IoT and Cloud Computing

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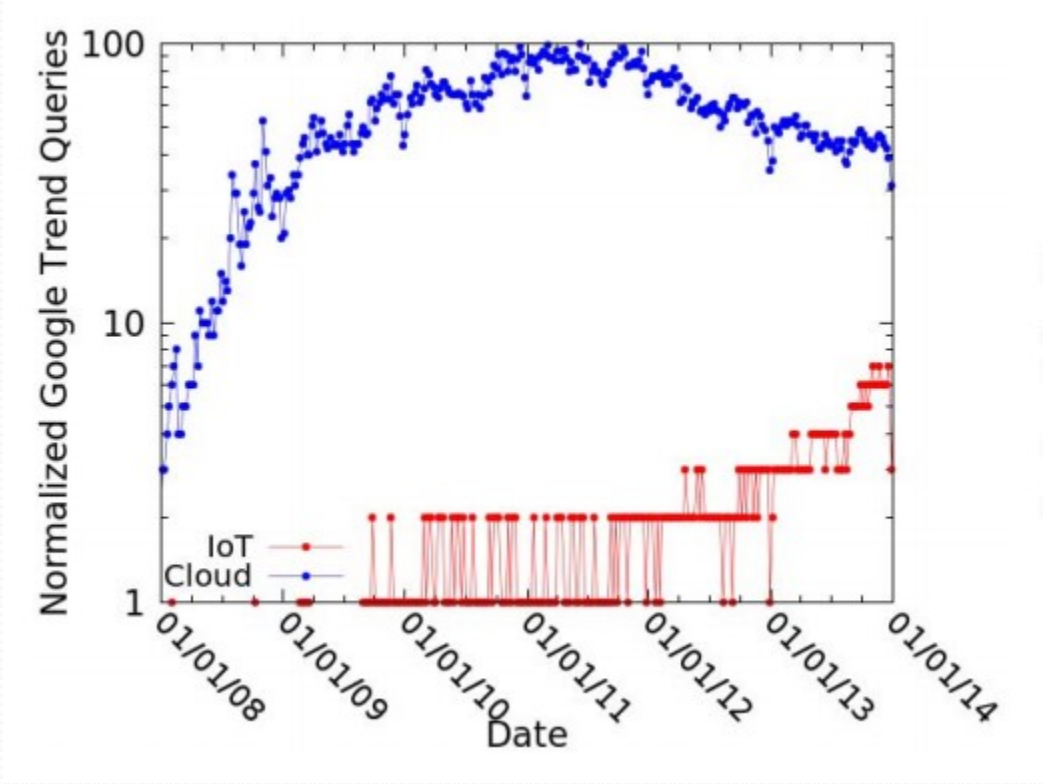
Things to cover

- Components of IoT
- Integration of IoT and Cloud Computing
- Cloud Computing basics
- CloudIoT: IoT PaaS
- Major players and five startups of IoT.
- IoT application with video streaming

Interest from Google research trends



Data obtained from Google Trends (https://www.google.com/trends/) and Scholar (scholar.google.com/) web facilities.

Defining things

A thing consists of at least three components:

- sensor or effector(actuators)
- computational capability
- communications channel (connectivity)

For high-end IoT

Cloud Computing and Big Data are the must.

Where to find new IoT products

- iotlist.co
- www.iotnewsnetwork.com

- www.kickstarter.com
- www.indiegogo.com

Limitation of Things

- small things with limited storage,
- limited processing capacity,
- less reliability

Strengths of Cloud

- virtually unlimited capabilities in terms of storage and processing power
- Suitable for complicate data analysis
- is a much more mature technology

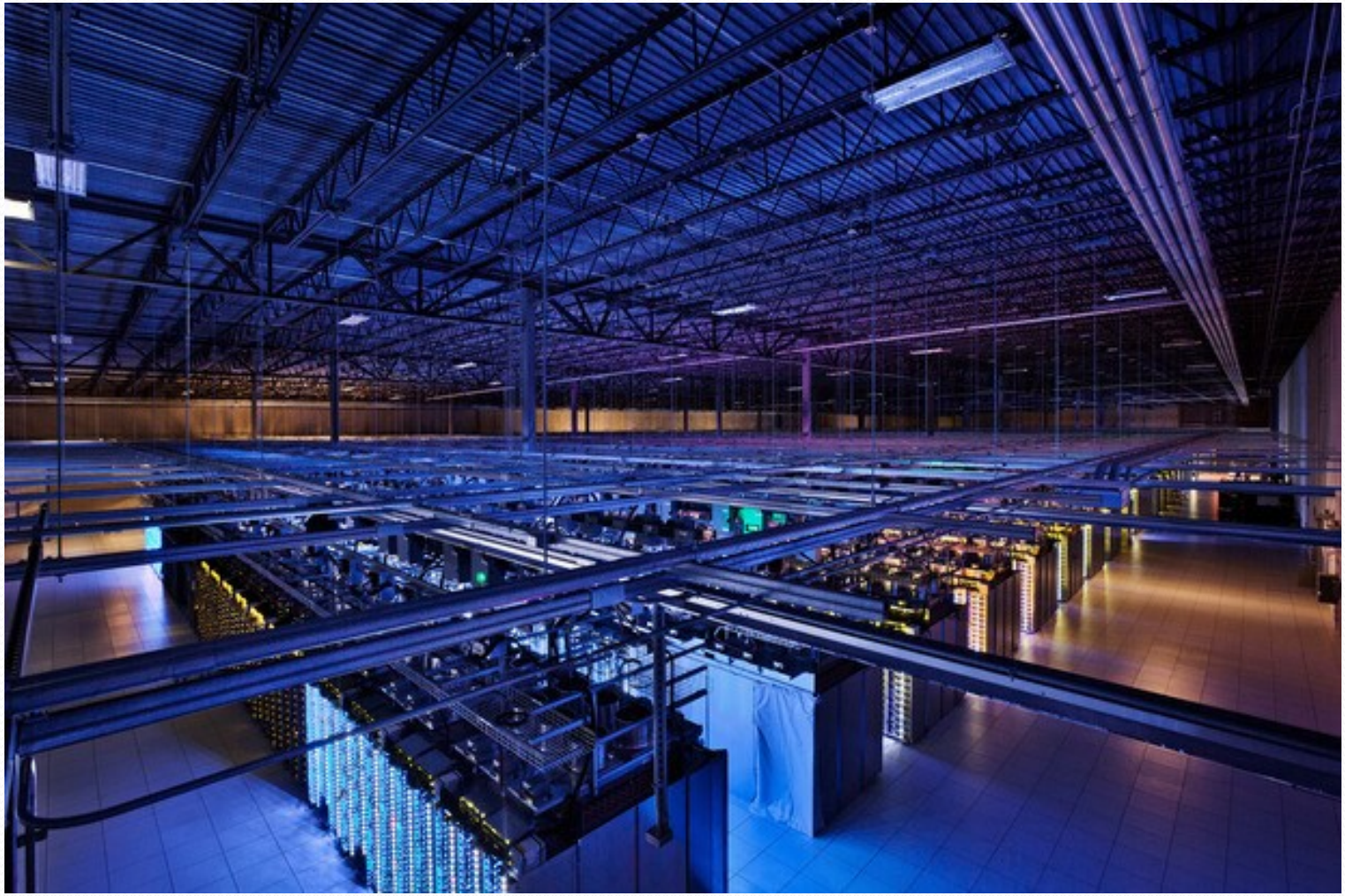
Windows Virtual Desktop
Server Hosting
Your Applications
Security
Cloud Computing
Web Hosting
Microsoft Exchange
Anti Spam & Anti Virus
Data Backup
VoIP
PABX

Cloud Computing

- A style of computing in which dynamically scalable and virtualized resources are provided as a service over the Internet.
- The forth IT revolution after mainframe computer, personal computer, and the Internet.

Cloud Data Center

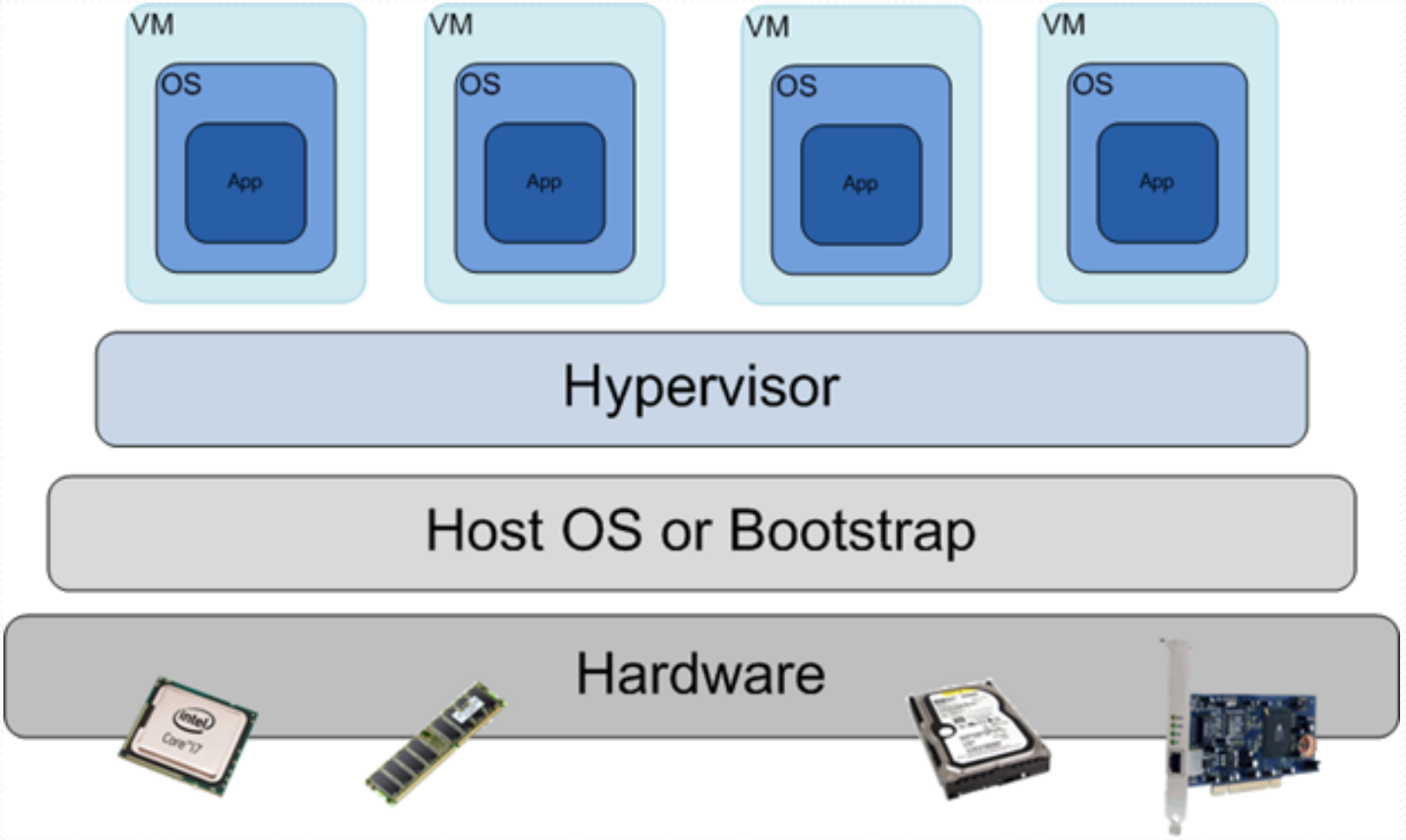
Cloud Data Center



Major Characteristics

- Internet based, any time, any where;
- Virtualized resources;
- Elastic service;
- Pay-per-use (no commitment);
- Huge storage, data and distributed processing.

Virtualization



Three Cloud Services

- IaaS (Infrastructure-as-a-Service),

  Amazon Web Services (AWS), Microsoft Azure, Google Compute Engine (GCE)

- PaaS (Platform-as-a-Service),

  database, web server, IoT as PaaS, Web API

- SaaS (Software-as-a-Service).

  Google Apps, Salesforce, Citrix GoToMeeting, Cisco WebEx

Types of Clouds

- Private: security and control;
- Public: shared, cheaper;
- Hybrid: mixed of public and private;
- Community: shared by similar stakeholders

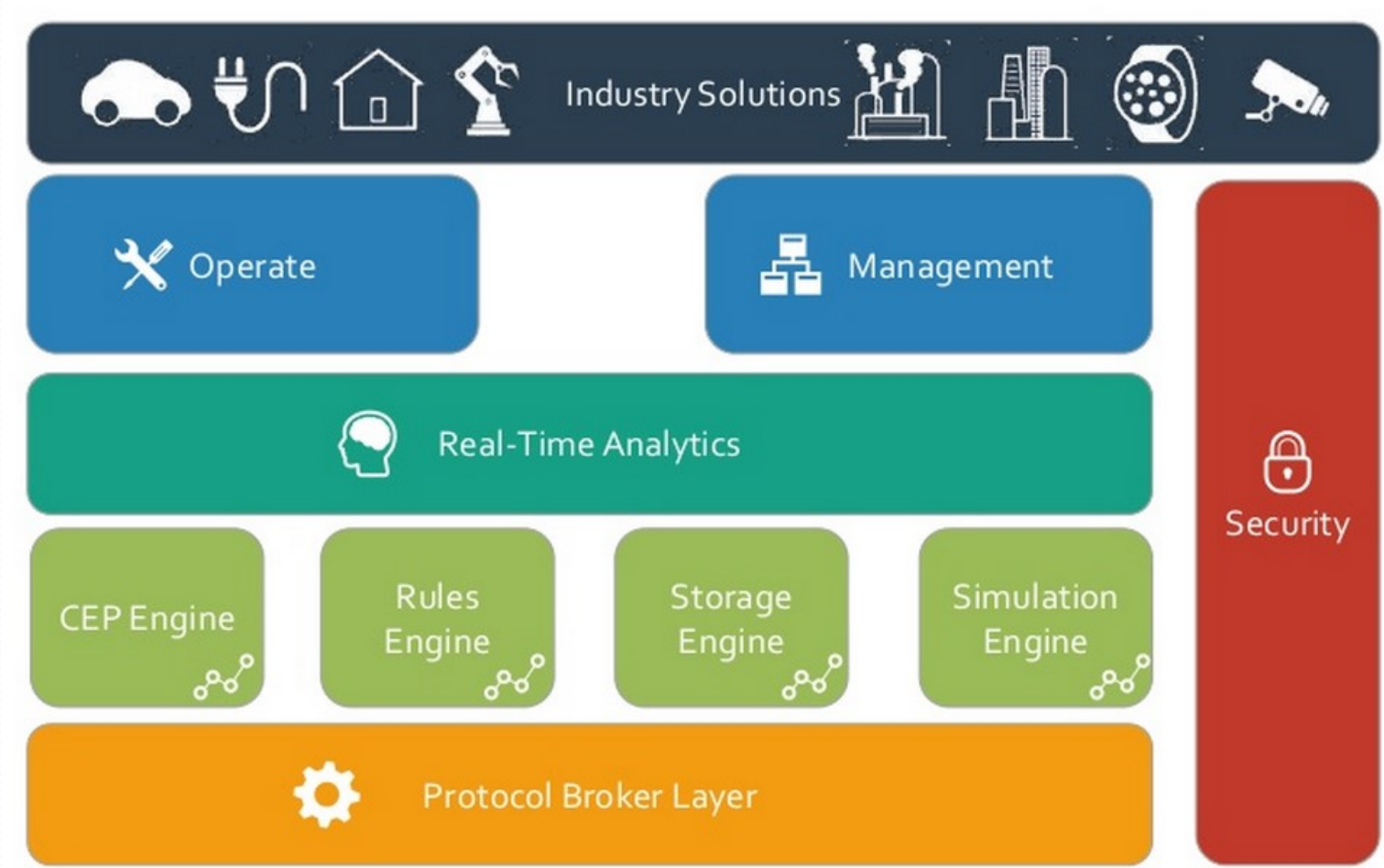
CloudIoT

- Integration of Cloud and IoT
- IoT can benefit from the virtually unlimited capabilities and resources of Cloud to compensate its technological constraints (e.g., storage, processing, energy)
- the Cloud can benefit from IoT by extending its scope to deal with real world things in a more distributed and dynamic manner, and for delivering new services in a large number of real life scenarios.

Needs for IoT as PaaS

- Build own infrastructure is hard
- It's not just about APIs
- Complex event processing platforms
- Time series storage
- Data visualization platforms
- Security and data privacy

A Conceptual Model of PaaS



Big Players in PaaS

- Amazon AWS
- Microsoft Azure
- Google App Engine
- IBM Smart Cloud
- Rackspace

Six IoT Startups in PaaS

A few startups are building APIs, tools, and platforms that enable developers to build IoT applications that connect devices with the cloud.

- Konekt: konekt.io
- Temboo: www.temboo.com
- TempoIQ: www.tempoiq.com
- thethings.iO: thethings.io
- Xively: www.xively.com
- SensorCloud: www.sensorcloud.com

PaaS Services

- Device management,
- Interface API and SDK
- Data capture and storage
- Data analysis and visualization
- Sim Cards and M2M –SMS
- Rule-based device data routing and notifications

Benefits of IoT PaaS

- Standardized and uniformed communication
- Fast and cheaper development and deployment
- Pay as you go
- More secure and reliable
- Can perform large scale data analysis
- Generate production-ready codes
- Let you focus on your core business

Price Plan for thethings.io

FREE	PROFESSIONAL	ENTERPRISE
Things up to 3 Storage Limited 3 months API calls limited Interoperability limited Analytics BASIC	€1 X THING / YEAR Unlimited things Unlimited storage Unlimited API calls Interoperability Analytics PRO	€5 X THING Unlimited things forever Unlimited storage forever Unlimited API calls Interoperability Analytics PRO

Thank you!

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