Hour)
1. Amadeus				1			1
2. Facebook						3	3
3. ServerBeach	4						4
4. Paypal			5				5
5. Google			4		1		5
6. Yahoo!					6		6
7. Twitter		7					7
8. Amazon			24				24
9. Microsoft			24		7		31
10. Hostway	72						72
11. BlackBerry					72		72
12. NaviSite	168						168
13. OVH			168			2	170

TABLE I

A SUMMARY OF DOWNTIME (IN HOUR) STATISTICS OF EACH CLOUD SERVICE PROVIDER FROM 2007 TO 2012

	Total(Hour)	Average(Hour)	Availability	Cost/Hour(USD)	Cost(USD)
1. Amadeus	1	0.167	99.998%	89,000	89,000
2. Facebook	3	0.500	99.994%	200,000	600,000
3. ServerBeach	4	0.667	99.992%	100,000	400,000
4. Paypal	5	0.833	99.990%	225,000	1,125,000
5. Google	5	0.833	99.990%	200,000	1,000,000
6. Yahoo!	6	1.000	99.989%	200,000	1,200,000
7. Twitter	7	1.167	99.987%	200,000	1,400,000
8. Amazon	24	4.000	99.954%	180,000	4,320,000
9. Microsoft	31	5.167	99.941%	200,000	6,200,000
10. Hostway	72	12.000	99.863%	100,000	7,200,000
11. BlackBerry	72	12.000	99.863%	200,000	14,400,000
12. NaviSite	168	28.000	99.680%	100,000	16,800,000
13. OVH	170	28.333	99.677%	100,000	17,000,000
Total	568	94.667	99.917%		71,734,000

TABLE II

A SUMMARY OF TOTAL AND AVERAGE DOWNTIME FOR EACH CLOUD SERVICE PROVIDER AND THEIR ECONOMIC IMPACT

## V. FUTURE WORKS

Here are at least several shortcomings in our approach.

First, our procedure to gather information is far from exhaustive. The consequence is ranking of availability becomes unreliable. In next version, we will use Google Alarms or advanced economic intelligence softwares to fetch news automatically. Besides, we plan to setup communication channels so users could report failures. We also plan to depoly online detectors or probes to monitor mainstream cloud service providers continuously. At last, we think messages from operators should be more transparent.

Second, our data is not based on number of users. However, the social or economic impact of big player failures (Google, Amazon, eBay, etc.) is much wider than the small one's. It is useful to consider this factor to make average estimation more accurate.

Further, we don't have precise value of economic cost for each failure or average hourly cost for each cloud service provider. This is required to obtain better assess the cloud society.

## REFERENCES

- [1] "Paris : 15 minutes de coupure de courant par an et par habitant," <http://www.leparisien.fr/paris-75/paris-75006/paris-15-minutes-de-coupure-de-courant-par-an-et-par-habitant-02-04-2012-1935792.php>, accessed: 10/04/2012.
- [2] "Downtime costs per hour," <http://iwgcr.org/?p=404>, accessed: 10/04/2012.