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June 30, 2010
Cloud computing is a style of computing in which **dynamically scalable** and often **virtualized** resources are provided as a service over the Internet.
Cloud Characteristics

- Low upfront costs
  - Servers are not purchased, only rented (utility computing)

- Multi-tenant
  - Centralization of infrastructure geographically
  - High-levels of utilization and efficiency

- Scalable and Agile
  - On-demand provisioning of resources
Computing Power History

Platform Development Time

Hardware Provisioning Time

Today

(Cloud) Virtual Servers

Dedicated

Colocation

Private Racks

- 6 Months
- 2 Months
- Weeks
- Hours

powered by Amazon Web Services™
The Next Step

Servers
Computing Power as a Utility

1000+ Cores

Always available
Accessible in seconds
PiCloud Platform

- Python-integrated cloud computing platform

```python
> import cloud
> from myfuncs import f1, f2, f3
> 
```

**PiCloud User**

**PiCloud**
PyCloud Platform

- Python-integrated cloud computing platform

```python
> import cloud
> from myfuncs import f1, f2, f3
> id1 = cloud.call(f1)
> 
```
PiCloud Platform

- Python-integrated cloud computing platform

```python
> import cloud
> from myfuncs import f1, f2, f3
> id1 = cloud.call(f1)
> id2 = cloud.call(f2, x)
```
PiCloud Platform

- Python-integrated cloud computing platform

Unified Monitoring

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<th>function</th>
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PiCloud in Action

- AutoTagger
  - Facebook photo-tagging assistant

- Basic Functionality
  - Detect and extract faces from a single photo
  - Repeatedly apply face detection to all photos in an album
Goals

- Python-integrated cloud computing platform

  **Elastic**
  - Pay as you Use
  - On-demand access to Massive Parallelization

  **Lock-in Free**
  - Data can live anywhere and in any form

  **Easy to use**
  - Developer friendly; Minimal API
  - You’re already using the “language of the cloud”
Architecture

Every component is designed to scale.

Python Application

```python
> import cloud
> id = cloud.call(foo)
> res = cloud.result(id)
```

cloud library
Identifies and transmits data and source dependencies

Monitoring

Web Request Load Balancer
-nginx
-Elastic Load Balancer

Job Acceptor
Receives incoming library calls

Apache web servers running Django via mod_wsgi

Stores Python Packages
-OpenAFS

Distributed File System

Distributed Relational Database

Job book keeping
-MySQL

Job result storage
-CouchDB

Workers (Number crunchers)

Overseers

Load balance workers and schedule jobs

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Scientific Computing

- We use the Enthought Python Distribution
  - Includes 75+ of the latest scientific packages
    - Numpy, Scipy
- PiCloud can accelerate all parallelizable computation
  - Protein Analysis
  - Cryptography
  - Astronomical and geological data analysis
  - Neural readings analysis
Conclusion

- “The cloud” is making computing resources available and accessible for all.
- Using the cloud doesn’t have to be difficult.
- PiCloud can help you!
  - Try us out at http://www.picloud.com
  - Stop by our table and say hi 😊