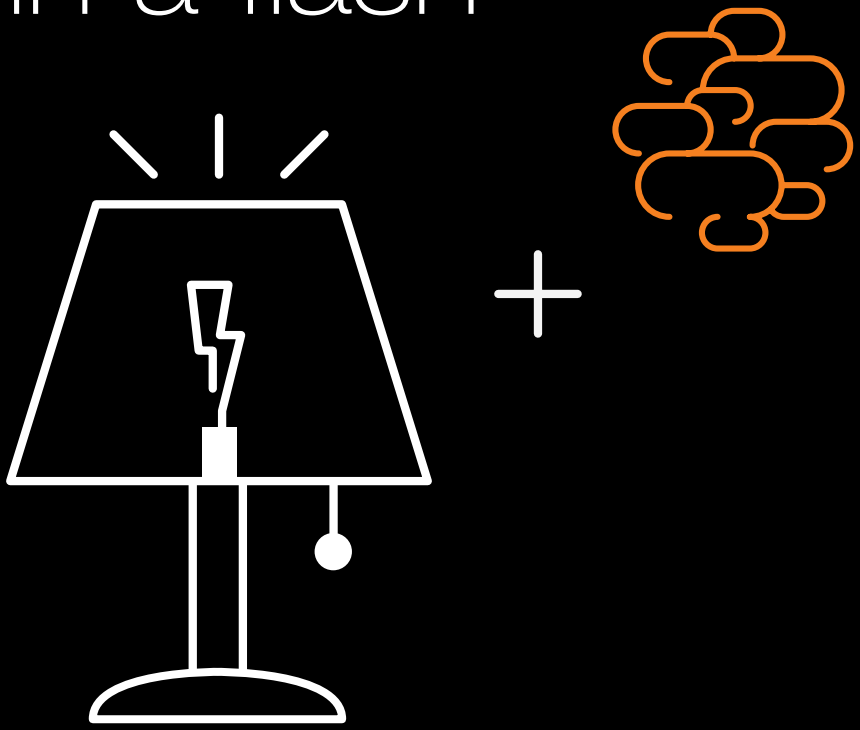
the real-time Cloud in a flash



Business Services

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editorial

Run a search for “real-time Cloud” in any search engine, and the sheer number of hits will already give you a clear indication of how important the notion of real time has become in the cloud computing world.
Major cloud computing players like Amazon, Google, Salesforce and even the FBI are all thinking about real time and making it a central tool for developing and expanding their activities.

Our experts have also joined the debate by reflecting on the development of the real-time Cloud from four very different yet interrelated and complementary points of view. These perspectives focus on:

- networks
- infrastructure/platforms
- business processes
- 4G/LTE mobility

Next, they analyze two concrete case studies: WebRTC, a new standard currently in development that will enable **real-time** browser-to-browser transfer of **audio and video**, and cloud gaming, which gives thin clients **real-time access to games** from the Cloud.

I hope you enjoy reading this!

Pascal Adam

content

the real-time Cloud
in a flash

cloud and mobile cloud: the same path to real time

by Gilles Deghilage

After recently reading a post by **Alan Quayle** on the « Realtime Cloud », I thought it might be a good idea to give a general overview of the various aspects of this new offshoot of the Cloud.
Put simply, the real-time Cloud is a high-performance **cloud infrastructure** that supports **real-time services** and **APIs** for any device connected to the Web.

agile, fast and adaptable

Before diving into the heart of the matter, I'd like to underline that the Cloud notably aims to improve the **agility, speed and adaptability of processes** in a distributed, evolving and collaborative world where **efficient communication** is crucial for innovation.

With this in mind, I've outlined **four different points of view** that are interrelated, complementary and essential to building the real-time Cloud.

the "network" point of view

Network quality, the **backbone** of any digital communications, is a network's capacity to deliver maximum **bandwidth**, minimal **lag** and optimal SLAs. It is crucial for efficient data exchange between any number of terminals located at any distance from each other. These are our core goals and the main **advantage of the Cloud**, and I won't add anything further.

the "infrastructure" point of view

Based on increasingly sophisticated **virtualization** platforms and hypervisors, the infrastructure portion runs on **physical layers** such as servers and physical hard disks. With years of **performance management** experience behind their development, the capacity of these layers can be increased or decreased depending on need. In some cases, they may be powerful enough to process data in real time. Specifications of these layers should be set to meet the target performance for the type of process being set up.

In-memory analytics may also be used to provide faster database transactions. SAP has provided one example of this by introducing HANA and recently upgrading its ERP suite with this technology. With in-memory, **database transactions are much faster**, since this technology does not need to access physical disks. AWS also released an option to combine EC2 Cloud services with high-memory clusters using in-memory analytics to power high-performance applications.

Lastly, the virtualization portion needs to offer maximum performance, both in terms of system overhead and **efficient I/O management**. It also has to provide optimal **interoperability with the outside world**, which may include several different cloud types.

the “business processes” point of view

Whether it’s in a **collaborative context shared** by several industrial companies working on the same project – as is often the case in the automotive and aeronautics sectors – or in a f**inancial decision-making context** based on risk assessment or industrial management, data transfer speeds are essential to ensuring **high-quality business processes** for individual sites and their interactions.

The APIs needed for data transfer also need to be fast, efficient and able to find the best paths through the network to avoid any delay in processing data.

“ the Cloud notably aims to improve the agility, speed and adaptability of processes in a distributed, evolving and collaborative world where efficient communication is crucial for innovation ”

focus

the “mobility” point of view

The arrival of **4G LTE** will expand some professional uses since it will **increase bandwidth** and significantly **reduce lag** (in theory, 150 Mb/s and 20 ms of lag). With this new technology (is this the real birth of the mobile Cloud?), connected devices will help expand the workplace by offering **complete access to all business services** combined with **optimal comfort**.

The arrival of 4G LTE will expand some professional uses since it will increase bandwidth and significantly reduce lag.

worth knowing

Connected devices need to run on a real-time cloud platform equipped with the latest technology such as **HTLM5, Node.js** and **NoSQL**. One of the innovations made possible by this technology is discussed in an article on the first Telco PaaS API developed by Voxea Labs and Joyent. Telco can now present Telco APIs to developers in order to build Mobile VoIP services to go along with IMS solutions and new real-time communication technology using Web-RTC which is the topic of our next article.

keyword: real time

To wrap things up, the technology needed for innovative uses powered by real-time services is already or will soon be in place for both the Cloud and the mobile Cloud.

In addition to WebRTC, one of these new uses is cloud gaming, which needs maximum bandwidth and minimal lag. We’ll take a closer look at cloud gaming later in this blog book.

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http://oran.ge/15OiAz4

#API, #bandwidth, #in-memory analytics, #lag, #Real-Time Cloud, #Iaas

WebRTC: the new standard for real-time communication in the Cloud?

by Jamil Chawki

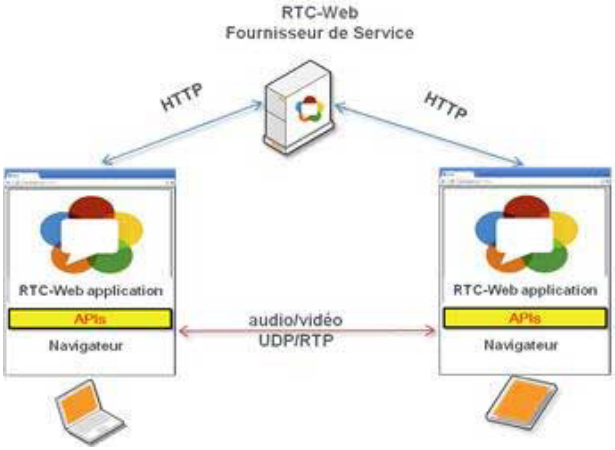
The Cloud covers most **IT applications** ranging from services in SaaS to infrastructure in IaaS. Integrating **Communication as a Service (CaaS)** into the mix means providing **real-time data processing** for **audio and video communication** from browser to browser.

a new standard under development

Developed by the IETF and the W3C, this new standard will make it easier to integrate **real-time audio and video communication services** (Web Real-Time Communication) into browsers and applications running on the Cloud with no plugins required on the user side.

Major players in cloud computing signaled the need for a new CaaS standard over a year ago. This is now being developed by two organizations: IETF and W3C. Called **RTCWeb** by IETF and **WebRTC** by W3C, the new standard will establish the protocol and APIs needed for audio and video communication between **users**.

chart showing the WebRTC architecture



“ Integrating Communication as a Service (CaaS) into the mix means providing real-time data processing for audio and video communication from browser to browser ”

focus

how it works

A WebRTC client and 2 APIs, called Media Stream and Peer Connection, are built into the browser.

- the WebRTC client, in HTML5/JavaScript, **processes the call** (HTTP/WebSocket) between the browser and the WebRTC server
- after login, **media is transmitted** on the Peer Connection API (RTP/UDP)
- the Media Stream API then **manages (In/Out)** the various interfaces on the terminal (microphones, speakers, webcams, etc.)

beta versions already available

The WebRTC standard will provide **fast access** to communication services **in an HTML5 browser**.
It is seen as a new way to provide communication services in the Cloud for various fixed and mobile devices. It will also make installation and updates much easier.

The WebRTC standard will provide fast access to communication services in an HTML5 browser.

While the standard has yet to be finalized (coding, NAT traversal, interconnection, etc.), most **web browsers** are starting to offer **beta versions** for use with their technology.

worth knowing

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http://oran.ge/1bE8aGY

#CaaS, #communication as a service, #HTML5, #IETF, #W3C, #WebRTC

cloud gaming, MMO* as a Service?

by Gilles Deghilage

Is a bright future in store for **cloud gaming**? (**real-time video games** accessed in the Cloud through thin clients) Or is it just another marketing gimmick pushed on us by graphics card manufacturers in their quest to differentiate their brand through **cloud washing**?

It's true that online gaming is a highly dynamic market. But cloud gaming offers extra advantages by helping us **avoid investing** every six months in next generation graphics cards and game consoles. Is the **video game** world about to go through the same revolution that transformed the music industry

a major trend

It's not yet a given, but the dominant trend is clearly towards an expansion of this model. As with other new uses for the Cloud, this trend has largely been spearheaded by the general public.

Many companies, such as Gaikai, G-Cluster, Nvidia, Onlive, OTOY, StreamMyGame and T5-Labs are now working in cloud gaming. They offer services designed for thin clients on PC/tablets/smartphones and even TVs through a set-top box. Some of the giants, like Sony, have also shown some interest in cloud gaming.

gaming and graphics performance: coding and decoding

Most of the current MMO (Wow, Swtor, Guild Wars 2...) rely on increasingly sophisticated 3D graphics engines running on a **DirectX** or **OpenGL** layer.

Two solutions are available to run these kinds of games from the Cloud: sending graphic commands (which use fewer network resources) to a fat client that will then render the graphics, or running the games on a high-performance server that encodes the display and provides video streaming to thin clients.

- **graphic rendering on devices**

OpenGL is adapted to thin client terminals, such as smartphones or tablets, by using the graphics libraries on these devices. In addition, **HTML5**, which will soon be the standard for HTML, offers graphics capabilities (**WebGL** based on OpenGL ES2.0) that can run an OpenGL subset from a web page's source code.

“ lag, bandwidth and rendering will remain three of the crucial needs in the digital landscape on a more or less long-term basis, and for all devices ”

focus

In the short term, it's hard to see how we will manage to load our smartphones and tablets with the equivalent of the latest r**esource-intensive graphics cards** that often cost more than a PC. For the foreseeable future, hard gamers aiming to have fun with their millimeter-thin tablets will have to compromise, though some of the newest tablet technology is nothing short of astounding: take the developments based on the Unreal Engine 3 **gaming engine**, for example.

- **graphics rendering on the server and H.264 coding**

The most popular method used here is to send settings user commands (moves, zooms, etc.) to the server running the game. Each image rendered on the server is **encoded** and sent to the remote device through a **video stream**.

The device's **refresh rate** will then depend on factors like the performance of its **H.264** decoder, **network lag** and **bandwidth**, as explained here.

Most of the current MMO (Wow, Swtor, Guild Wars 2, etc.) rely on increasingly sophisticated 3D graphics engines running on a DirectX or OpenGL layer.

worth knowing

beyond hard gamers

Other types of games are available online:

- on **social networks** like Facebook, for example
- on networks created for **gaming consoles**
- **Serious Games** within companies

Although the needs of games, access networks and devices can vary greatly for each use and user, **lag, bandwidth** and **rendering** will remain three of the crucial needs in the digital landscape on a more or less long-term basis and **for all devices**.

In addition, this technology also has plenty of applications in the industrial world: it can be used whenever sophisticated visualization tools are needed **for analyzing complex datasets** compiled by **simulations** or **statistics** initiatives.

While it is **critical for optimizing user experience**, real-time communications is not always a priority for operators. And yet, future business models will need to incorporate real-time communications on the technical level in order for it to become the **standard** for online gaming.

* MMO or MMOG: Massively Multiplayer Online Game, meaning a video game capable of supporting a large number of users playing simultaneously on an online network.

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http://bit.ly/mmo-cloudgaming

#cloud gaming, #MMO, #network gaming, #lag, #bandwidth, #graphic card

about the authors

Gilles Deghilage

Passionate about physics and specializing in numerical simulations, I started my career with 3D simulations of turbulent flows and spatial trajectory. To learn more about the parallel computing architecture used in computational science, I worked with hardware manufacturers in the US and Europe, where I saw firsthand the development of grid computing and cloud computing. I am a technical and commercial expert in cloud solutions, currently focusing on Cloud Business Development by working with my network in the IT world.

read his bio online

Jamil Chawki

Since 2008, I have coordinated cloud standardization activities at Orange Labs. I worked for 10 years developing optic and Internet networks at France Telecom, taking part in 2006 in the development of SaaS activities for web 2.0 companies. I also managed a telecom operator in Lebanon, where I introduced an online billing service in 2001. I'm currently head of the work group on cloud standardization at UIT-T and ISO IEC JTC1.

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