Cloud Computing, Web Services, and the New Web Stack

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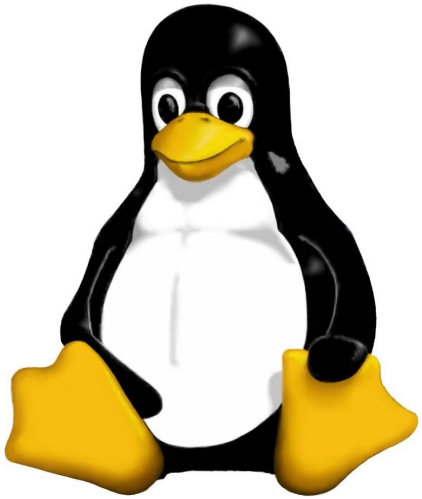
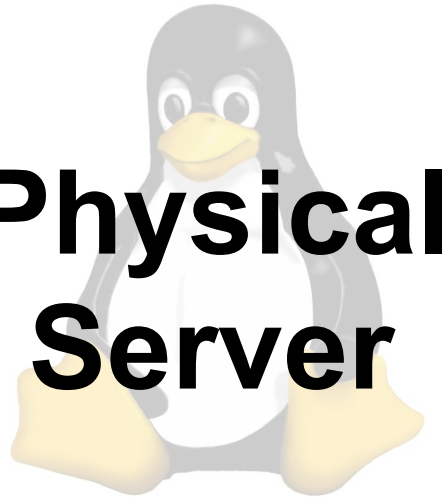
The LAMP Stack



The LAMP Stack



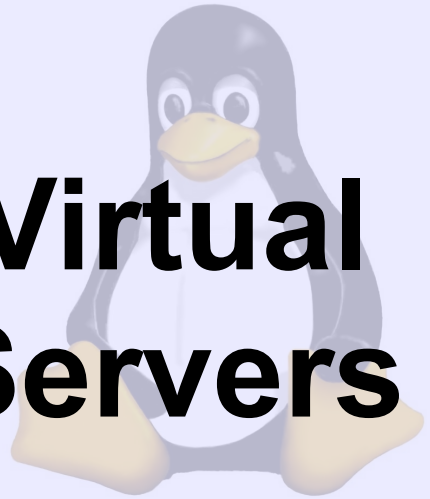
Physical Server

File-based Web Server

Relational Database

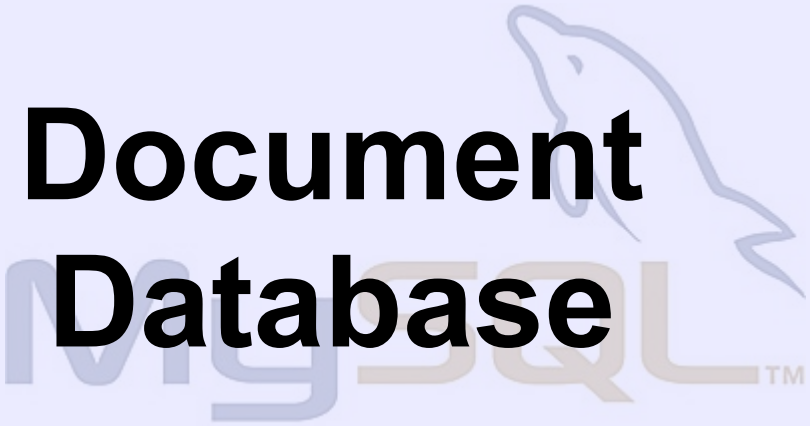
Embedded Scripting Language

The New Web Stack



Virtual Servers

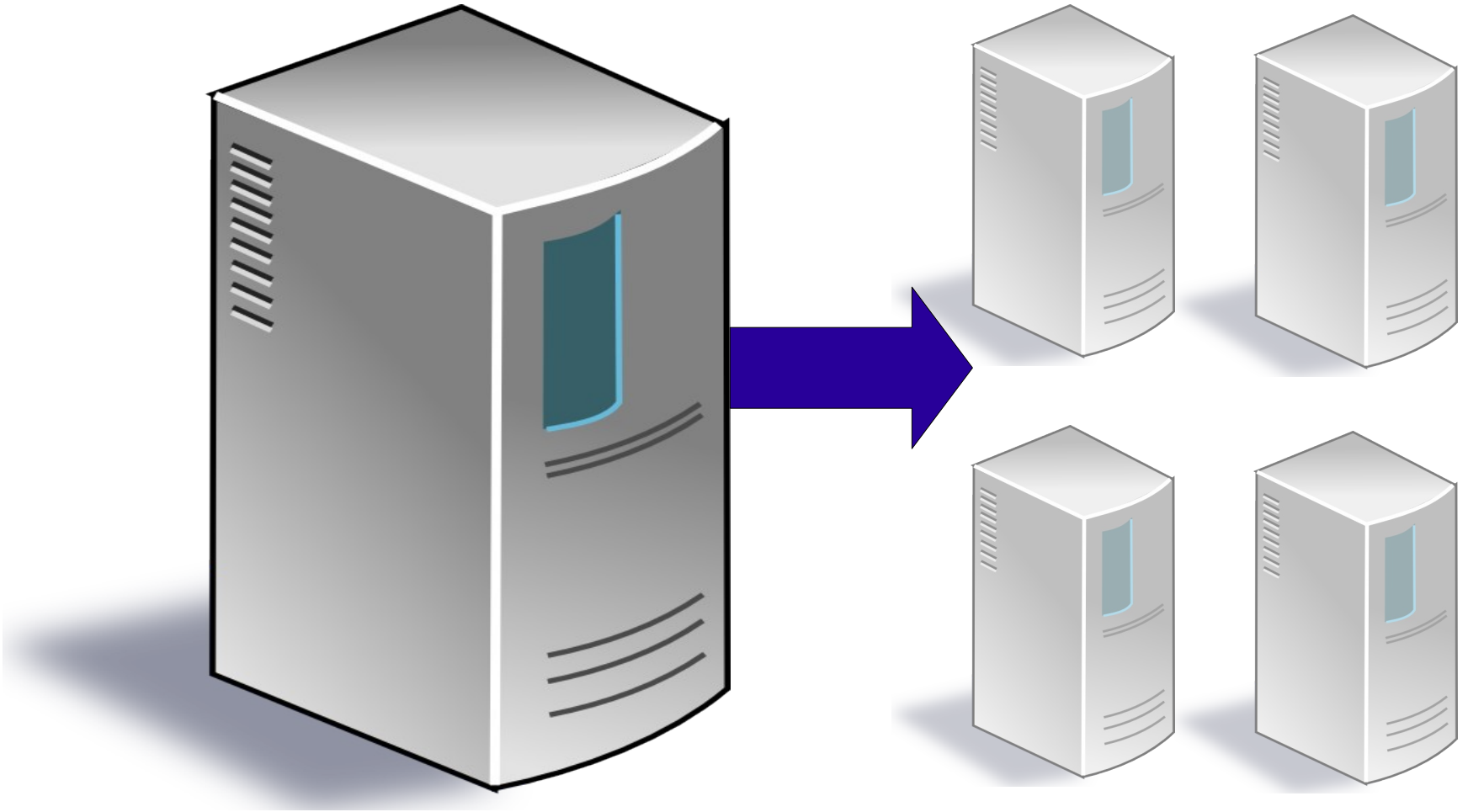
Web Proxy



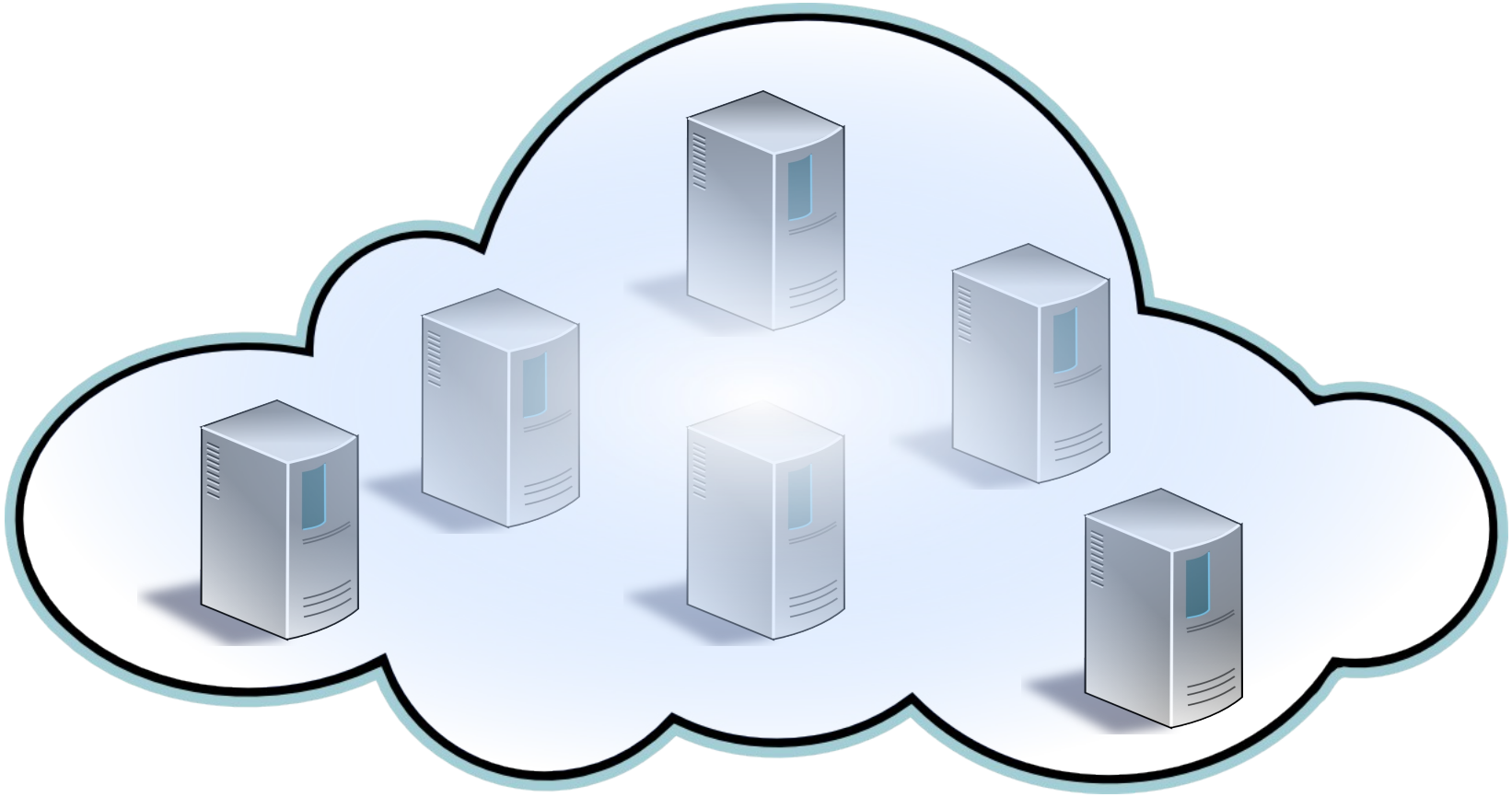
Document Database

REST Framework

Virtualization



Cloud Infrastructure



Amazon EC2

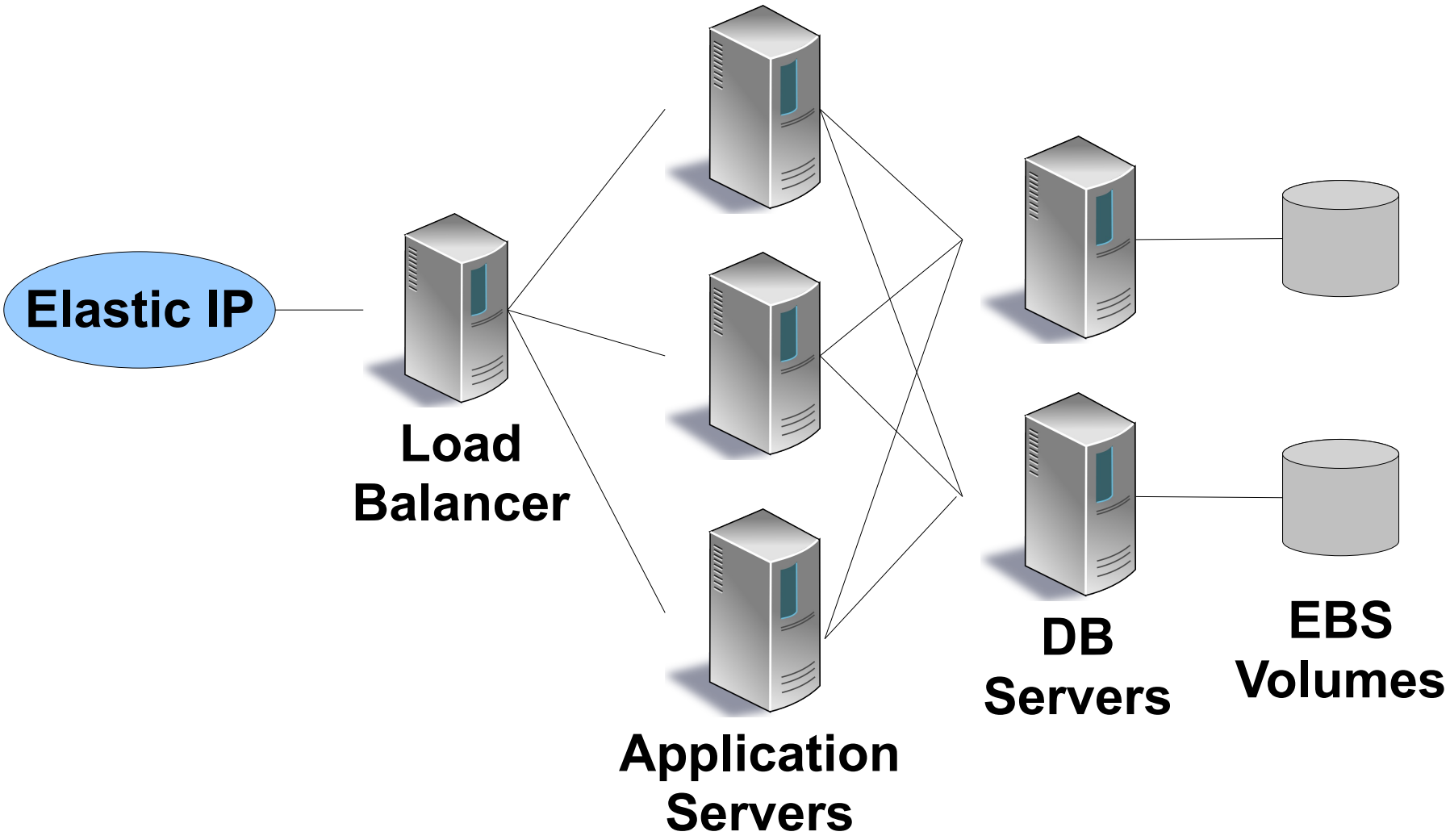
	Cost	RAM	Processor
Small	**$0.10 / hour**	**1.7 GB**	**1 core**
Large	**$0.40 / hour**	**7.5 GB**	**2 cores**
Extra-Large	**$0.80 / hour**	**15 GB**	**4 cores**

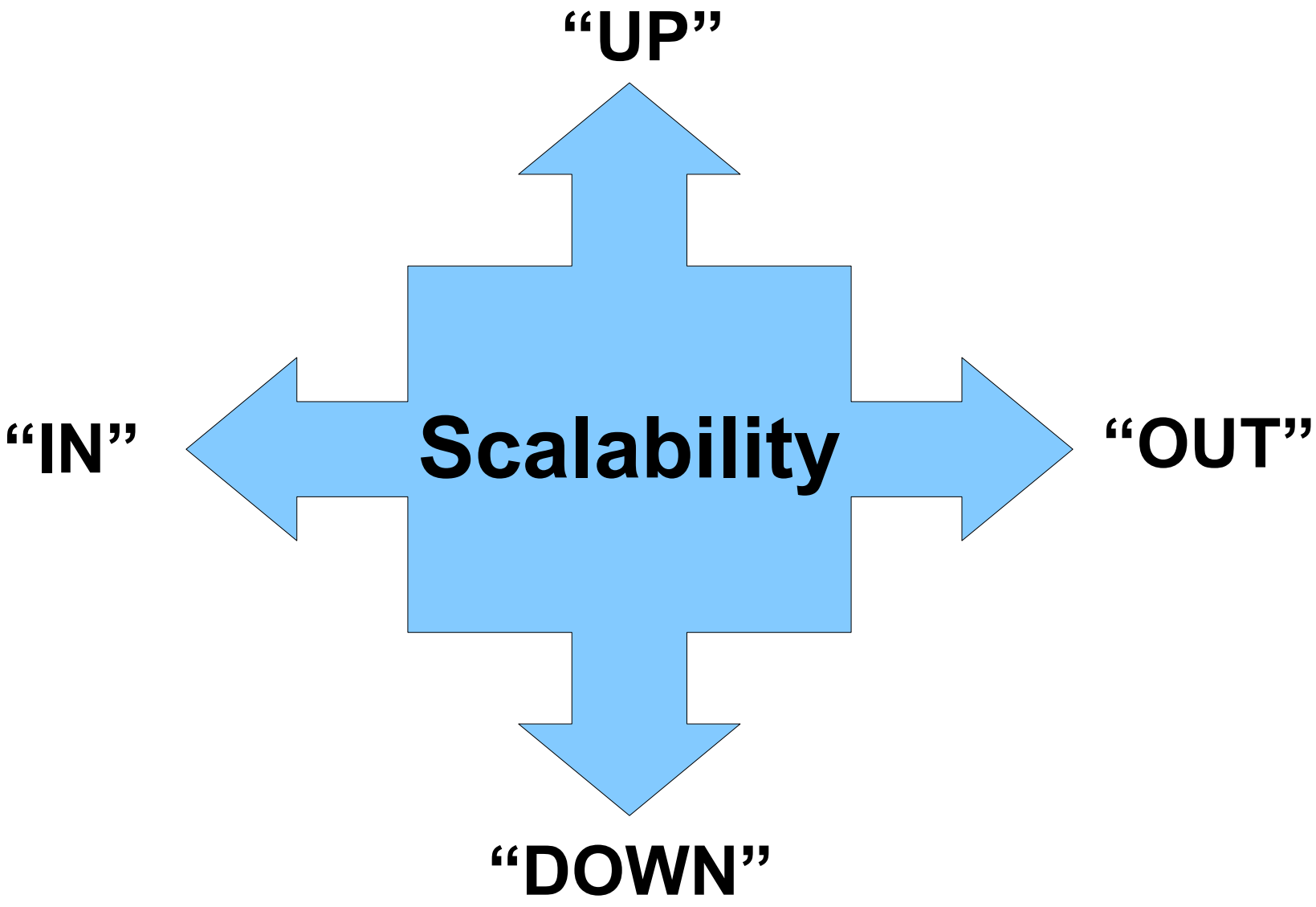
EC^2= Elastic Compute Cloud

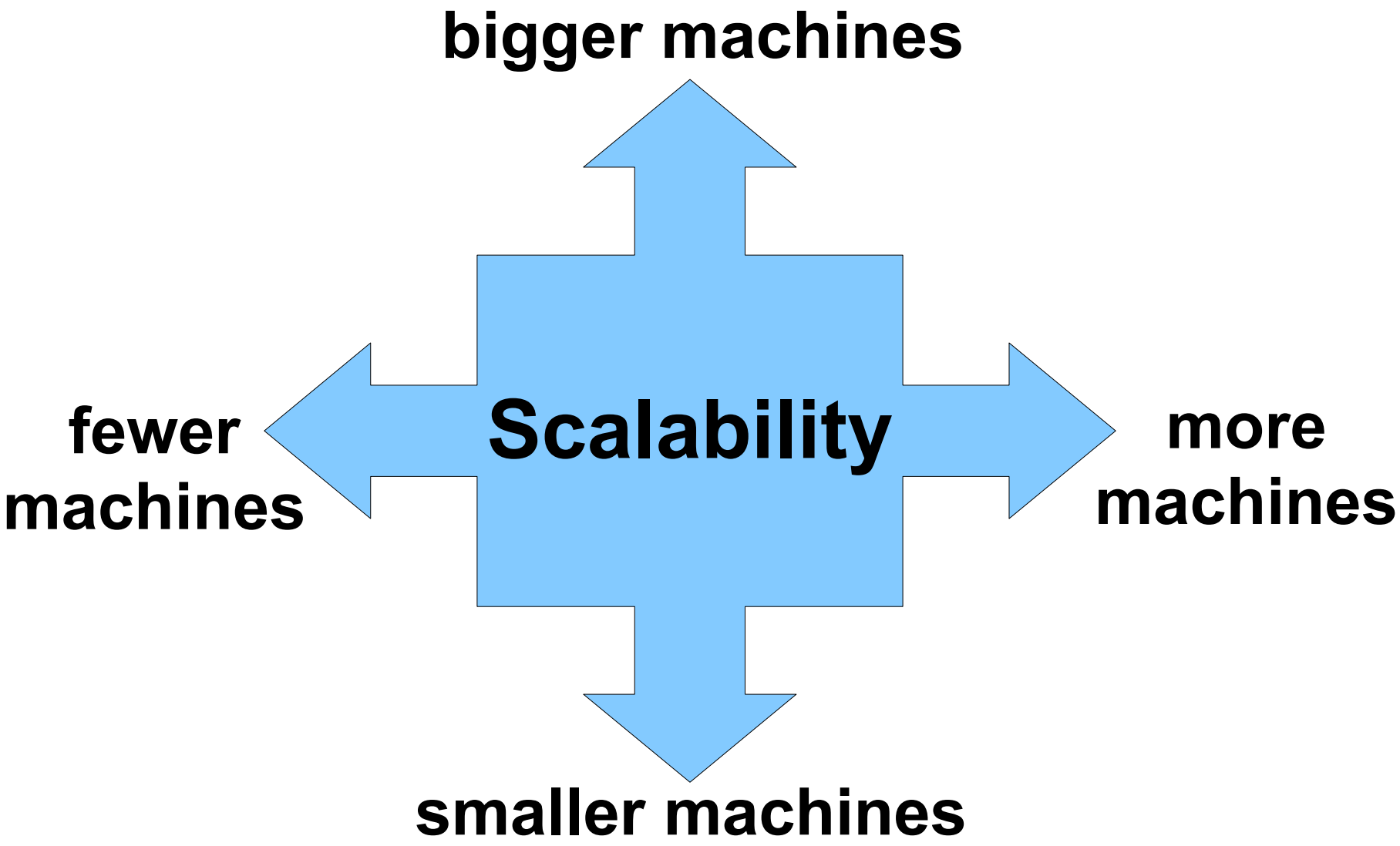
EC2

- “Instance” - one virtual machine
- “Image” - OS and root file system
- “Elastic Block Store” (EBS) - virtual disks
- “Availability Zone” - data center location
- “Elastic IP” - assignable public IP address
- “Elastic Load Balancing”

Amazon EC2


Elastic IP
Load Balancer
Application Servers
DB Servers
EBS Volumes


“UP”
“IN”
Scalability
“OUT”
“DOWN”


bigger machines
fewer machines
Scalability
more machines
smaller machines

Document Databases

Relational

- Rows
- Tables
- Schema
- Atomic values
- Normalization
- Joins

Document

- Documents
- One namespace
- No schema
- Multiple values
- Denormalization
- Maps

Relational

- Atomicity
- Consistency
- Isolation
- Durability

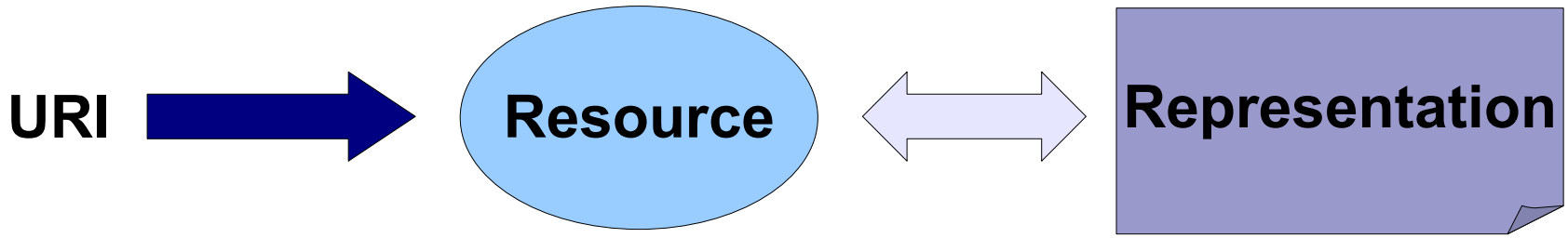
Distributed

- Basically available
- Soft state / scalable
- Eventually consistent

"BASE" coined by Dan Pritchett of EBay

ReST

- ReST= Representational State Transfer
- Roy T. Fielding's Ph.D. thesis
- Everything is a resource...
- ...referenced by URIs...
- ...viewed & created as representations.



WWW

- Cookies, sessions
- HTTP as transport
- URIs reveal server architecture
- Web Sites
- Pages
- HTML

ReST

- Stateless
- HTTP as API
- URIs give names to resources
- Web Services
- Resources
- HTML, XML, JSON...

Real ReST

- Ruby on Rails
- Django (Python)
- Restlet (Java)
- *RESTful Web Services* by Richardson

Proxies

The New Web Stack

- Virtual servers, on-demand scalability
- Distributed, document-oriented databases
- Proxies, load-balancing
- ReST and web services

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