

# Cloud Computing

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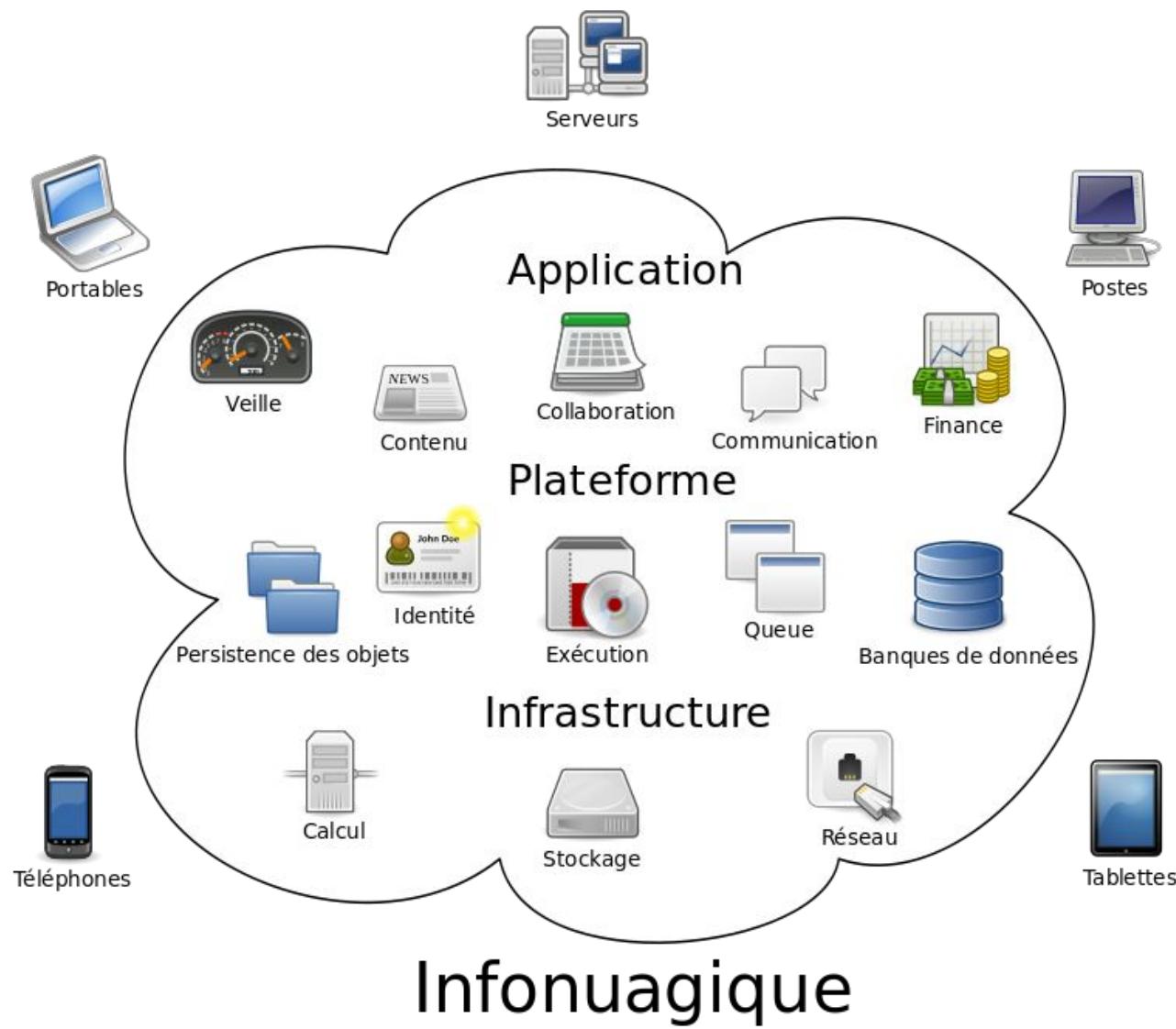
# Échange avec les élèves

Qu'est-ce que  
le Cloud Computing ?

# Définition québécoise

**infonuagique** \ɛ̃.fo.ny.a.ʒik\ ou \ɛ̃.fo.nya.ʒik\ féminin

1. (Canada) (Néologisme) (Internet) Informatique en nuage. Utilisation de la mémoire et des capacités de calcul de différents ordinateurs et serveurs reliés par un réseau, parfois répartis dans le monde entier.



# The NIST definition of Cloud Computing

Cloud computing is a model for enabling **ubiquitous, convenient, on-demand** network access to a shared pool of configurable **computing resources** (e.g., networks, servers, storage, applications, and services) that can be **rapidly provisioned** and released with minimal management effort or service provider interaction. This cloud model is composed of **five essential characteristics, three service models, and four deployment models.**

# The NIST definition of Cloud Computing

## 5 essential characteristics

On-demand self-service

Broad network access

Resource pooling

Rapid elasticity

Measured service

# The NIST definition of Cloud Computing

## 3 service models

Software as a Service (SaaS)

Platform as a Service (PaaS)

Infrastructure as a Service (IaaS)

# The NIST definition of Cloud Computing

## 4 deployment models

Private cloud

Community cloud

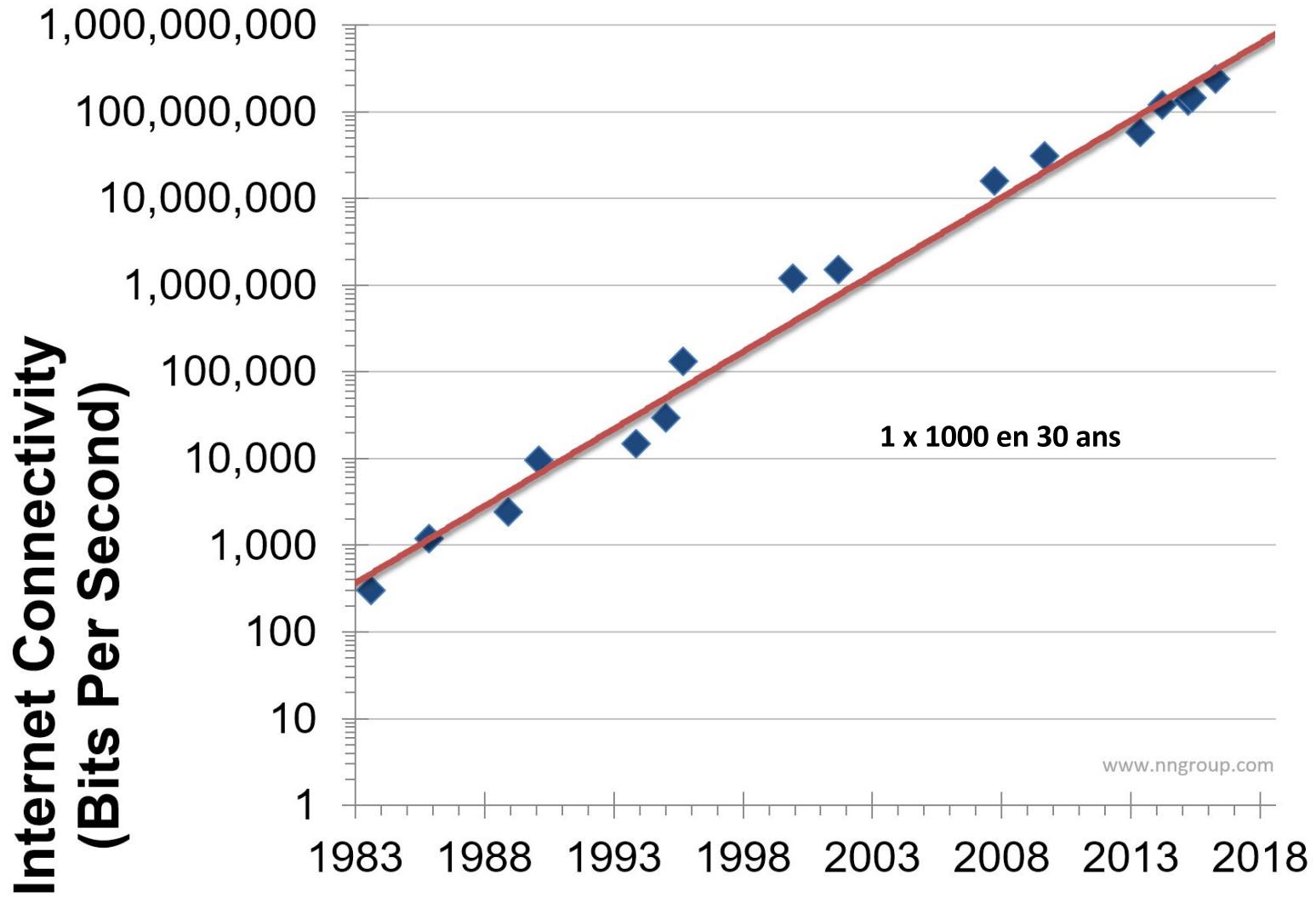
Public cloud

Hybrid cloud

# Les origines du Cloud Computing

Quels furent les facteurs de  
son émergence ?

# La croissance de la bande passante



# Apport d'une grande bande passante

(in NIST 5 essential characteristics)

On-demand self-service

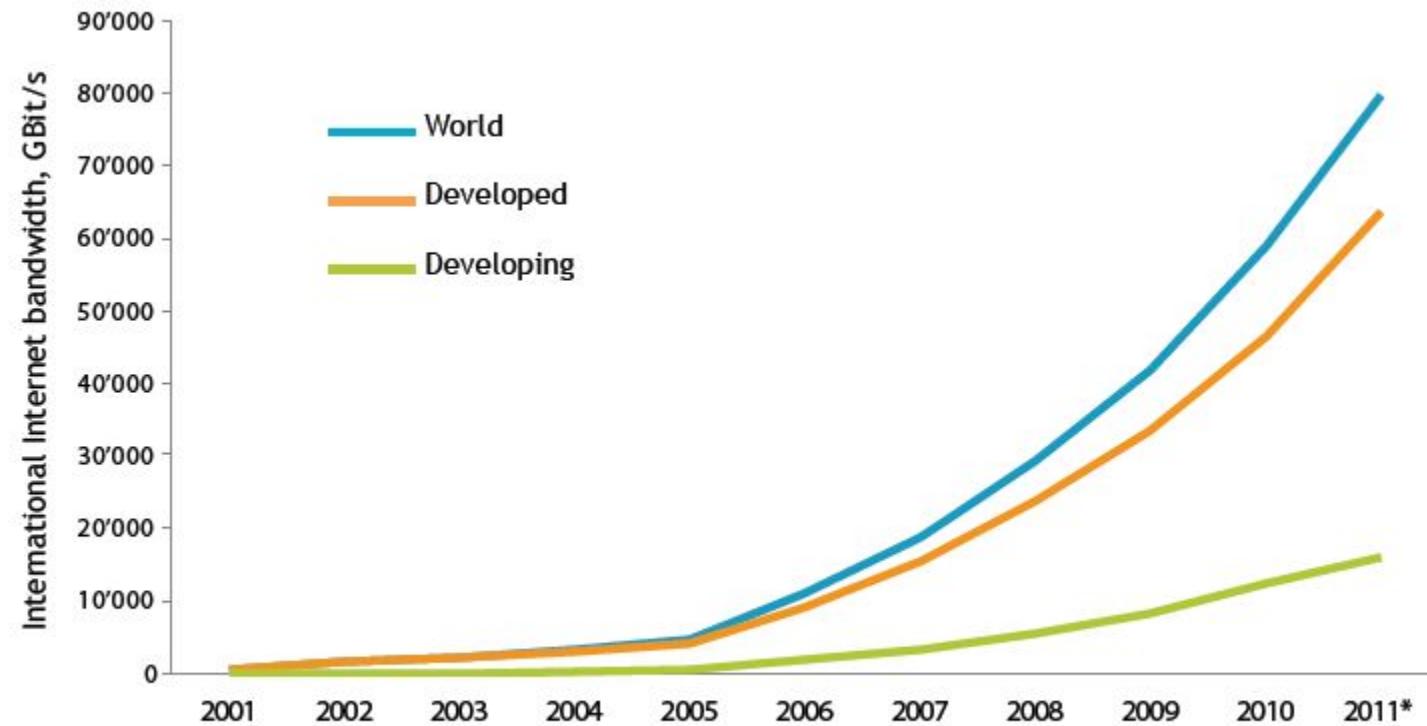
**Broad network access**

Resource pooling

Rapid elasticity

Measured service

# Évolution de la bande passante globale dans le monde



Note: \* Estimate

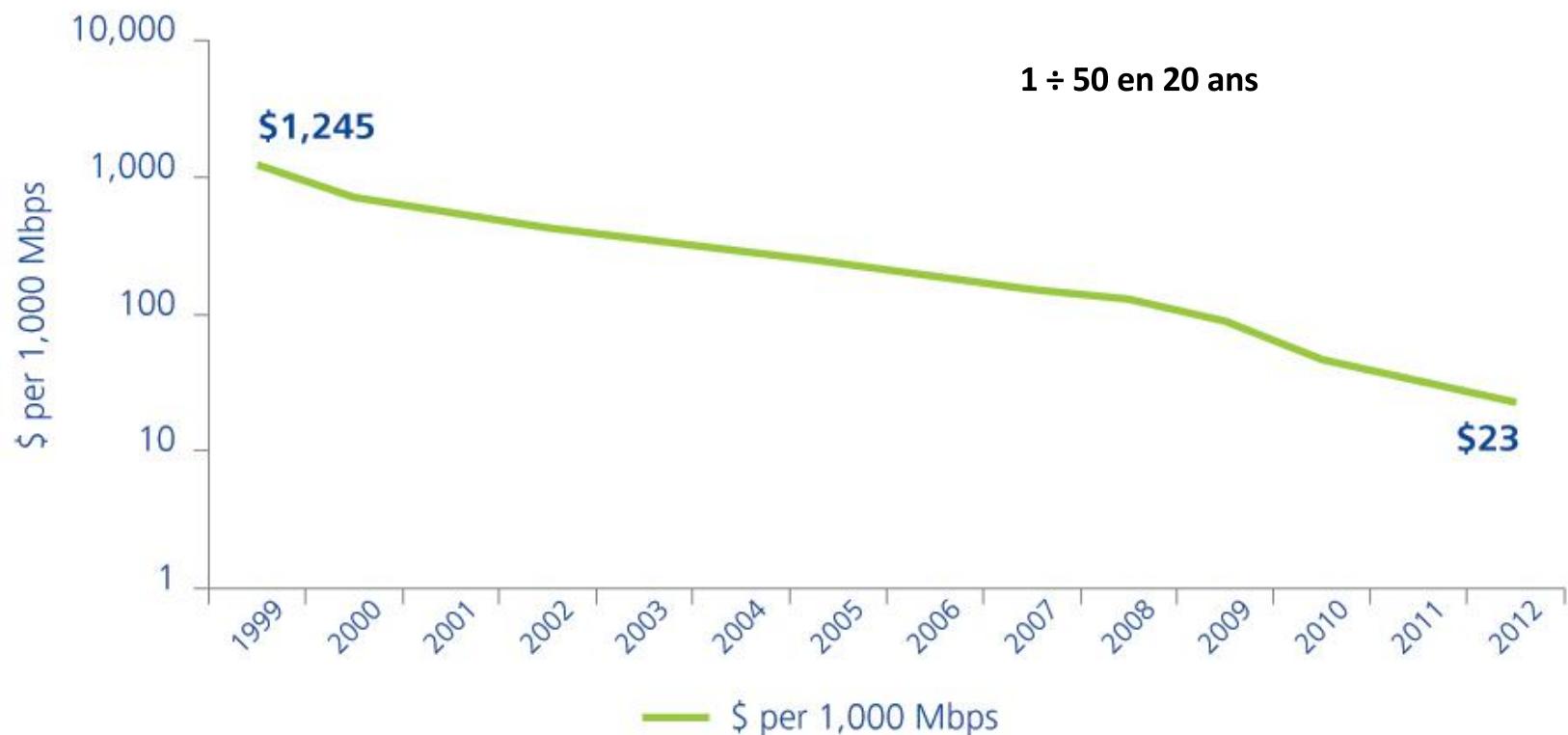
Source: ITU World Telecommunication/ICT Indicators database

Annual global IP traffic ... will reach **2.3 ZB\*** per year by 2020 (\* 1 ZB =  $10^9$  TB)

<http://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/vni-hyperconnectivity-wp.html>

# La décroissance du coût du trafic sur Internet

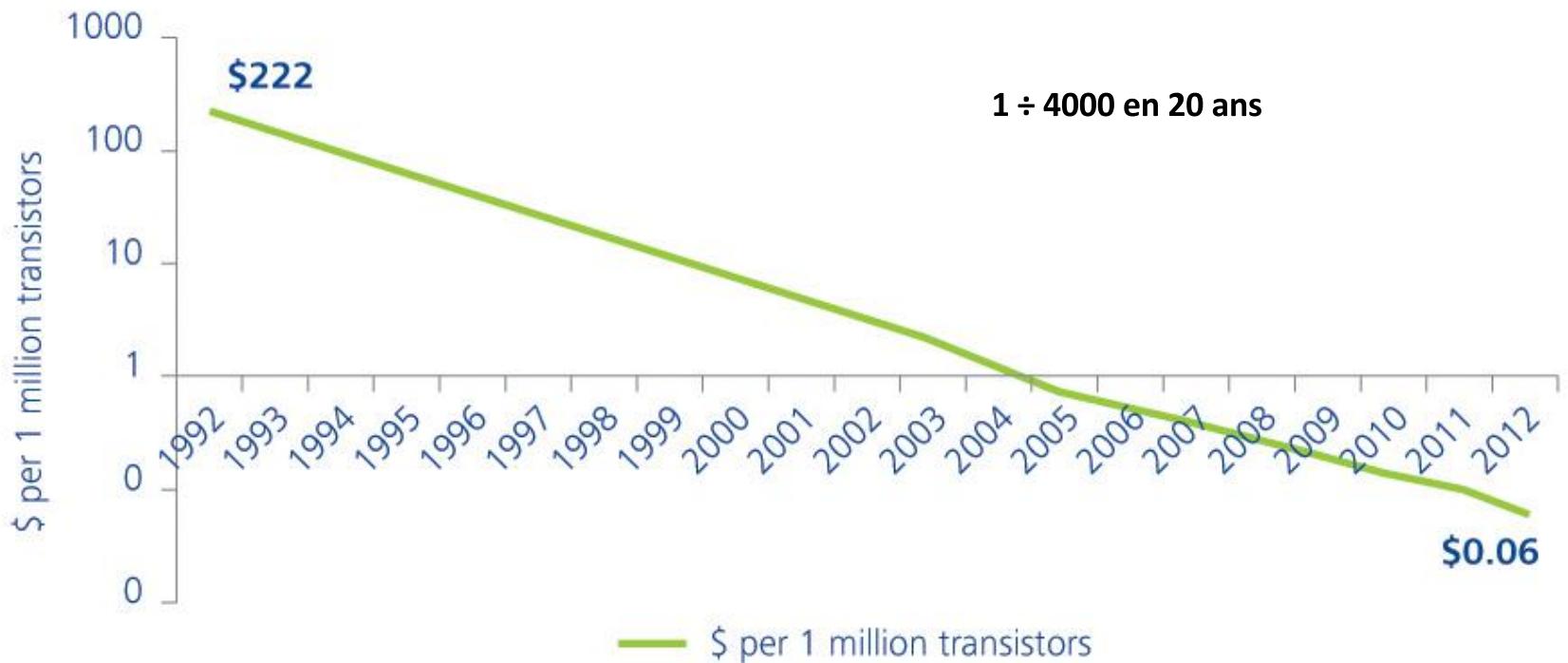
Figure 3. Bandwidth cost-performance (1999–2012)



Source: Leading technology research vendor

# La décroissance du coût du CPU

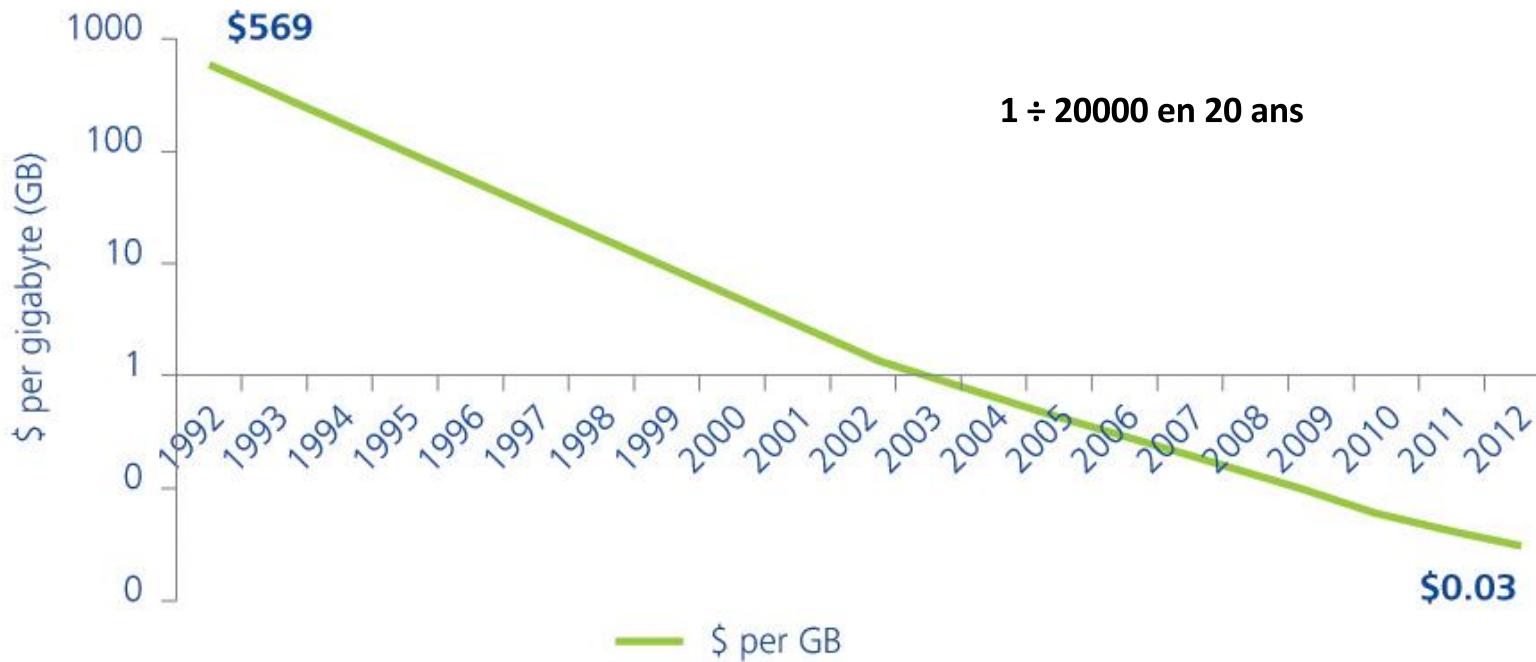
Figure 1. Computing cost-performance (1992–2012)



Source: Leading technology research vendor

# La décroissance du coût du stockage

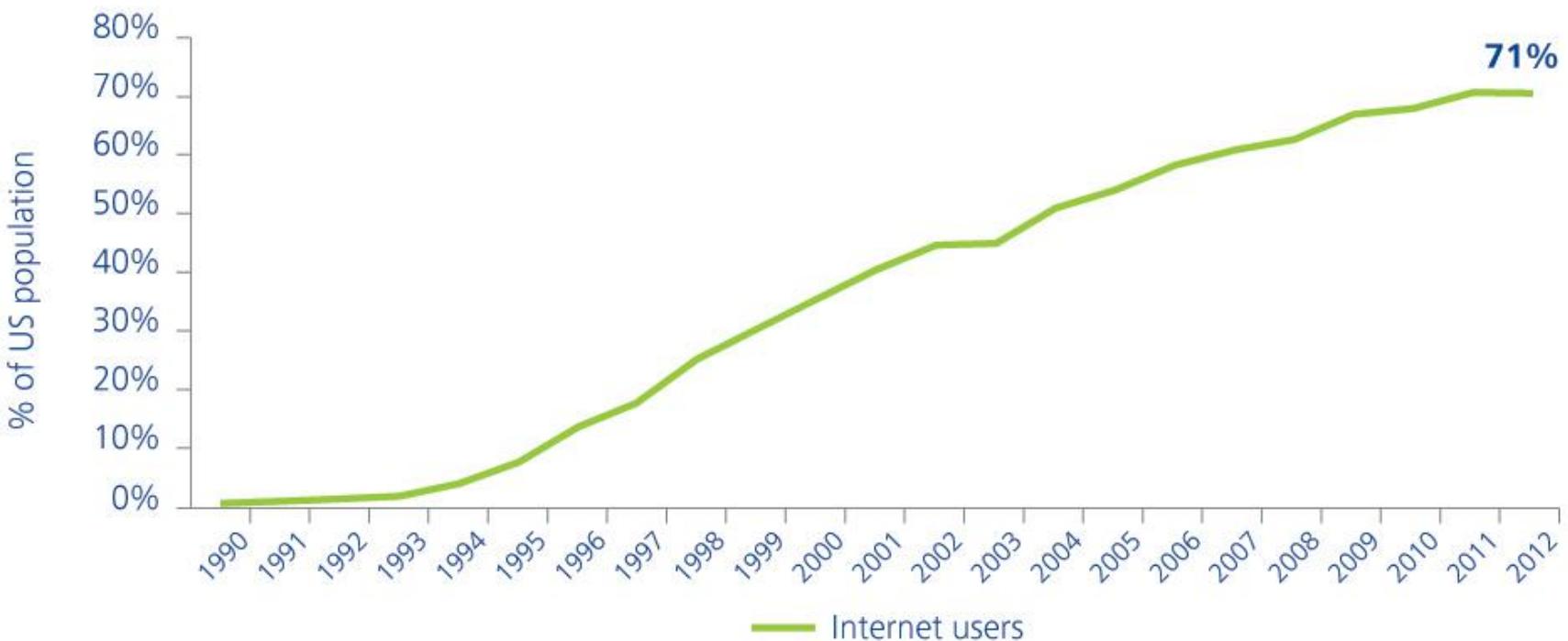
Figure 2. Storage cost-performance (1992–2012)



Source: Leading technology research vendor

# L'accès à Internet banalisé

Figure 4. Internet users (1990–2012)



Source: comScore, Deloitte analysis

# La généralisation de la virtualisation

- 1960 → 2000 : IBM de CP/CMS à z/VM
- 1979 : chroot (Unix)
- 1982 : chroot (BSD)
- **1999** : VMware (virtualisation pour x86)
- 2000 : FreeBSD Jail (\*BSD)
- **2003** : Xen (Linux)
- 2005 : Solaris Zones (Solaris et dérivés)
- **2005/2006** : Intel-VT et AMD-V (virtualisation matérielle)
- 2006 : OpenVZ (Linux)
- **2007** : KVM (Linux)
- 2008 : LxC (Linux)
- 2008 : Hyper-V (Microsoft)
- **2013** : Docker

# Apports de la virtualisation

## (in NIST 5 essential characteristics)

On-demand self-service

Broad network access

**Resource pooling**

**Rapid elasticity**

Measured service

# Avantages du Cloud

Ne plus s'occuper de son infrastructure  
(se concentrer sur son cœur de métier)

Ne plus nécessiter de personnel dédié

Bénéficier de ressources adaptables à ses besoins

Rapidité de mise en œuvre

Ne plus craindre de pertes de données

# **Les craintes du Cloud**

**Sécurité (exposition des données sur le Net)**

**Confidentialité (intégrité du prestataire)**

**Localisation des données**

**(type de loi applicable => cf Patriot Act)**

**Prochaine loi européenne : Règlement Général de Protection des Données**

**<http://data.consilium.europa.eu/doc/document/ST-5455-2016-INIT/fr/pdf>**

**(notamment : responsabilités des entreprises et des prestataires)**

# Bases du cloud - IaaS



*Datacenter*



*Serveurs*

*Virtualisation*



# The NIST definition of Cloud Computing

## **service model: IaaS**

The capability provided to the consumer is to provision **processing, storage, networks**, and other fundamental computing resources where the consumer is able to deploy and run arbitrary software, which can include operating systems and applications.

The consumer does not manage or control the underlying cloud infrastructure but has control over operating systems, storage, and deployed applications; and possibly limited control of select networking components (e.g., host firewalls).

# Naissance du IaaS : 2006

Amazon

d'une infrastructure pour la vente en ligne

à



# AWS : une infrastructure mondiale



## Region & Number of Availability Zones

AWS GovCloud	(2)	Europe
US West		Ireland (3), Frankfurt (2), London (2)
Oregon (3), Northern California (3)		
US East		Asia Pacific
Northern Virginia (5), Ohio (3)		Singapore (2), Sydney (3), Tokyo (3), Seoul (2), Mumbai (2)
Canada		China
Central (2)		Beijing (2)
South America		
São Paulo (3)		



## New Region (coming soon)

Paris

Ningxia

# AWS : une offre de services pléthorique

The screenshot shows the AWS Management Console homepage. At the top, there's a navigation bar with links for Services, Resource Groups, Notifications (with a bell icon), Dominique Rodrigues (user profile), Ireland (region dropdown), and Support. Below the navigation is a search bar with placeholder text "Find a service by name (for example, EC2, S3, Elastic Beanstalk)".  
  
The main area is titled "AWS services" and contains a grid of service icons and names:

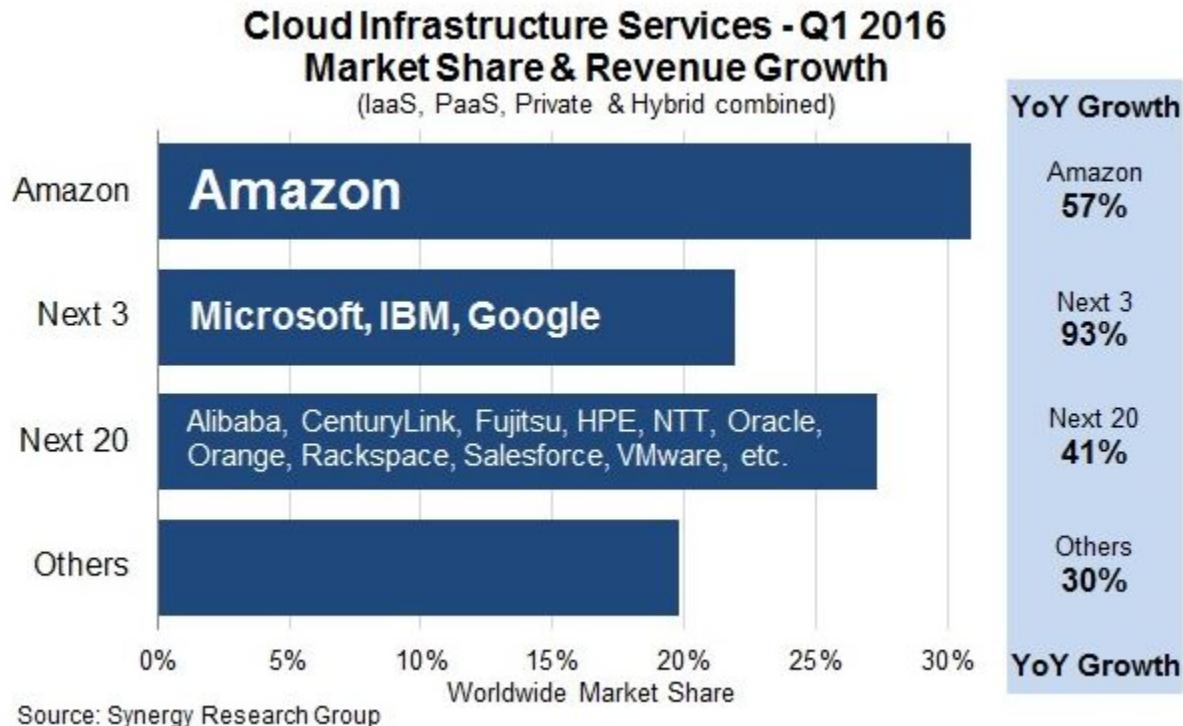
- Compute**: EC2, EC2 Container Service, Lightsail, Elastic Beanstalk, Lambda, Batch
- Storage**: S3, EFS, Glacier, Storage Gateway
- Database**: RDS, DynamoDB, ElastiCache, Redshift
- Networking & Content Delivery**: VPC, CloudFront, Direct Connect, Route 53
- Developer Tools**: CodeCommit, CodeBuild, CodeDeploy, CodePipeline, X-Ray
- Management Tools**: CloudWatch, CloudFormation, CloudTrail, Config, OpsWorks, Service Catalog, Trusted Advisor, Managed Services
- Security, Identity & Compliance**: IAM, Inspector, Certificate Manager, Directory Service, WAF & Shield, Compliance Reports
- Internet of Things**: AWS IoT
- Contact Center**: Amazon Connect
- Game Development**: Amazon GameLift
- Mobile Services**: Mobile Hub, Cognito, Device Farm, Mobile Analytics, Pinpoint
- Application Services**: Step Functions, SWF, API Gateway, Elastic Transcoder
- Messaging**: Simple Queue Service, Simple Notification Service

  
On the right side, there are two sections:

- Helpful tips**: Manage your costs (Get real-time billing alerts based on your cost and usage budgets. [Start now](#)) and Create an organization (Use AWS Organizations for policy-based management of multiple AWS accounts. [Start now](#))
- What's new?**: Announcing Amazon Chime (Learn how this new communication service makes it easy for employees to communicate with voice, video and chat. [Learn more](#)) and Introducing Elastic Volumes for Amazon EBS (Learn how this new capability allows you to modify configuration of live volumes with a simple API call or a few console clicks. [Learn more](#))

At the bottom right, there are links for "See all", "AWS Marketplace", "Discover, procure, and deploy popular software products that run on AWS.", and "Have feedback?".

# AWS : leader du marché IaaS *et des challengers en forte croissance*



# Azure : la riposte Microsoft

The screenshot shows the Microsoft Azure portal interface. At the top, there's a browser header with the title "Tableau de bord" and the URL "https://portal.azure.com/#dashboard/private/1e42acc0-0bcc-4471-ab5f-c". To the right of the URL is a user profile icon labeled "Dominique". Below the header is the Microsoft Azure logo and a search bar with the placeholder "Search resources". To the right of the search bar are several icons: a bell with a "7", a gear, a smiley face, a question mark, and a user profile icon.

The main area is titled "Tableau de bord" and includes the following sections:

- All resources ALL SUBSCRIPTIONS**: A section showing "No resources to display".
- Service health MY RESOURCES**: A section showing a world map with a "refresh" icon.
- cory1**: A section with a dark gray box containing the word "Deleted" and a small monitor icon.
- Marketplace**: A section with a blue shopping bag icon.
- Help + support**: A section with a blue person icon.

On the left side, there's a vertical navigation menu with the following items:

- New**
- Dashboard**
- Resource groups**
- All resources**
- Recent**
- App Services**
- Virtual machines**
- SQL databases**
- Security Center**
- Subscriptions**
- Azure Active Directory**
- Monitor**
- Billing**
- Help + support**
- Advisor**
- More services >**

# Azure : une stratégie “market place”

Sécurisé | https://portal.azure.com/#blade/Microsoft\_Azure\_Marketplace/GalleryFeat

Microsoft Azure New > Compute > Marketplace > Compute

Marketplace

Compute

Everything

Compute

Networking

Storage

Web + Mobile

Databases

Intelligence + analytics

Internet of Things

Enterprise Integration

Security + Identity

Developer tools

Monitoring + Management

Add-ons

Containers

Blockchain

Filter

Search Compute

Windows Server

Red Hat Enterprise Linux

Ubuntu Server

SQL Server 2016 SP1 Enterprise on Microsoft

Virtual machine scale set

SharePoint Server 2016 Trial

Microsoft

RedHat

Canonical

Microsoft

Microsoft

More

Virtual Machine Images

Linux Data Science Virtual Machine

Citrix XenApp 7.13 Trial

SQL Server vNext on Red Hat

Veeam Cloud Connect for the Veeam

Dynamics AX 2012 R3 (preview)

VoipNow 3.6.0

Microsoft

Citrix

Microsoft

Veeam

Microsoft

4PSA

More

What's new

VARNISH PLUS

More

Compute

# GCE : la concurrence de Google

The screenshot shows the Google Cloud Platform (GCP) dashboard for the project "kuberlearn".

**Left Sidebar (Navigation):**

- Accueil
- API: Gestionnaire d'API, Facturation, Cloud Launcher, Assistance, IAM et admin, CALCUL, App Engine, Compute Engine, Container Engine, Cloud Functions, Réseau.
- STOCKAGE: Bigtable, SQL, Datastore, Stockage.

**Middle Section (Tableau de Bord):**

**Informations sur le projet:** kuberlearn, ID de projet : kuberlearn, #23191206800.

**API:** API Requêtes (requêtes par seconde) graph showing a sharp spike from 0,05 to approximately 0,45 at 18 avr. 05:07.

**Autres cartes (Cards):**

- État de Google Cloud Platform:** Fonctionnement normal de tous les services. Accéder à Cloud Status Dashboard.
- Facturation:** 7,81 €. Coût approximatif du mois à ce jour. Afficher les frais détaillés.
- Error Reporting:** Aucun signe d'erreur. Avez-vous configuré Error Reporting ? Configurer Error Reporting.

**Bottom Section (Premiers pas):**

Premiers pas avec Stackdriver Trace.

# Digital Ocean : le petit poucet qui monte

The screenshot shows the DigitalOcean 'Create Droplets' interface. At the top, there's a navigation bar with links for 'Droplets', 'Images', 'Networking', 'Monitoring', 'API', and 'Support'. On the right side of the header is a user profile icon for 'Dominique'.

## Create Droplets

Choose an image ?

[Distributions](#) [One-click apps](#)

Ubuntu Select version	FreeBSD Select version	Fedora Select version	Debian 8.7 x64 Select version	CoreOS Select version	CentOS Select version
--------------------------	---------------------------	--------------------------	-------------------------------------	--------------------------	--------------------------

### Choose a size

\$ 5 /mo \$0.007/hour 512 MB / 1 CPU 20 GB SSD disk 1000 GB transfer	\$ 10 /mo \$0.015/hour 1 GB / 1 CPU 30 GB SSD disk 2 TB transfer	\$ 20 /mo \$0.030/hour 2 GB / 2 CPUs 40 GB SSD disk 3 TB transfer	\$ 40 /mo \$0.060/hour 4 GB / 2 CPUs 60 GB SSD disk 4 TB transfer	\$ 80 /mo \$0.119/hour 8 GB / 4 CPUs 80 GB SSD disk 5 TB transfer	\$ 160 /mo \$0.238/hour 16 GB / 8 CPUs 160 GB SSD disk 6 TB transfer
----------------------------------------------------------------------------------	------------------------------------------------------------------------------	-------------------------------------------------------------------------------	-------------------------------------------------------------------------------	-------------------------------------------------------------------------------	----------------------------------------------------------------------------------

# Les projets Open Source pour le IaaS

CloudStack

OpenNebula

OpenStack

# The NIST definition of Cloud Computing

## **service model: PaaS**

The capability provided to the consumer is **to deploy** onto the cloud infrastructure consumer-created or acquired **applications** created using programming languages, libraries, services, and tools supported by the provider.

**The consumer does not manage or control the underlying cloud infrastructure** including network, servers, operating systems, or storage, but has control over the deployed applications and possibly configuration settings for the application-hosting environment.

# Quelques acteurs du PaaS

Cloud Foundry (VMware)

OpenShift (Redhat)

Heroku (Salesforce)

# Cloud Foundry

The screenshot shows the Cloud Foundry website homepage. At the top, there's a navigation bar with links for "Choose Certified Platform", "Become a Member", and "Blog". Below that is a secondary navigation bar with links for "Platform", "Get Started", "Community", "Case Studies", "Events", "Newsroom", and "About Us". A third navigation bar at the bottom has links for "About", "Projects", "Containers", "Multi-Cloud", and "Security". The main content area features a large section titled "Developer training and certification" with a sub-section about businesses needing skilled developers and a "Learn More" button. There's also a photo of people working together.

Cloud Foundry - Indu

Sécurisé | https://www.cloudfoundry.org

Choose Certified Platform   Become a Member   Blog

CLOUD FOUNDRY Platform Get Started Community Case Studies Events Newsroom About Us

About Projects Containers Multi-Cloud Security

01 –

## Developer training and certification

Businesses around the world need more skilled developers. Our training and certification program gives developers the skills they need to create open source cloud services and applications. Update your cloud-native skills to deliver world-class apps. Get [Cloud Foundry trained and certified](#).

Learn More →

EVENT TRAINING RESEARCH

# Cloud Foundry : moteur de Predix (GE)

The screenshot shows a web browser window for the 'Cloud-based Platform' at <https://www.predix.io>. The page title is 'PREDIX Developer Network'. The navigation bar includes links for CATALOG, DOCUMENTATION, RESOURCES, COMMUNITY, SUPPORT, SIGN IN, and SIGN UP. A 'Feedback' button is located on the right side. The main content area features a heading 'How Predix Works' and a subtext: 'Predix helps you develop, deploy, and operate industrial apps at the edge and in the cloud. Securely connect machines, data, and analytics to improve operational efficiency.' Below this is a 'Get the Predix Whitepaper' button. The central visual is a diagram illustrating the Predix architecture: a central hexagonal hub containing a 3D grid of blue and white cubes, connected by a network of lines to a sun icon on the left and a line graph icon on the right.

# OpenShift

The screenshot shows the official website for Red Hat OpenShift Container Platform 3.5. At the top, a banner reads "Announcing Red Hat OpenShift Container Platform 3.5". Below the banner is a navigation bar with links for MENU, OPENSHIFT (with a red logo), FEATURES, PRICING, CONTAINER PLATFORM, MORE, MY ACCOUNT, and a prominent red "SIGN UP FOR FREE" button. The main content area features a dark background with green abstract shapes. In the center, the Red Hat OpenShift Online logo is displayed. Below the logo, the tagline "Develop, Host, and Scale Apps in the Cloud" is written in white. A descriptive paragraph follows: "Red Hat's public cloud application development and hosting platform automates the provisioning, management and scaling of applications so that you can focus on writing the code for your business, startup, or next big idea." At the bottom of the main section, there is a callout for "OpenShift Online (Next Gen) Developer Preview" with a link to sign up.



Self-Service, On-Demand Application Stacks

Develop your application with the language and tools you want.

# OpenShift : mise en avant des conteneurs

The screenshot shows the official website for Red Hat OpenShift Container Platform 3.5. At the top, a banner reads "Announcing Red Hat OpenShift Container Platform 3.5". The main header features the "OPENSHIFT" logo with a red circular icon. Below the header, a large background image of a train station platform with a "Orange Line To Convention Center" sign is overlaid with the "RED HAT OPENSHIFT Container Platform" logo. The central text "RED HAT OPENSHIFT CONTAINER PLATFORM" is displayed in large, white, sans-serif letters. A subtext below it states: "The industry's most secure and comprehensive enterprise-grade container platform based on industry standards, Docker and Kubernetes." A prominent red "TRY IT FOR FREE" button is located in the lower-left area of the main image. The footer contains several navigation links: "OVERVIEW" (with a cloud icon), "FEATURES" (with a gear icon), "CUSTOMERS" (with a lightning bolt icon), "CONTACT" (with a speech bubble icon), "RESOURCES" (with a folder icon), and another "TRY IT FOR FREE" button. The URL in the browser bar is <https://www.openshift.com/container-platform/>.

# Heroku (le leader)

The screenshot shows the Heroku website homepage. At the top, there's a navigation bar with links for Products, Elements, Pricing, Documentation, Support, and More. A search bar and login/signup buttons are also present. The main visual is a large, stylized illustration of a smartphone and laptop displaying code, set against a background of clouds and a circuit board. Below this, there's a section titled "ENTERPRISE" with the sub-headline "Turn your company into an apps company". It includes a brief description of how Heroku helps companies build, manage, and deploy apps at scale. A "SIGN UP FOR FREE" button and a link to "Explore Heroku Enterprise" are included. Further down, there's a row of developer tool icons (JS, Node.js, Python, etc.) and a large purple banner with the text "Get straight to building apps" and a subtext about avoiding infrastructure complexity.

Cloud Application Plat x

Heroku, Inc. [US] | <https://www.heroku.com>

HEROKU Products Elements Pricing Documentation Support More

Log in or Sign up

ENTERPRISE

Turn your company into an apps company

Today every company needs apps to engage their customers and run their businesses. Step up your ability to build, manage, and deploy great apps at scale with Heroku.

SIGN UP FOR FREE

Explore Heroku Enterprise

JS Node.js Python Ruby Java .NET

Get straight to building apps

Setting up, operating and maintaining your own platform is not where the race is won. Avoid the risk and complexity, and dedicate your energy to what really matters: building great apps.

Build apps ...not infrastructure

# Heroku packs

Sécurisé | https://elements.heroku.com/buildpacks

HEROKU Products Elements Pricing Documentation Support More Search Elements Log in or Sign up

## Heroku Buildpacks

Buildpacks automate the build processes for your preferred languages and frameworks.

Add-ons Buttons Buildpacks

### Officially Supported Buildpacks ([What is Officially Supported?](#))

 Node.js Buildpack	 Python Buildpack	 PHP Buildpack	 Ruby Buildpack	 Java Buildpack
 Go Buildpack	 Gradle Buildpack	 Scala Buildpack	 Clojure Buildpack	

# The NIST definition of Cloud Computing

## **service model: SaaS**

The capability provided to the consumer is to **use the provider's applications running on a cloud infrastructure**.

The applications are **accessible from various client devices** through either a thin client interface, **such as a web browser** (e.g., web-based email), or a program interface.

The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, storage, or even individual application capabilities, with the possible exception of limited user-specific application configuration settings.

# **Exemples de SaaS ?**

**(tout le monde en connaît)**

# Le pionnier : Salesforce

The screenshot shows the official website of Salesforce (<https://www.salesforce.com/fr/?ir=1>). The header includes the Salesforce logo, a phone number (0 800 908 534), contact links ('NOUS CONTACTER' and 'CONNEXION CLIENT'), and a search bar. The main navigation menu features 'PRODUITS', 'SOLUTIONS', 'CLIENTS', 'SERVICES', 'COMMUNAUTÉ', 'ÉVÉNEMENTS', 'À PROPOS DE...', and a prominent green 'ESSAI GRATUIT' button. On the left, there's a sidebar with sections for 'NOS SOLUTIONS' (PME et start-up, par secteur d'activité) and 'NOS PRODUITS' (Ventes, Service client, Marketing, Communautés, Analytique, Développement, Internet des objets). The central area features a large image of a person interacting with a tablet displaying Salesforce dashboards. Text overlays include 'Accélérez vos ventes avec le n° 1 du CRM.', 'PLUS D'OPPORTUNITÉS. PLUS DE CROISSANCE.', 'TOUT SALESFORCE EN VIDÉO', and 'FORMULES D'ABONNEMENT'. At the bottom, a dark banner mentions 'Voici Salesforce Einstein, l'intelligence artificielle intégrée dans tous les produits Salesforce'.

# Salesforce en quelques chiffres

**1999** : création par Mark Benioff

**2004** : introduction au Nasdaq

**2014** : Salesforce est désignée par Forbes entreprise la plus innovante du monde pour la 4e année consécutive

**2017** : valorisation \$60 Md

# Google Apps : l'alternative à Office



Web Store



Google Docs



Google Drive



YouTube



Recherche Google



Gmail hors connexion



Gmail



Google Slides



Google Sheets



Desktop, formerly D...



&gt; BETA\_



VNC® Viewer for Go..



Awesome Screensh...



Zoom



Google Keep



Google Agenda



# Office365 : la contre-alternative de Microsoft

The screenshot shows the Microsoft Office 365 sign-in interface. At the top, there's a navigation bar with icons for file, home, search, and account. The main area features a large "Sign in to your account" button. Below it, the URL "Microsoft Corporation [US] | https://login.microsoftonline.com/login.srf?wa=wsignin1.0&rpsnv=4&ct=1492441147&rver=6.7.6640.0&wp=MC" is displayed. To the left of the sign-in form is a decorative graphic of a highway at sunset with several small video frames showing people using various Microsoft services like Skype and OneDrive.

**Office 365**

Work or school account

someone@example.com

Password

Keep me signed in

**Sign in**

[Can't access your account?](#)

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Terms of use   Privacy & Cookies

Microsoft

# Outlook.com : l'autre contre-alternative de Microsoft

The screenshot shows the Microsoft Outlook web interface (owa) in a browser window. The top navigation bar includes links for 'Courrier', 'Calendrier', 'Contacts', 'OneDrive', 'Tâches', 'Word', 'Excel', 'PowerPoint', 'OneNote', 'Sway', 'Skype', 'Docs.com', 'Office', 'Bing', 'MSN', and 'Flow'. Below the ribbon, there's a message list with items from Microsoft. A modal dialog box is open, prompting the user to 'Selectionnez un élément à lire' (Select an item to read). It also contains the text 'Cliquez ici pour que le premier élément de la liste soit toujours sélectionné' (Click here so that the first item in the list is always selected).

Messagerie - domrod

https://outlook.live.com/owa/

Courier Outlook

Annuller

Courrier

Calendrier

Contacts

OneDrive

Tâches

Word

Excel

PowerPoint

OneNote

Sway

Skype

Docs.com

Office

Bing

MSN

Flow

Annuler

Selectionnez un élément à lire

Cliquez ici pour que le premier élément de la liste soit toujours sélectionné

Microsoft

Mises à jour de nos conditions d'utilisation et

Votre Contrat de services et la Déclaration de confide...

28/07/2016

Microsoft

Windows Server 2016 Technical Preview 5: dé

TechNet Evaluation Center Ressources pour votre év...

23/07/2016

Microsoft

Microsoft

Microsoft

Microsoft

# Bureautique, comptabilité, CRM, ... tout devient SaaS

The screenshot shows the PayFit homepage. At the top, there's a navigation bar with links for 'COMMENT ÇA MARCHE', 'TARIFS', 'LA PAIE POUR LES NULS', 'RECRUTEMENT', 'BLOG', 'CONNEXION', and a green 'ESSAI GRATUIT' button. Below the navigation is a large banner featuring several people working at desks in an office. The text on the banner reads 'Payer ses employés n'a jamais été aussi simple'. There are two prominent buttons: a green one labeled 'JE VEUX TESTER GRATUITEMENT !' and a blue one labeled 'VOIR LA DÉMO'.

483 entreprises nous font confiance



# Évolution de l'édition de logiciels

Le SaaS est une lame de fond

Tous les éditeurs “on-premise” ont réalisé ou prévoient une version SaaS de leurs produits

# Des outils pour le développement

**Github** (gestion de version de code)

**Jira** (tickets de développement)

**Travis, CircleCI, Concourse** (tests)

# Github : le standard pour Git

(gratuit pour les projets open source)

The screenshot shows the GitHub homepage with a dark background. At the top, there's a navigation bar with links for Features, Business, Explore, and Pricing. A search bar and a 'Sign in or Sign up' button are also at the top. The main heading 'Built for developers' is prominently displayed. Below it, a paragraph describes GitHub as a development platform for both open source and business projects. To the right, there's a sign-up form with fields for 'Pick a username', 'Your email address', and 'Create a password'. A note below the password field says 'Use at least one letter, one numeral, and seven characters.' An orange 'Sign up for GitHub' button is at the bottom of the form. A small disclaimer at the bottom right states: 'By clicking "Sign up for GitHub", you agree to our [terms of service](#) and [privacy policy](#). We'll occasionally send you account related emails.'



## SATELLITE

Check out GitHub Satellite, in orbit around London on May 22-23.

[Learn more](#)

# Github : le collaboratif avant tout

The screenshot shows a GitHub repository page for 'domrod/dockerapp'. The repository was forked from 'jeetutorial/dockerapp'. The page displays 11 commits, 10 branches, 11 releases, and 0 contributors. The latest commit is by James Lee, updating a Docker compose file for Docker Swarm, made 10 months ago. A green 'Clone or download' button is visible. At the bottom, there's a call to action to add a README.

domrod/dockerapp

GitHub, Inc. [US] | https://github.com/domrod/dockerapp

This repository Search Pull requests Issues Gist

Unwatch 1 Star 0 Fork 585

Code Pull requests 0 Projects 0 Wiki Pulse Graphs Settings

No description, website, or topics provided. Edit Add topics

11 commits 10 branches 11 releases 0 contributors

Branch: master New pull request Create new file Upload files Find file Clone or download

This branch is 1 commit behind jeetutorial:master.

James Lee update docker compose file for docker swarm Latest commit 8bddaa6 on 27 Jun 2016

app add unit test 10 months ago

Dockerfile update deployment branch and remove volumn 10 months ago

circle.yml update deployment branch and remove volumn 10 months ago

common.yml refactor docker compose file 10 months ago

docker-compose.yml refactor docker compose file 10 months ago

prod.yml update docker compose file for docker swarm 10 months ago

Help people interested in this repository understand your project by adding a README. Add a README

# Concourse : les tests en continu

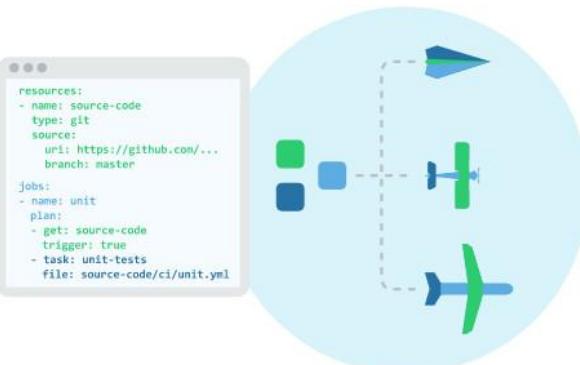
The screenshot shows the Concourse website at <https://concourse.ci>. The page features a large teal header with the text "CI that scales with your project." Below the header is a diagram illustrating a CI pipeline. The pipeline consists of several components: three "worker" boxes, two "controller" boxes, a green "integration" box, a green "deploy" box, and a "final-release" box. The "controller" boxes are connected to the "worker" boxes and the "integration" box. The "integration" box is connected to the "deploy" box, which in turn leads to the "final-release" box. The "deploy" box also has a "release" connection back to the "controller" boxes.

## Simple and Scalable

Rather than a myriad of checkboxes, pipelines are defined as a single declarative config file, composing together just [three core concepts](#).

As your project grows, your pipeline will grow with it, and remain understandable.

```
resources:
- name: source-code
  type: git
  source:
    url: https://github.com/...
    branch: master
jobs:
- name: unit
  plan:
    - get: source-code
      trigger: true
    - task: unit-tests
      file: source-code/ci/unit.yml
```



Le Cloud : avènement des API

SDK (AWS, Azure, GCE)

API REST (Consul, Restlet)

# REST

Representational State Transfer

Utilisation de méthodes (verbes) tels que

**GET / PUT / POST / DELETE**

via HTTP/HTTPS

[http://www.ics.uci.edu/~fielding/pubs/dissertation/rest\\_arch\\_style.htm](http://www.ics.uci.edu/~fielding/pubs/dissertation/rest_arch_style.htm)

# Restlet : un fournisseur d'API REST

The screenshot shows the Restlet Cloud interface. At the top, there's a navigation bar with links for Modules, Use cases, Pricing, Documentation, and Open Source. Below that is a main heading "Cloud" with the subtext "Create & Host your Data APIs". A prominent "Launch Cloud" button is centered. The main content area features a dark header with tabs for CLOUD (selected), DASHBOARD, and ANALYTICS, along with Pricing, Help, a search icon, and a Sign in link. Below this is a card for "My Company API" which is described as a "Web API - Full Stack". The card includes a "Deploy" button and a "Version 1 Draft" dropdown. The left sidebar contains sections for General information, Endpoints, and Resources. Under Resources, there are entries for "/companies/" and "/companies/{companyid}". The "/companies/" section has a GET endpoint labeled "Loads a list of Company" and a POST endpoint labeled "Adds a Company". The "/companies/{companyid}" section has a GET endpoint labeled "Loads a Company" and a PUT endpoint labeled "Stores a Company". On the right side, there's a form for defining a resource with fields for Relative path, Name, Description, and Section. The "Relative path" field contains "/companies/{companyid}", "Name" contains "Company", and "Section" contains "My Company API\_Data". At the bottom, there's a "Try it out" section with a "swagger" button and a note about opening a testing UI.

Restlet Cloud | Create a new API

Sécurisé | https://restlet.com/modules/cloud/ Dominique

# Restlet

## Cloud

Create & Host your Data APIs

Launch Cloud

CLOUD DASHBOARD ANALYTICS Pricing Help Sign in

My Company API - Web API - Full Stack

Version 1 Draft Deploy ?

General information

Endpoints Add

Resources Search

/companies/

GET Loads a list of Company

POST Adds a Company

/companies/{companyid}

GET Loads a Company

PUT Stores a Company

Relative path /companies/{companyid}

Name Company

Description

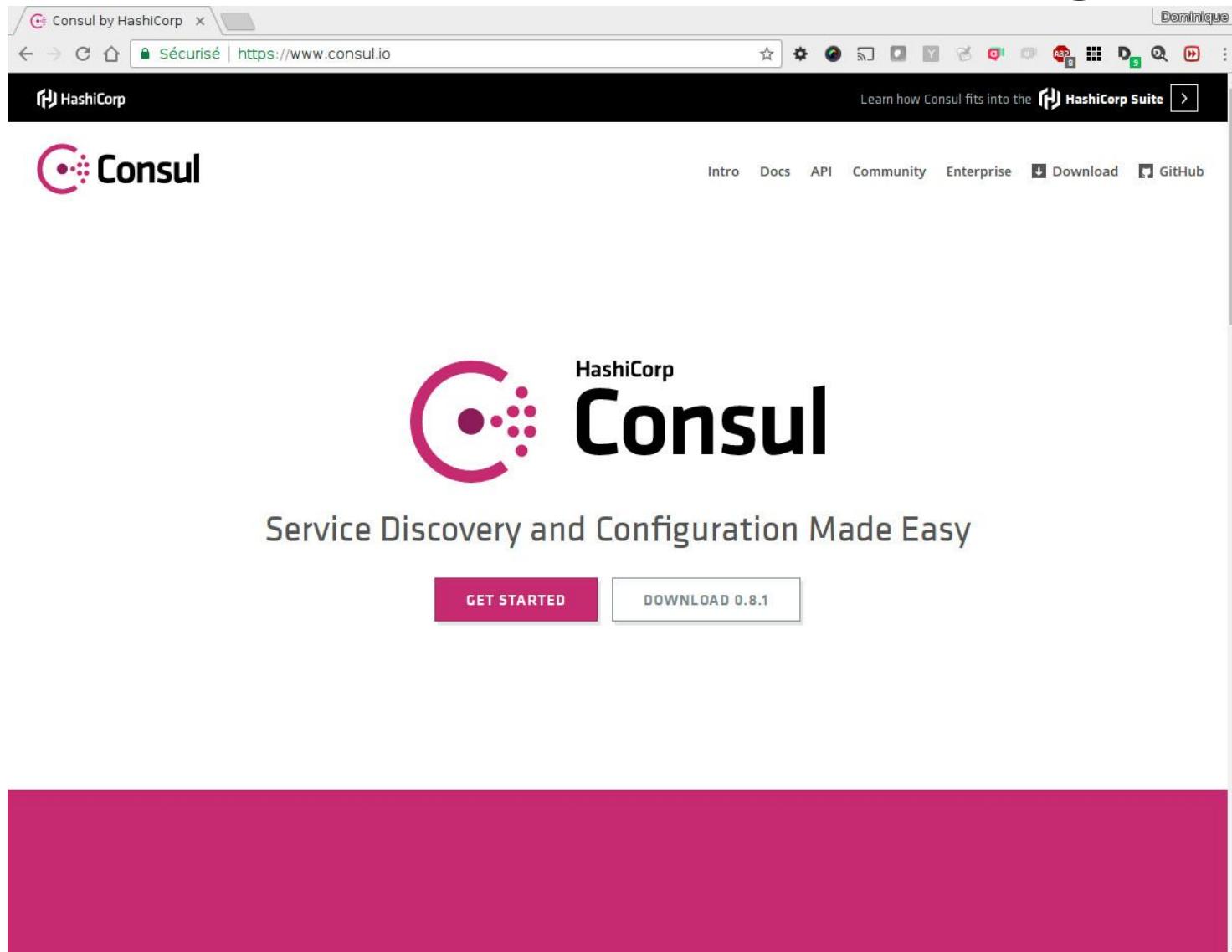
Section My Company API\_Data

Try it out swagger

Opens a new tab with a dedicated testing UI for your API. If your API's authentication is managed via Restlet Cloud, your credentials will be filled in automatically.

# Consul

# découverte de services et stockage K/V



# Le Cloud : ère des orchestrateurs multi-cloud

Swarm (Docker inc.)

Mesos

Terraform

Kubernetes

# Terraform

The screenshot shows a web browser displaying the official Terraform website at <https://www.terraform.io>. The page features the Terraform logo (a blue stylized 'T') and the word 'Terraform' in large black letters. Below the logo, the tagline 'Write, Plan, and Create Infrastructure as Code' is displayed. Two prominent buttons are visible: 'GET STARTED' in a purple box and 'DOWNLOAD 0.9.3' in a white box. At the top of the page, there is a navigation bar with links to 'Intro', 'Docs', 'Community', 'Enterprise', 'Download', and 'GitHub'. A banner at the top right mentions the 'HashiCorp Suite'. The browser's address bar shows the URL and indicates it is a secure connection. The overall layout is clean and professional.

Terraform

HashiCorp

# Terraform

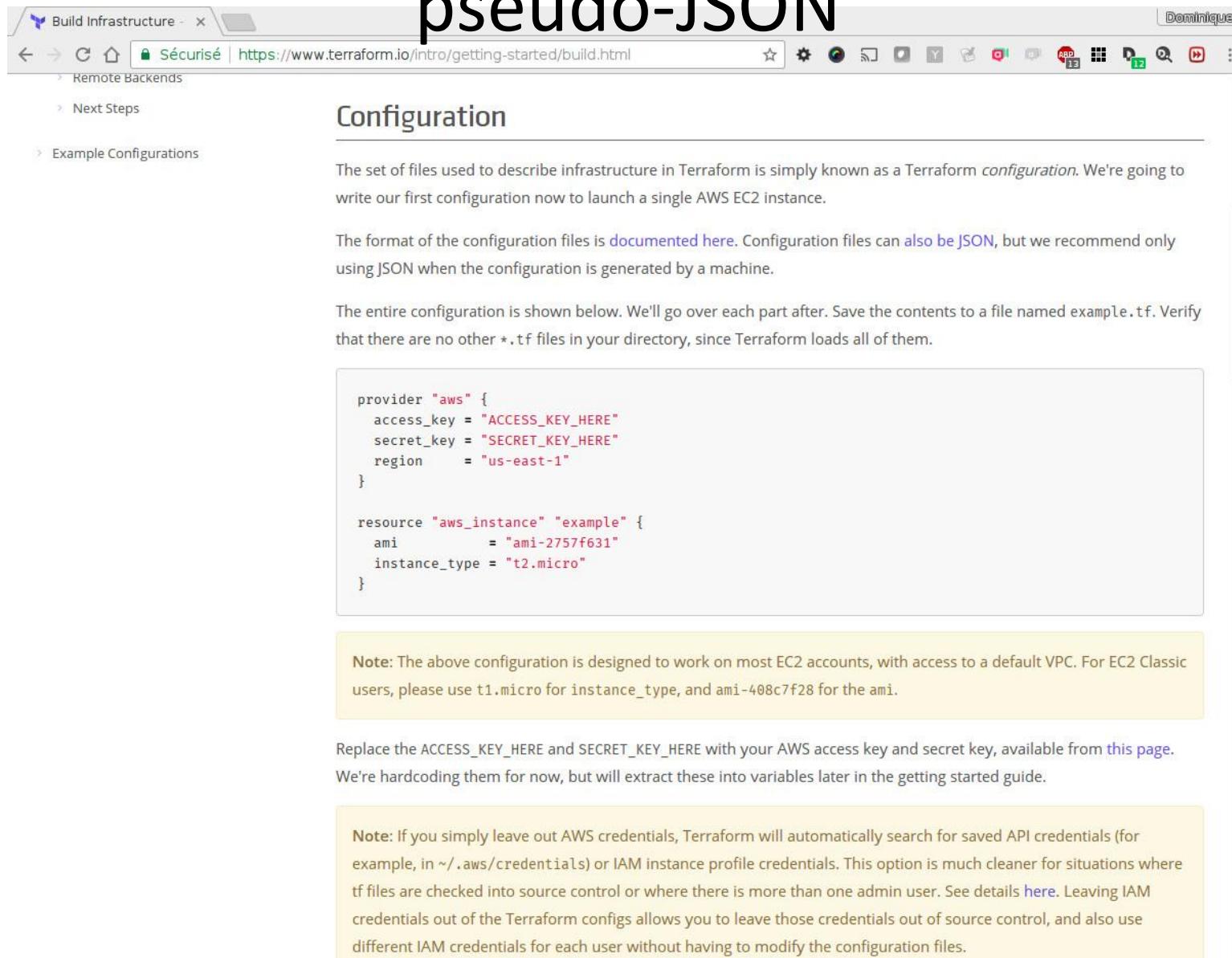
Write, Plan, and Create Infrastructure as Code

GET STARTED

DOWNLOAD 0.9.3

SIMPLE AND POWERFUL

# Terraform : infrastructure en pseudo-JSON



The screenshot shows a web browser window with the URL <https://www.terraform.io/intro/getting-started/build.html>. The page title is "Configuration". The content discusses Terraform configuration files and provides an example configuration for launching an AWS EC2 instance.

The set of files used to describe infrastructure in Terraform is simply known as a Terraform *configuration*. We're going to write our first configuration now to launch a single AWS EC2 instance.

The format of the configuration files is [documented here](#). Configuration files can [also be JSON](#), but we recommend only using JSON when the configuration is generated by a machine.

The entire configuration is shown below. We'll go over each part after. Save the contents to a file named `example.tf`. Verify that there are no other `*.tf` files in your directory, since Terraform loads all of them.

```
provider "aws" {  
    access_key = "ACCESS_KEY_HERE"  
    secret_key = "SECRET_KEY_HERE"  
    region     = "us-east-1"  
}  
  
resource "aws_instance" "example" {  
    ami          = "ami-2757f631"  
    instance_type = "t2.micro"  
}
```

**Note:** The above configuration is designed to work on most EC2 accounts, with access to a default VPC. For EC2 Classic users, please use `t1.micro` for `instance_type`, and `ami-408c7f28` for the `ami`.

Replace the `ACCESS_KEY_HERE` and `SECRET_KEY_HERE` with your AWS access key and secret key, available from [this page](#). We're hardcoding them for now, but will extract these into variables later in the getting started guide.

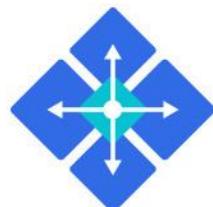
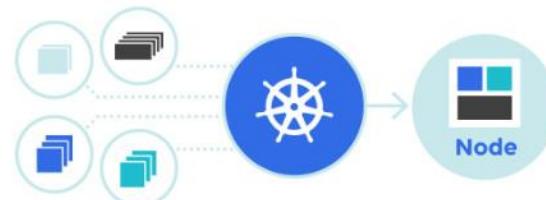
**Note:** If you simply leave out AWS credentials, Terraform will automatically search for saved API credentials (for example, in `~/.aws/credentials`) or IAM instance profile credentials. This option is much cleaner for situations where `tf` files are checked into source control or where there is more than one admin user. See details [here](#). Leaving IAM credentials out of the Terraform configs allows you to leave those credentials out of source control, and also use different IAM credentials for each user without having to modify the configuration files.

# Kubernetes (k8s) par Google

The screenshot shows the official Kubernetes website at https://kubernetes.io. The page has a dark background with a network-like graphic. At the top, there's a navigation bar with links to Documentation, Blog, Partners, Community, and Case Studies. Below the navigation, the word "kubernetes" is written in lowercase with a blue hexagonal icon to its left. The main title "Production-Grade Container Orchestration" is centered above a subtitle "Automated container deployment, scaling, and management". A blue button labeled "Try Our Interactive Tutorials" is visible. The URL in the browser bar is https://kubernetes.io, and the tab title is "Kubernetes | Product".

**Kubernetes** is an open-source system for automating deployment, scaling, and management of containerized applications.

It groups containers that make up an application into logical units for easy management and discovery. Kubernetes builds upon 15 years of experience of running production workloads at Google, combined with best-of-breed ideas and practices from the community.



## Planet Scale

Designed on the same principles that allows Google to run billions of containers a week, Kubernetes can scale without increasing your ops team.

# DEMO

Digital Ocean  
(web)

Google Compute Platform  
(web)

AWS  
(web, SDK, Terraform)