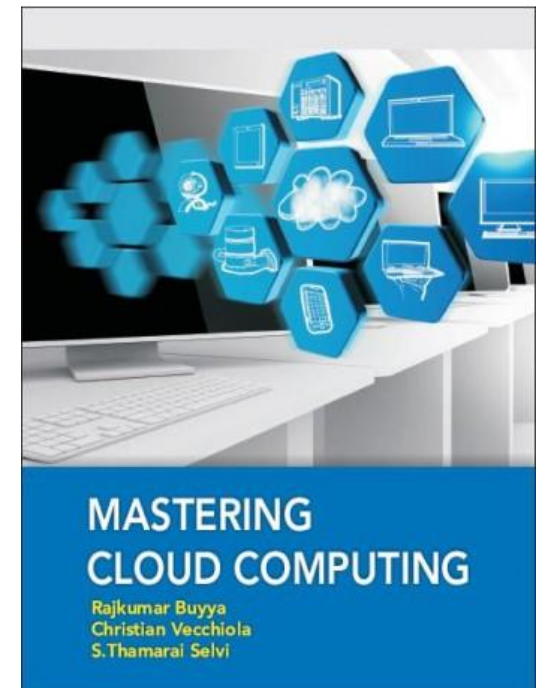
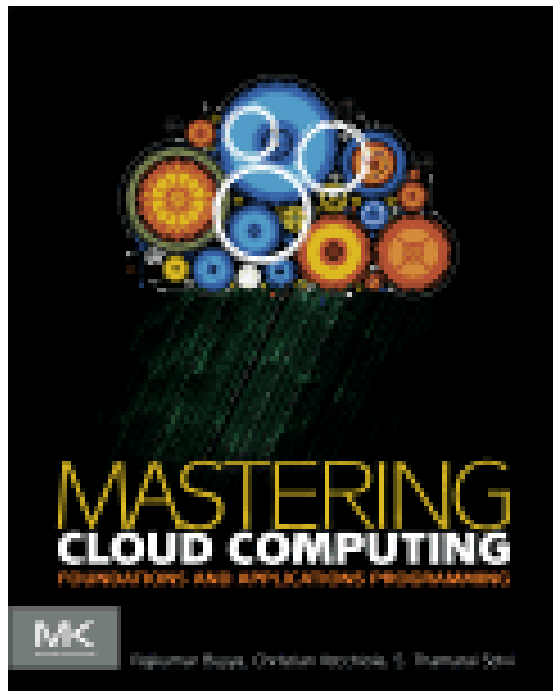


TÓPICOS DE COMPUTAÇÃO EM NUVEM 2016

SERGIO TAKEO KOFUJI

Mastering Cloud Computing

- Rajkumar Buyya, Christian Vecchiola, Thamarai Selvi



Chapters

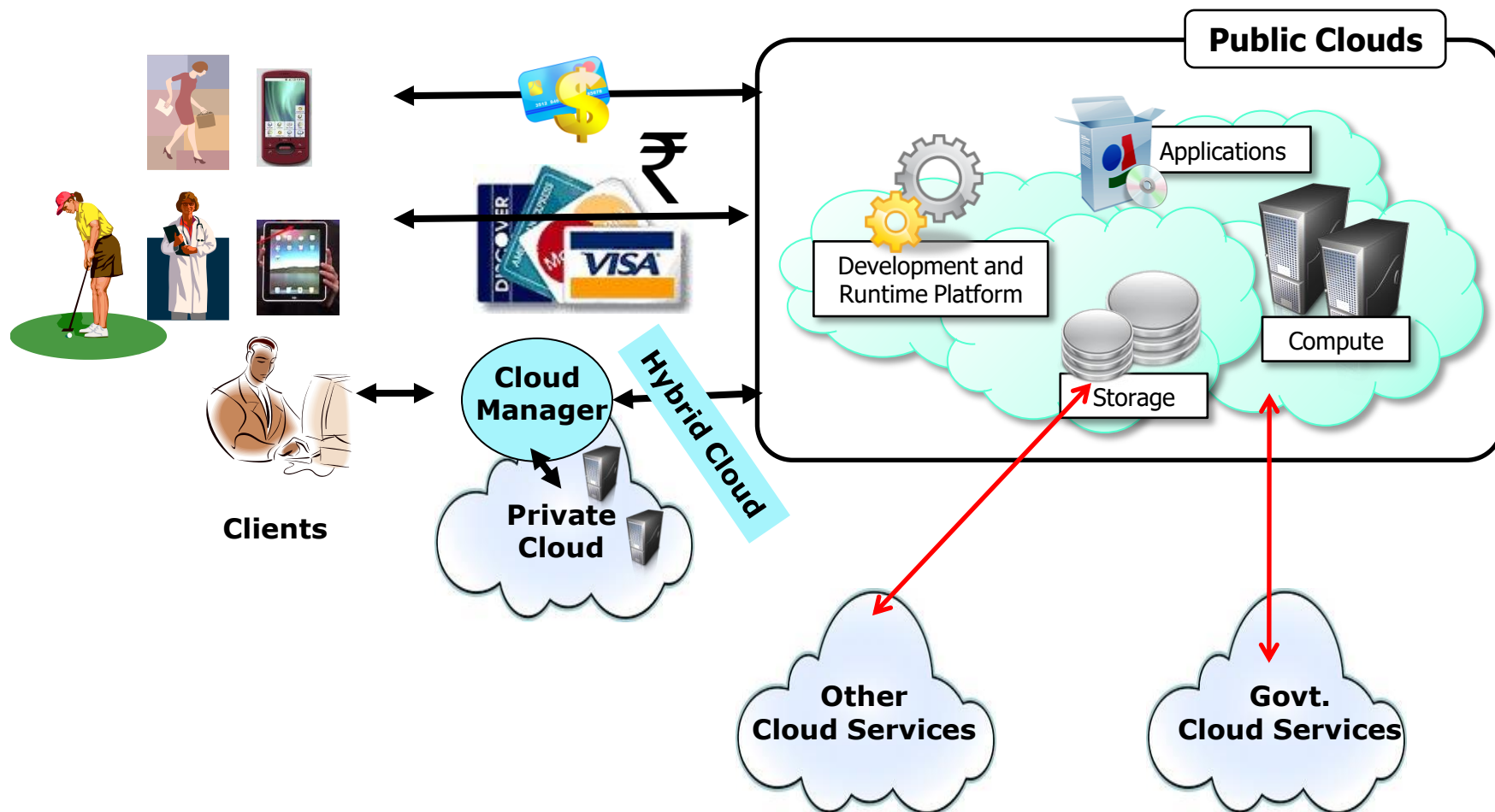
- **Part I: Foundations**
- Chapter 1 — Introduction
- Chapter 2 — Principles of Parallel and Distributed Computing
- Chapter 3 — Virtualization
- Chapter 4 — Cloud Computing Architecture
-
- **Part II: Cloud Application Programming and the Aneka Platform**
- Chapter 5 — Aneka: Cloud Application Platform
- Chapter 6 — Concurrent Computing: Thread Programming
- Chapter 7 — High-Throughput Computing: Task Programming
- Chapter 8 — Data Intensive Computing: Map-Reduce Programming
-
- **Part III: Industrial Platforms and New Developments**
- Chapter 9 — Cloud Platforms in Industry
- Chapter 10 — Cloud Applications
- Chapter 11 — Advanced Topics in Cloud Computing

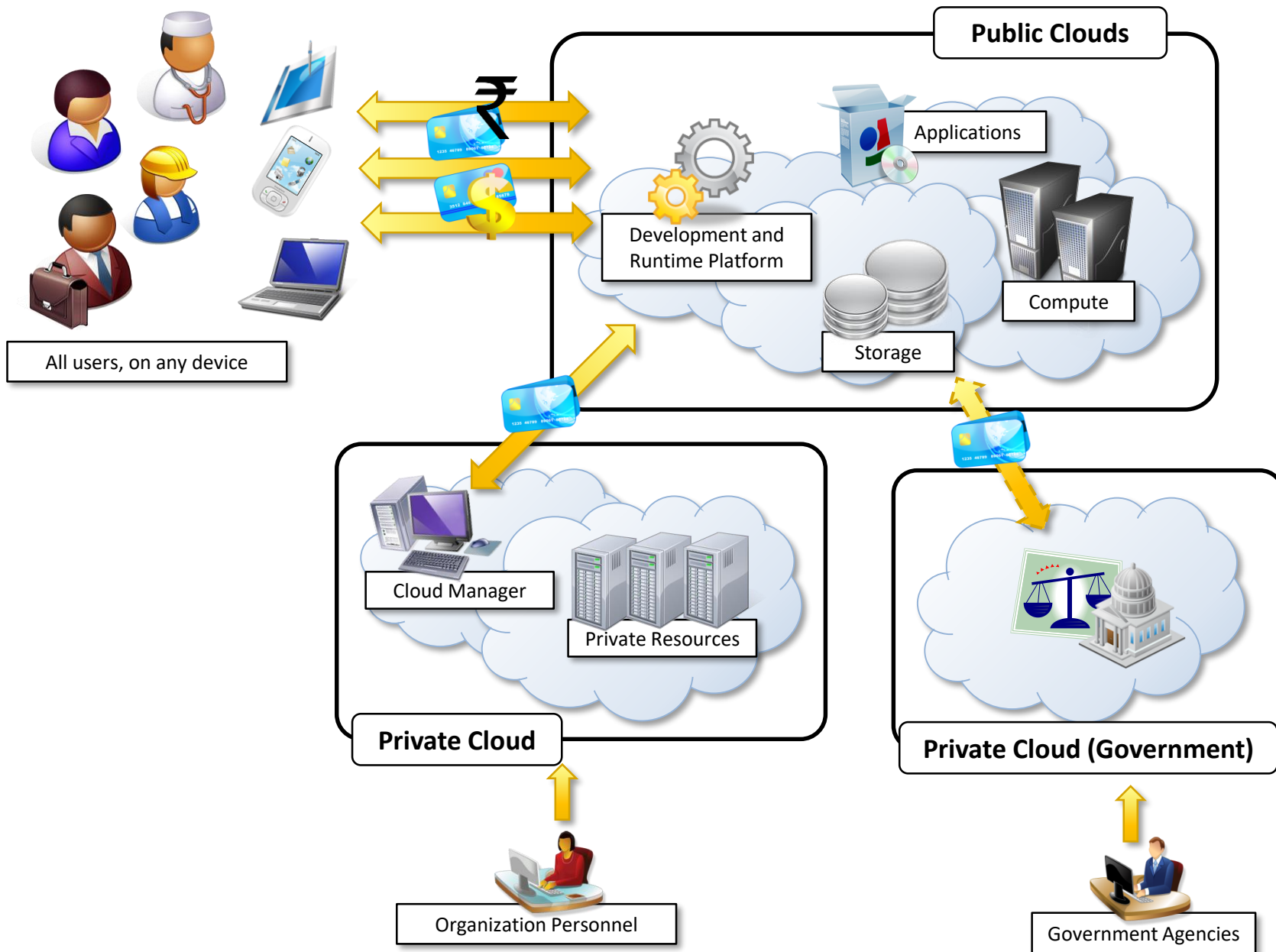
Chapter 1 - Introduction





Subscription-Oriented Cloud Services: X{compute, apps, data, ..} as a Service (..aaS)





Cloud Deployment Models

Public/Internet Clouds

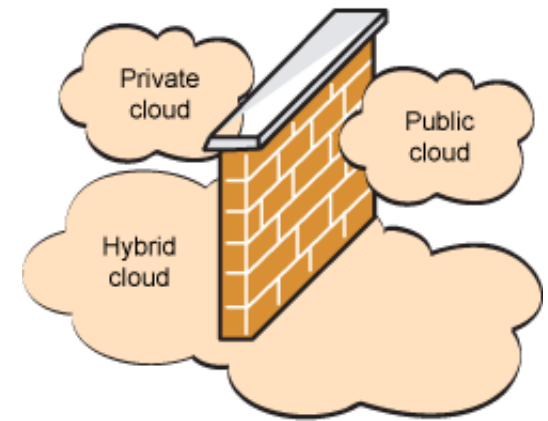
- * 3rd party, multi-tenant Cloud infrastructure & services:
- * available on subscription basis to all.

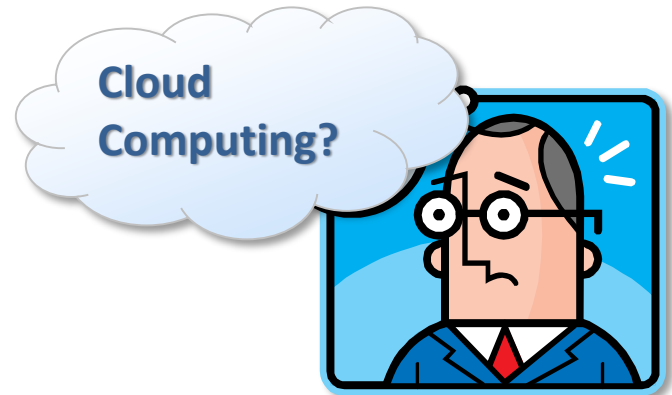
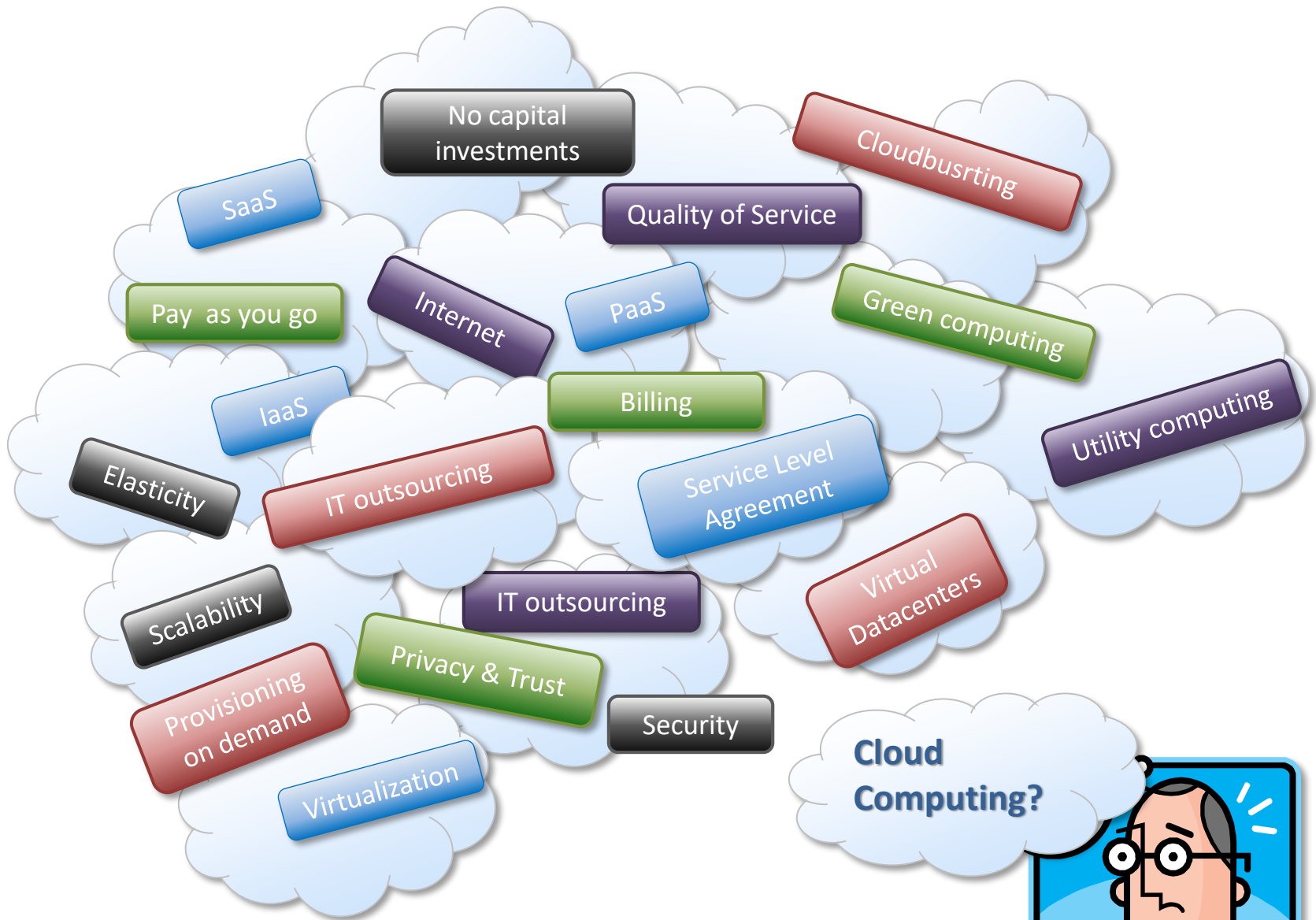
Private/Enterprise Clouds

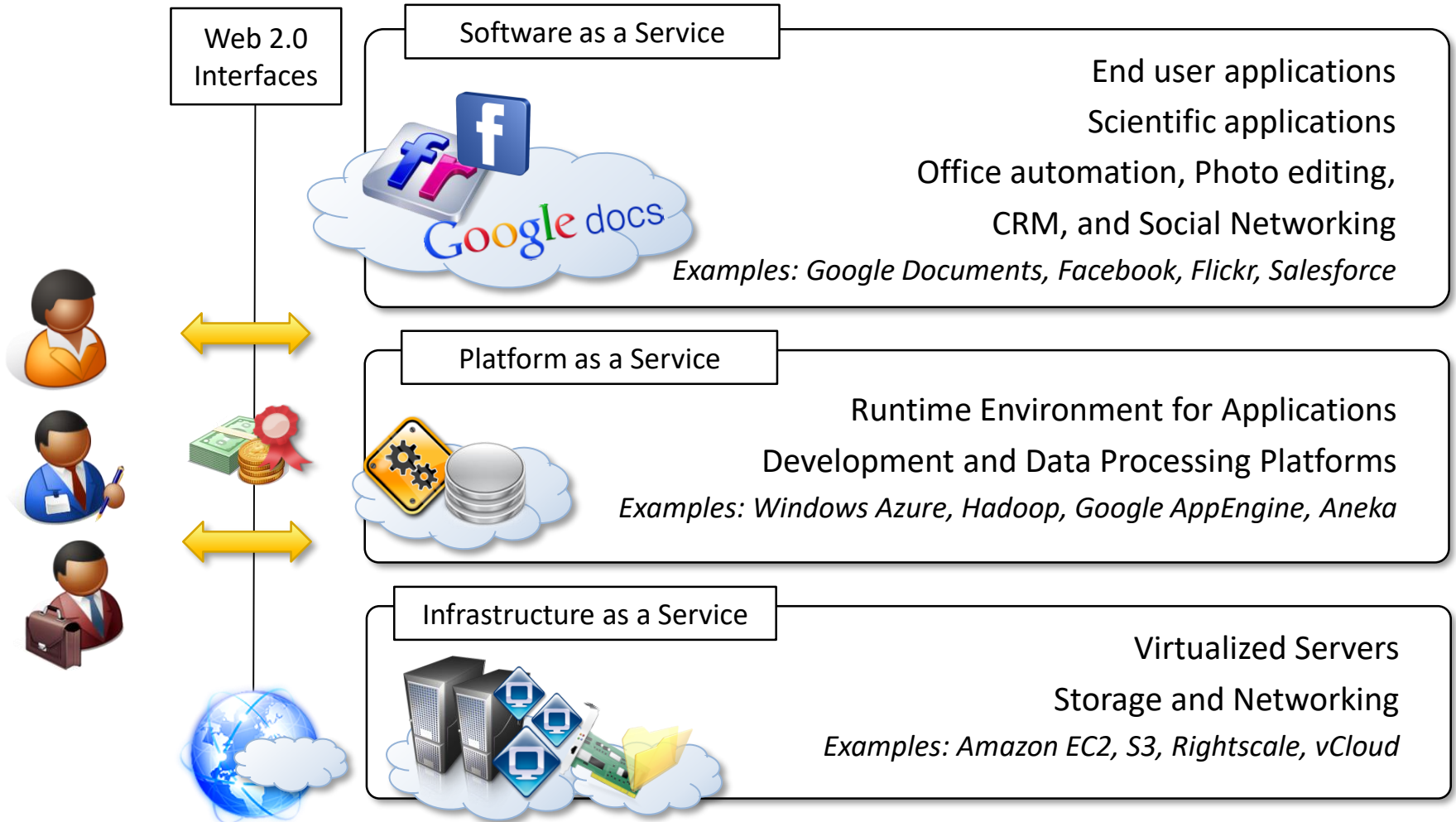
- * A public Cloud model within a company's own Data Center / infrastructure for internal and/or partners use.

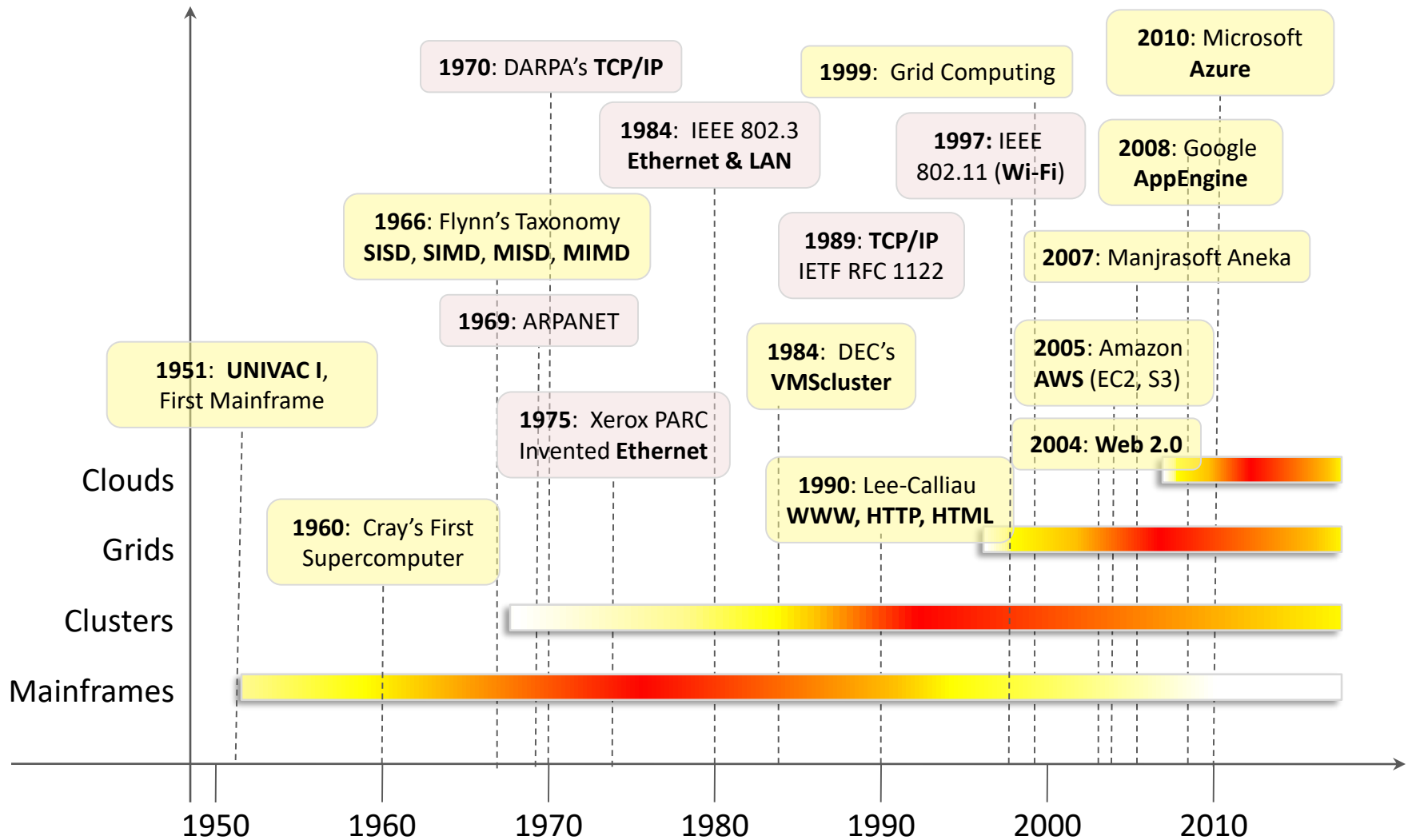
Hybrid/Inter Clouds

- * Mixed usage of private and public Clouds: Leasing public cloud services when private cloud capacity is insufficient

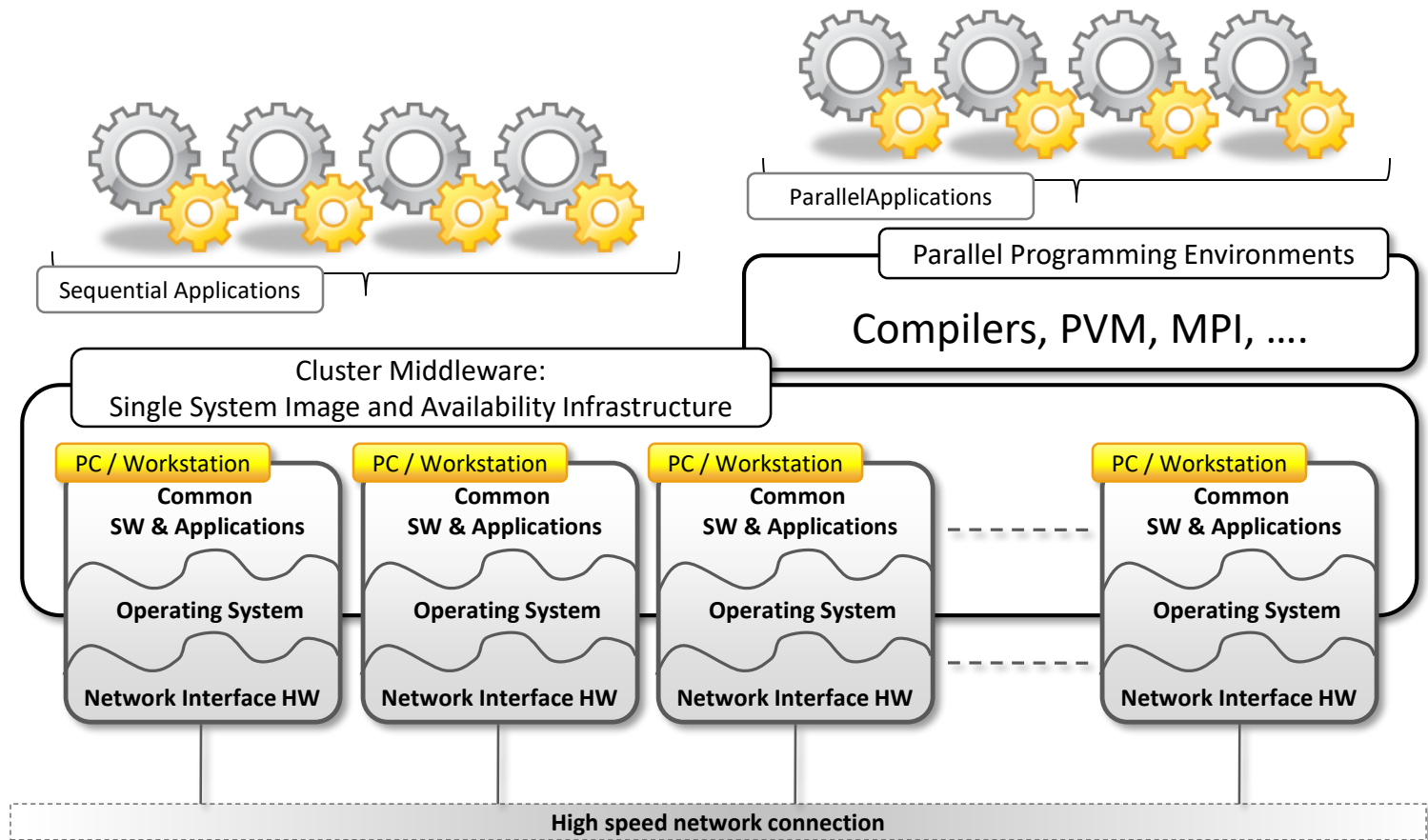


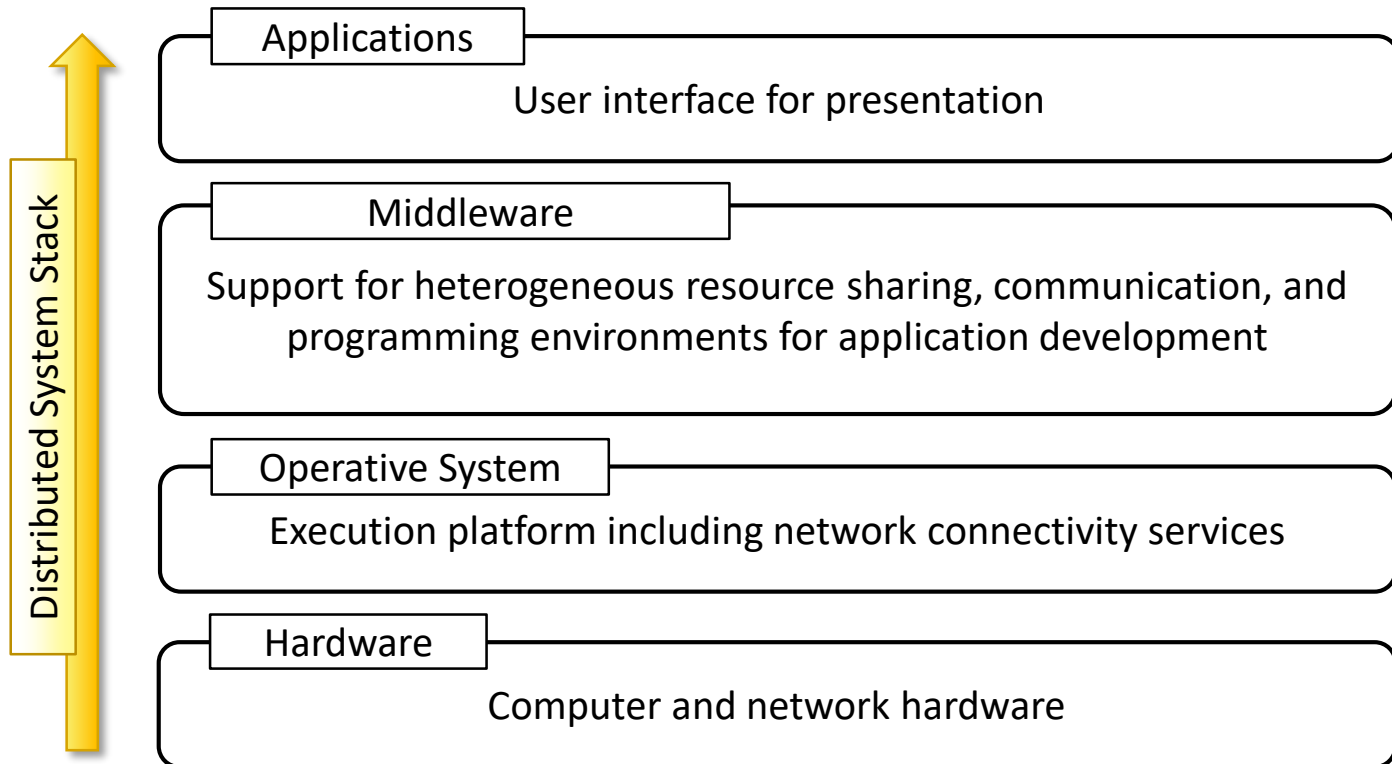


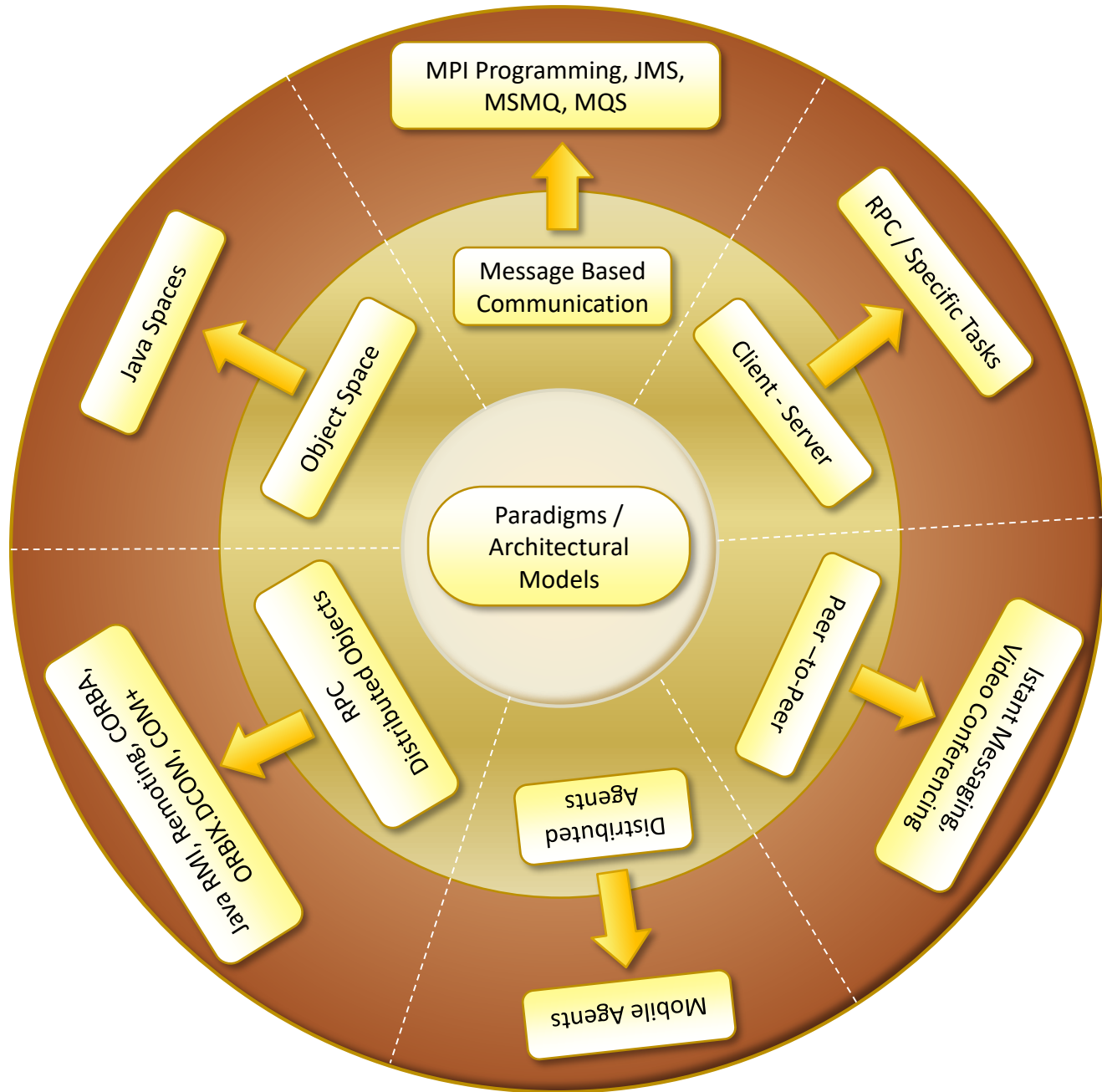


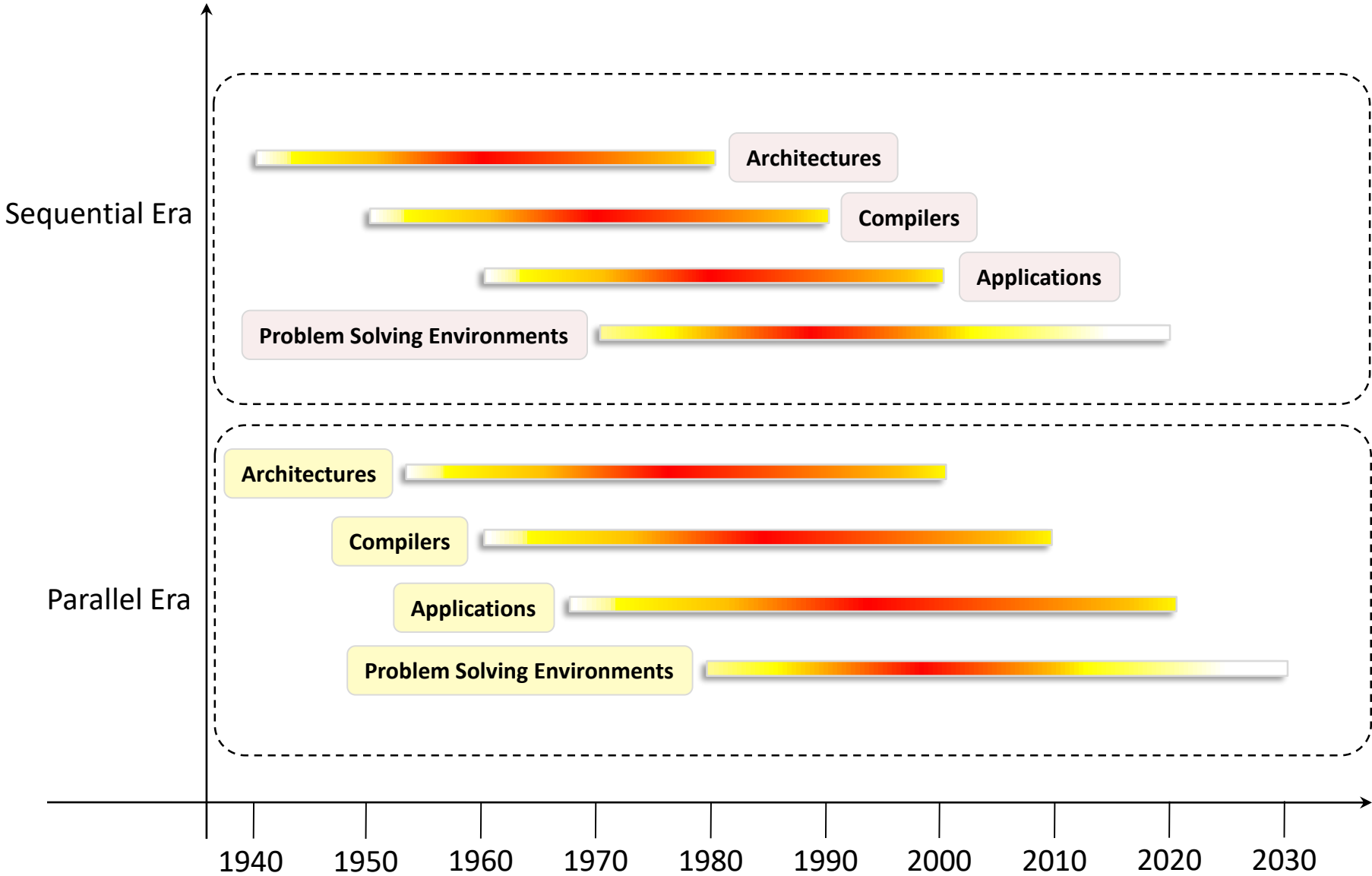


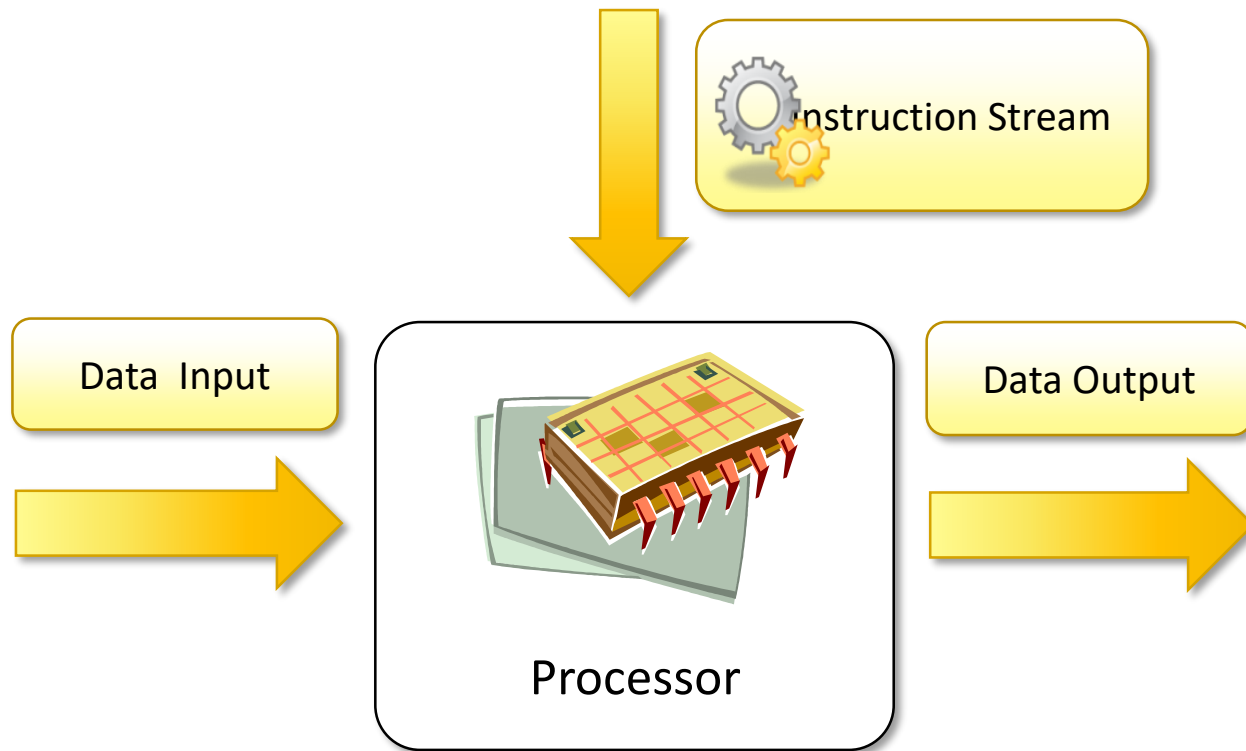
Chapter 2 – Parallel and Distributed Computing

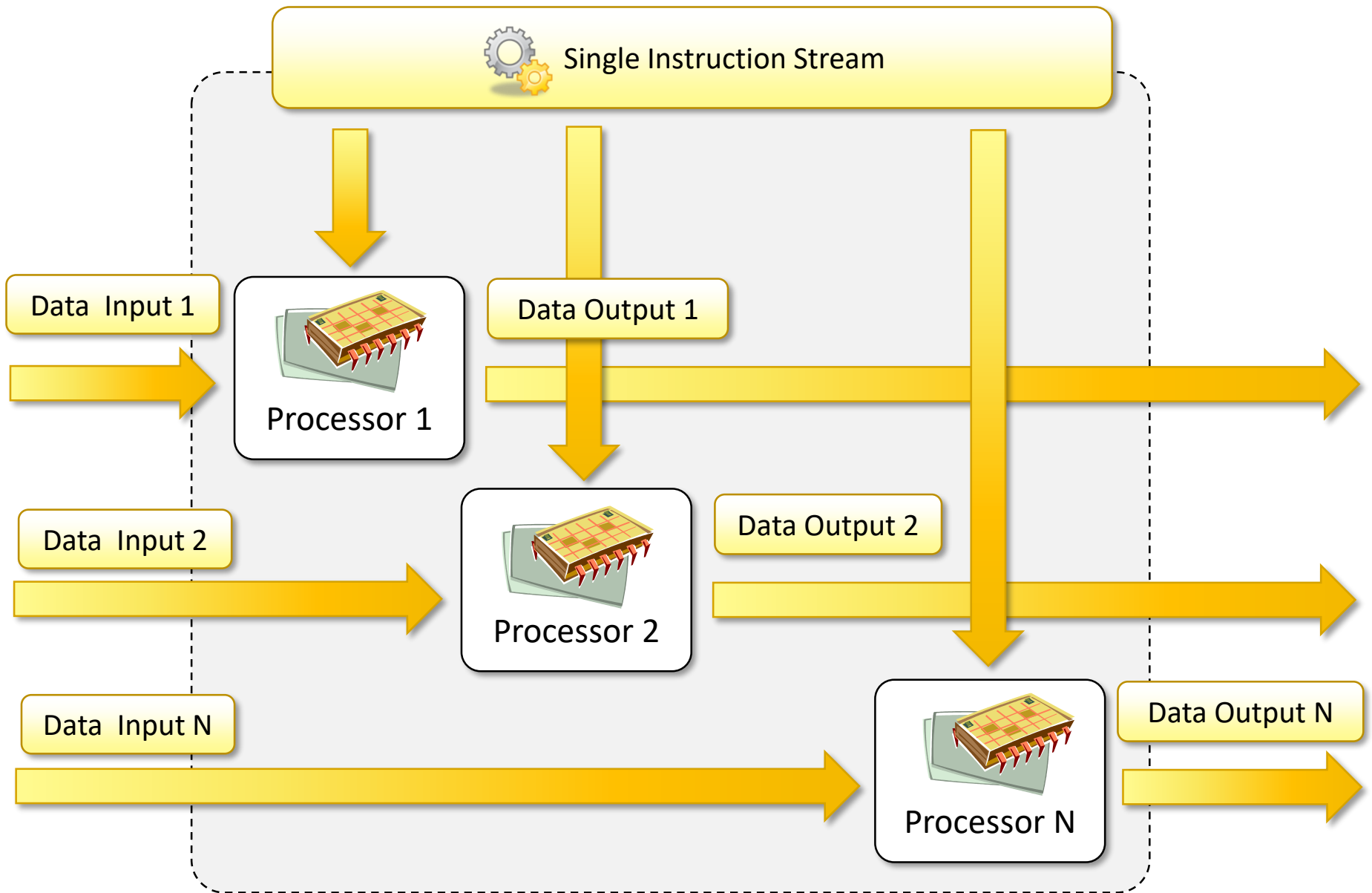


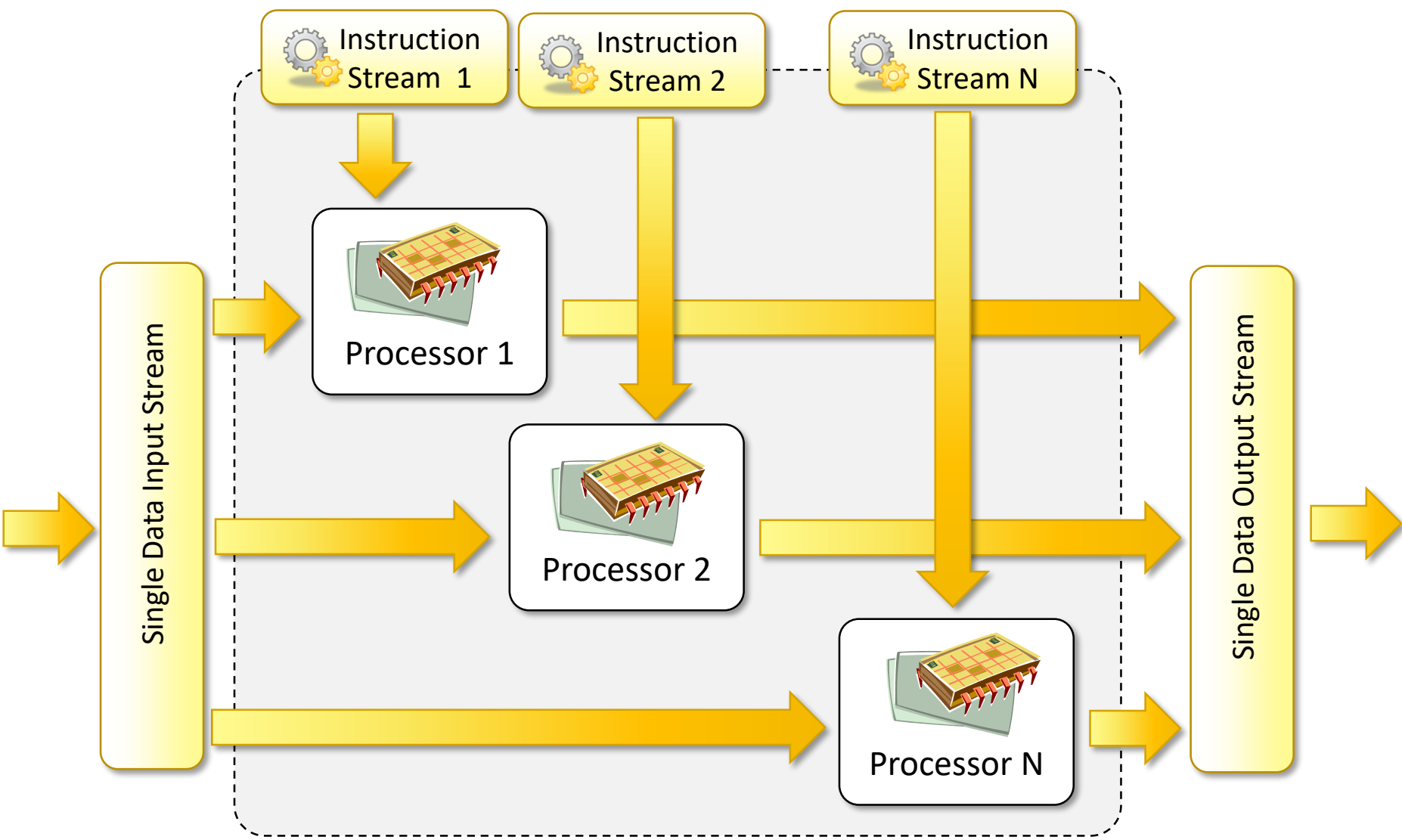


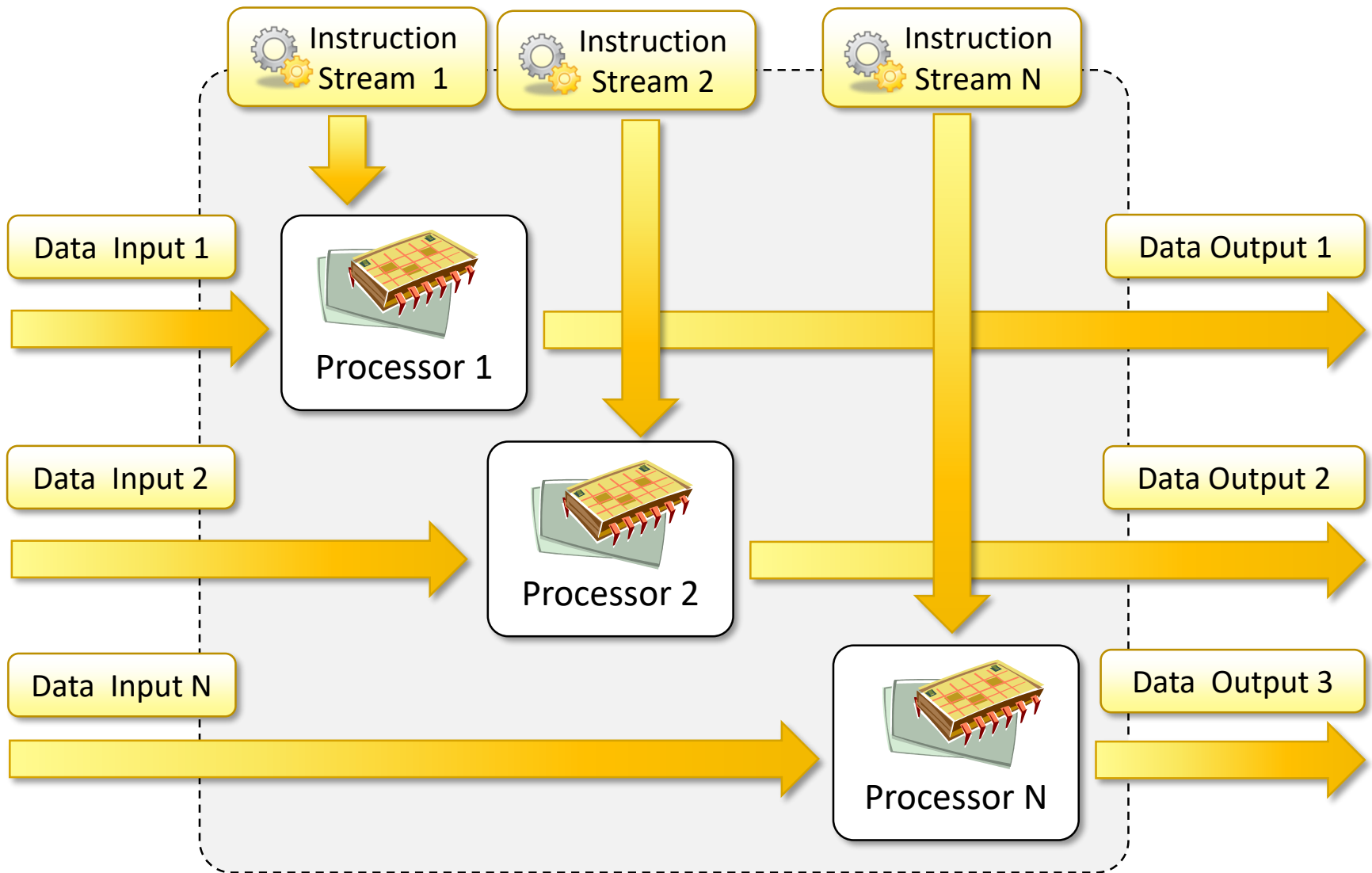


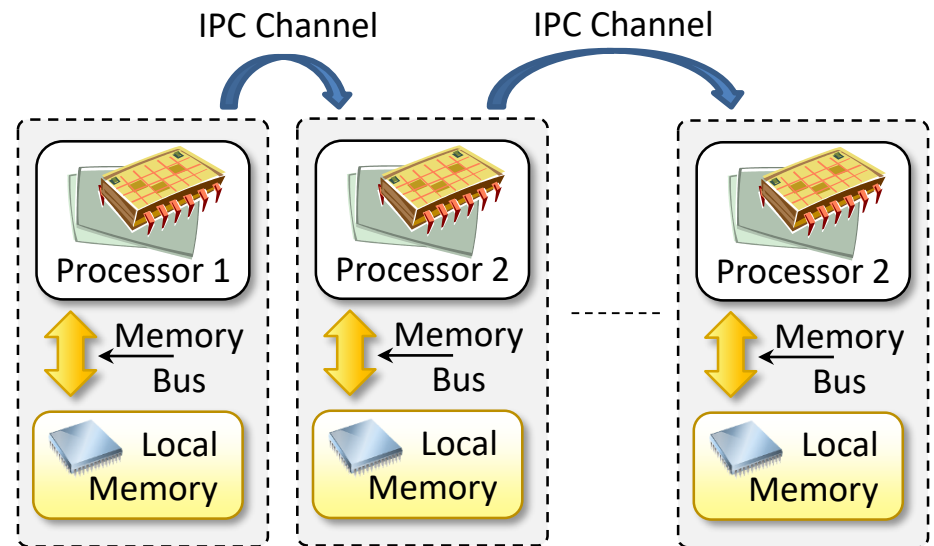
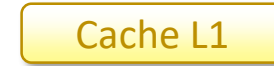
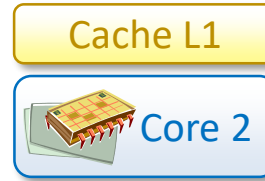
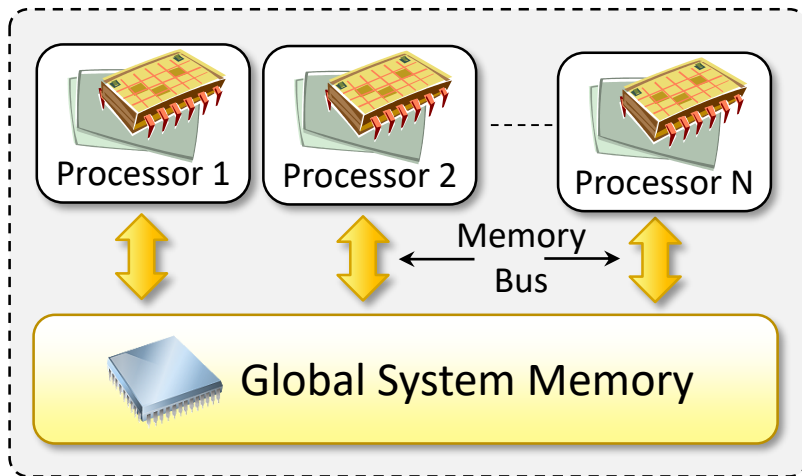


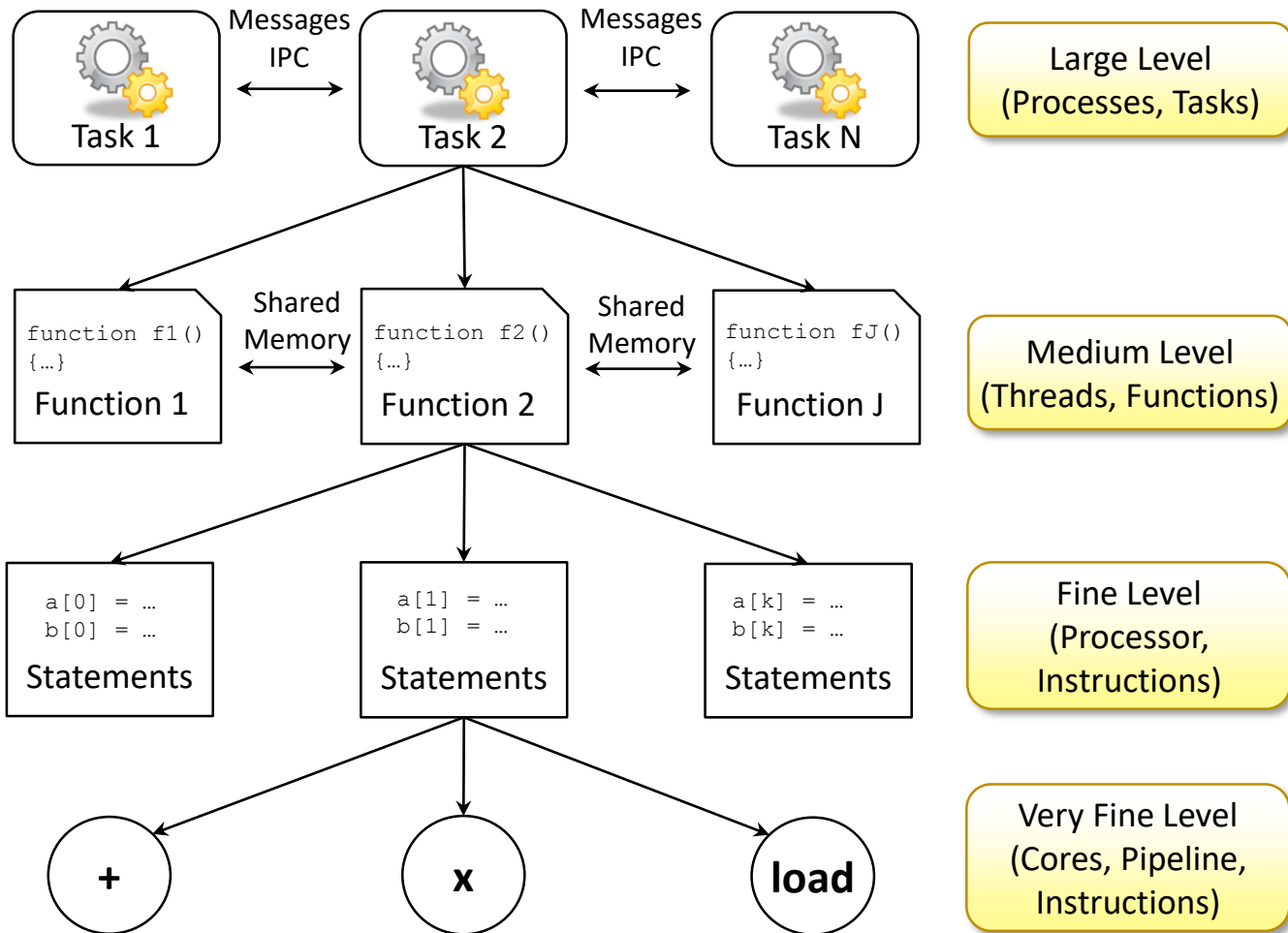


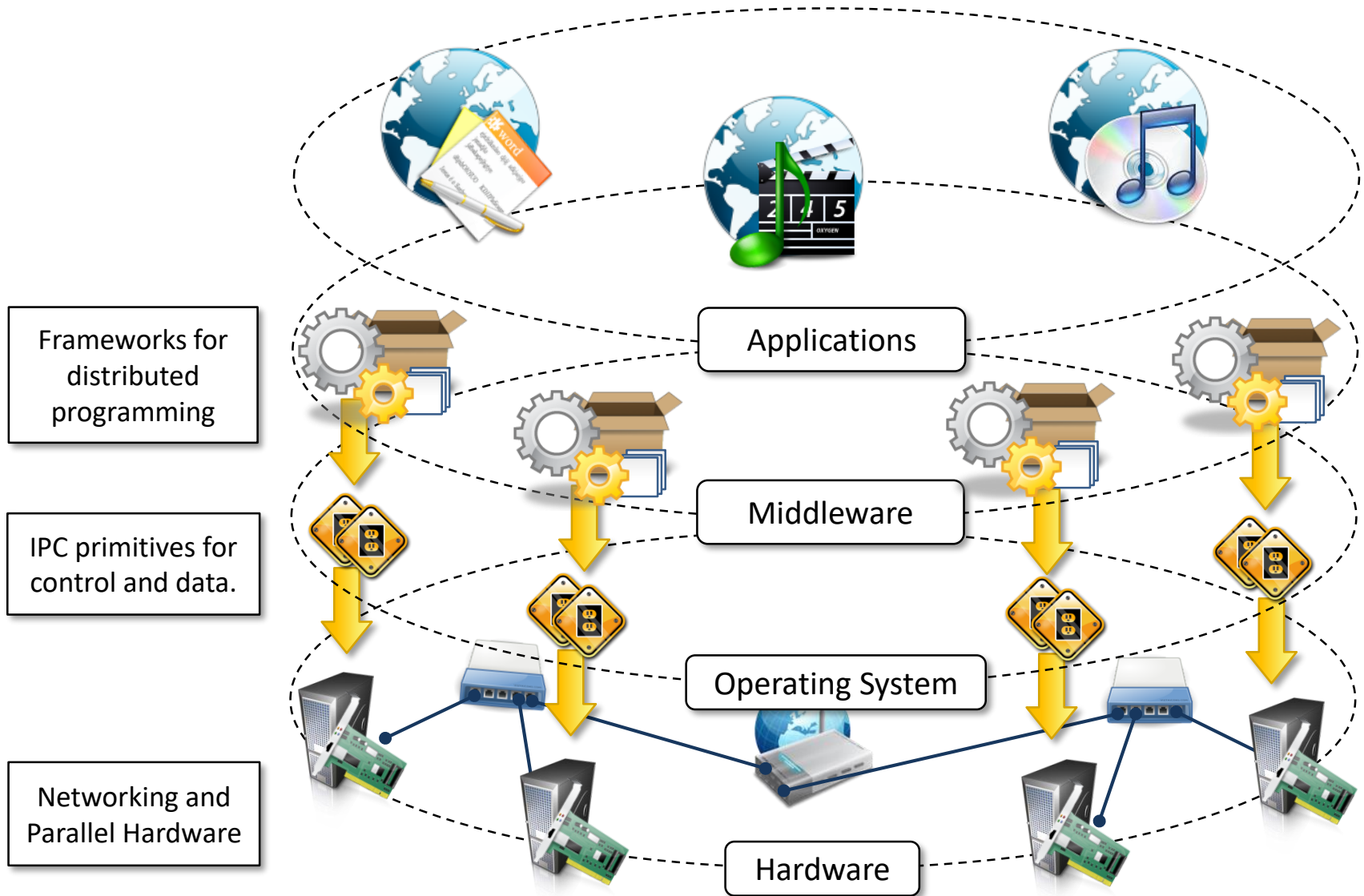

















Social Networks,
Scientific Computing,
Enterprise Applications



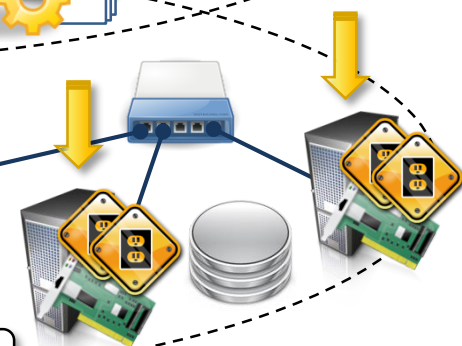
Frameworks for
Cloud Application
Development



Virtual hardware,
networking, OS images,
and storage.

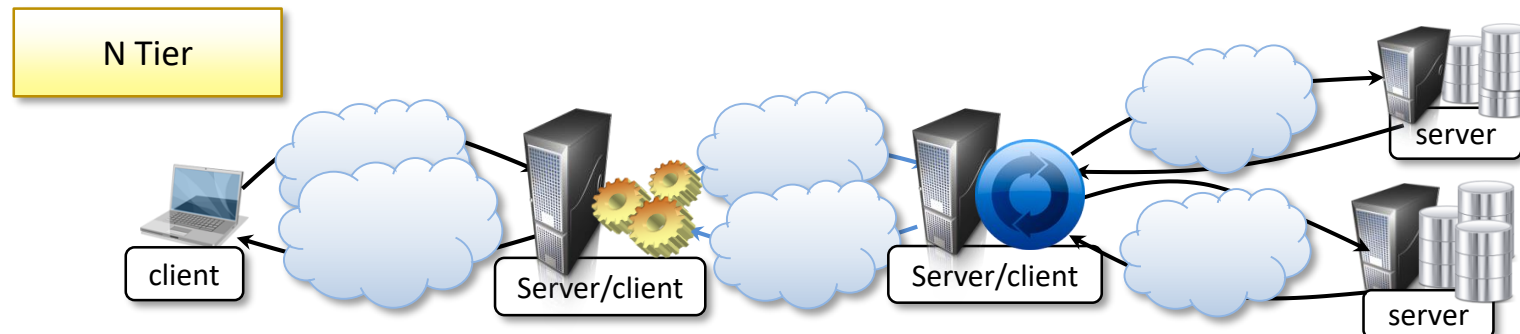
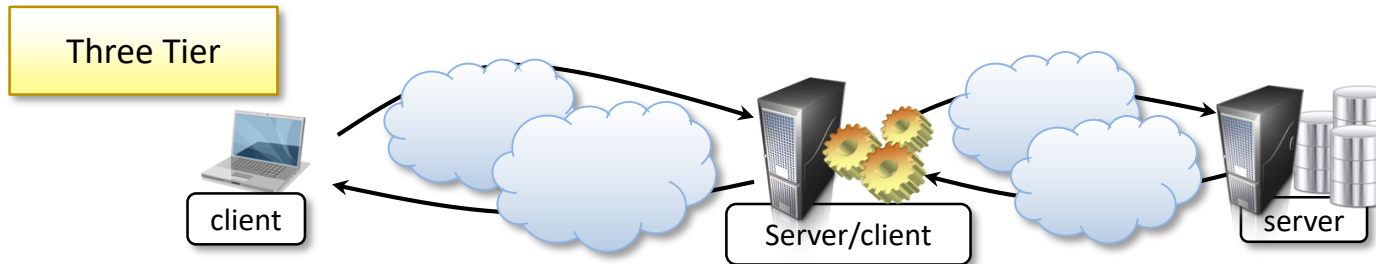
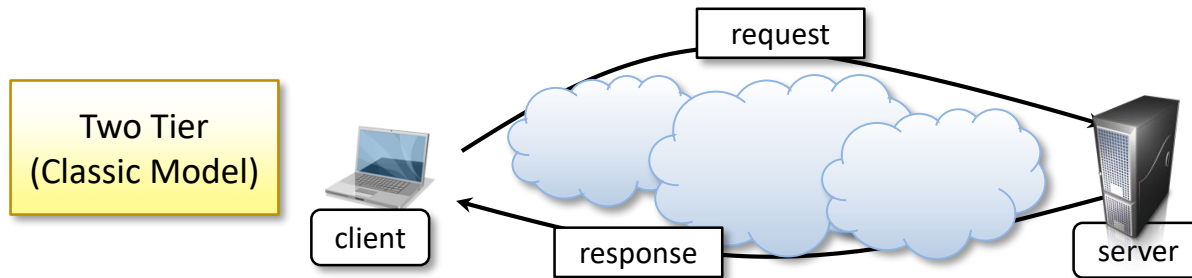


Middleware (PaaS)

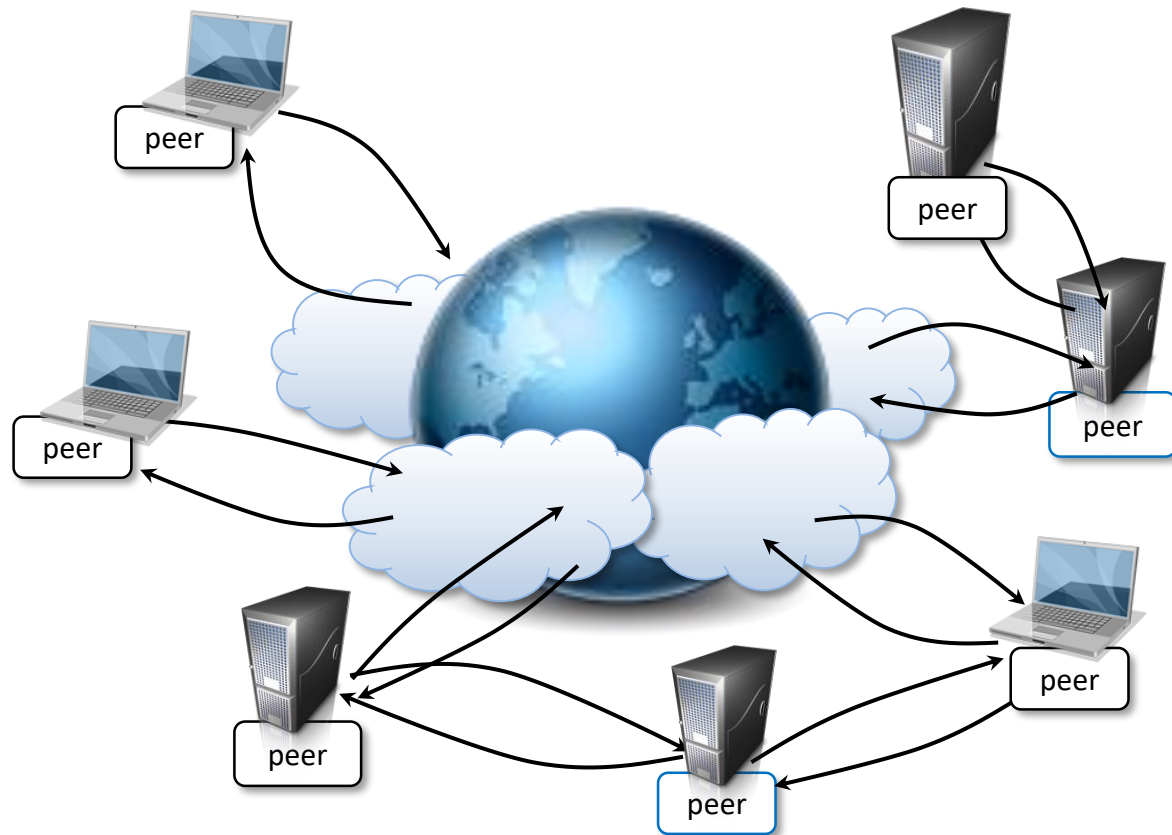


Hardware and OS (IaaS)

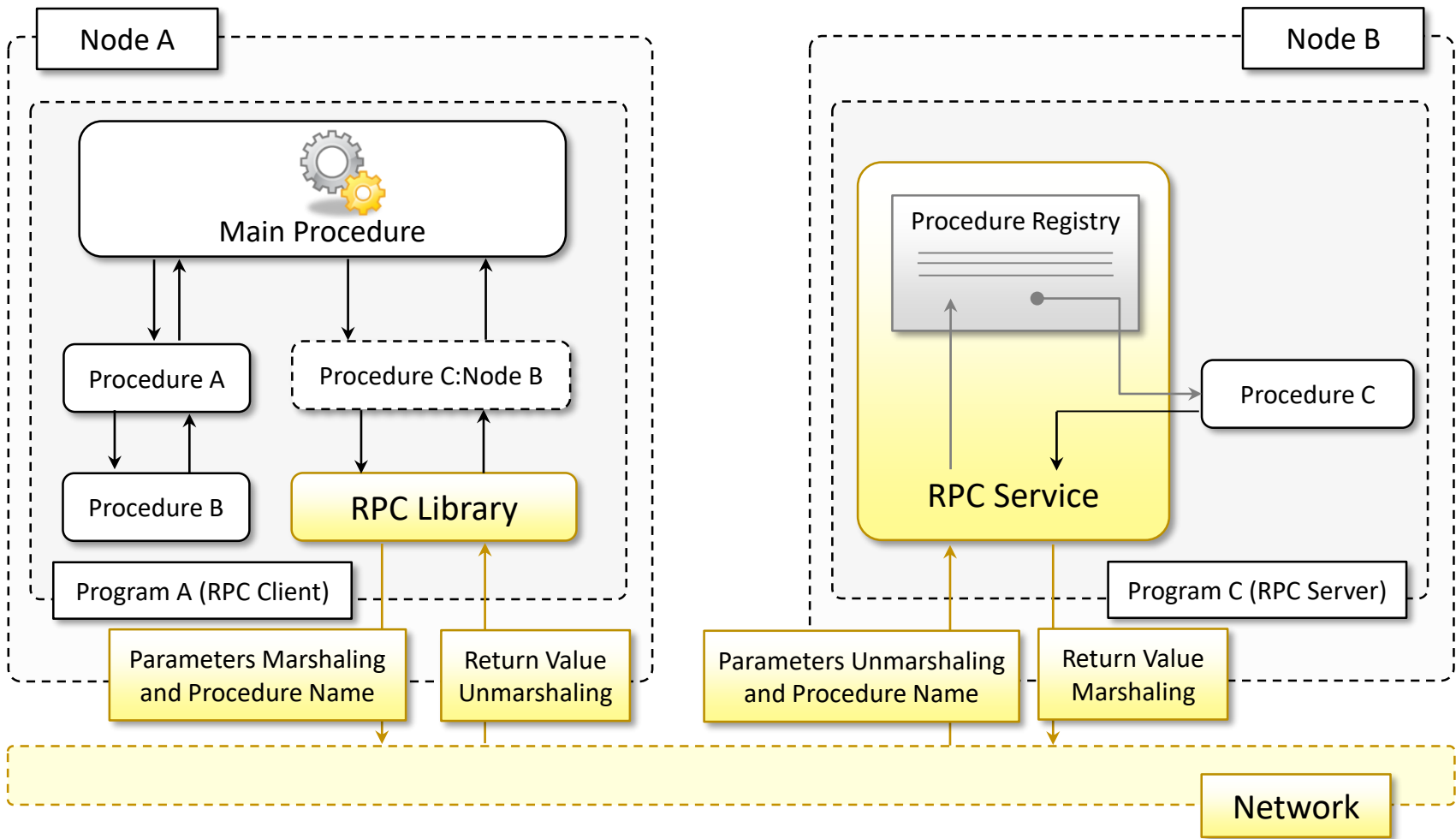
Client-server



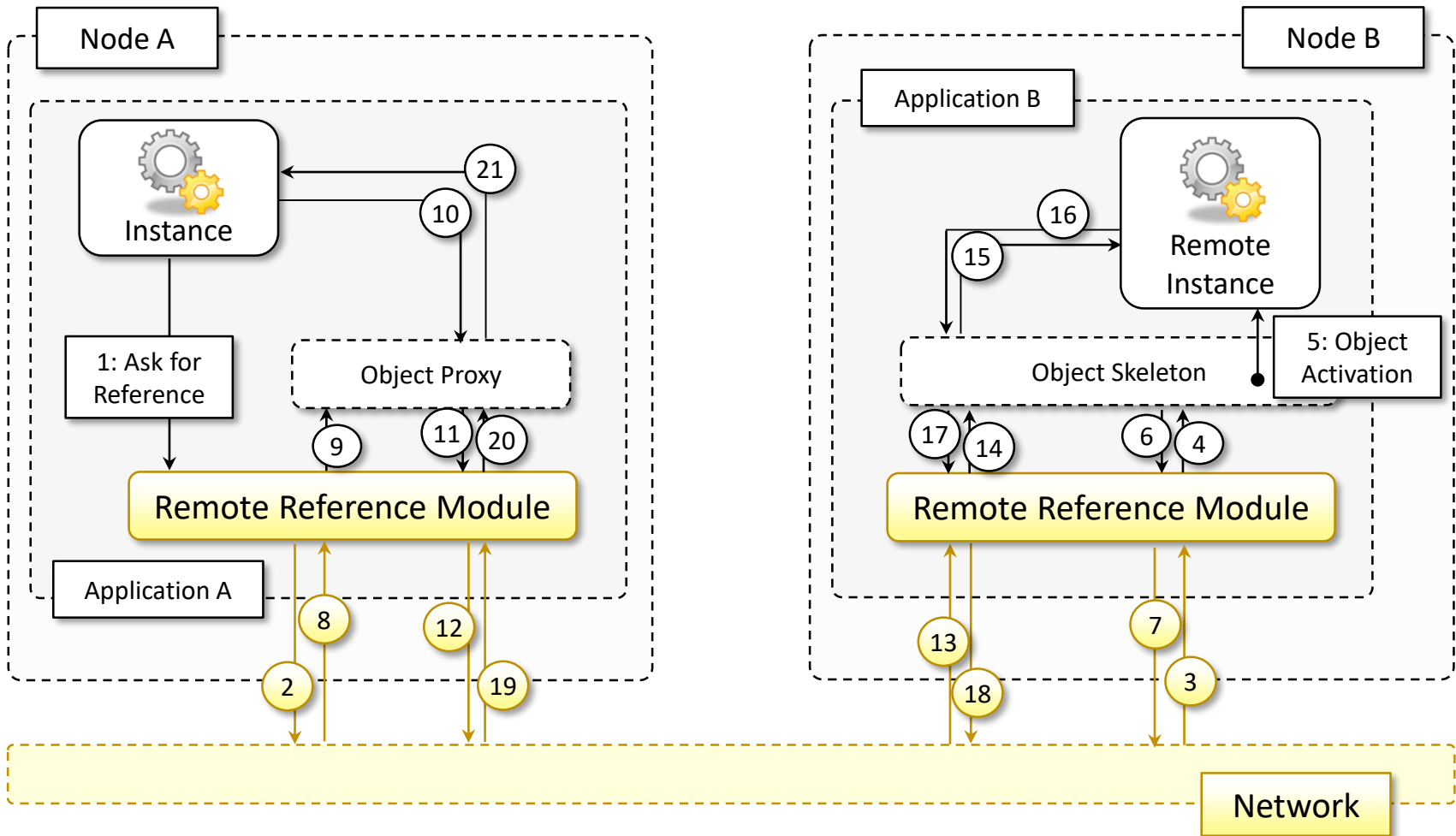
P2P

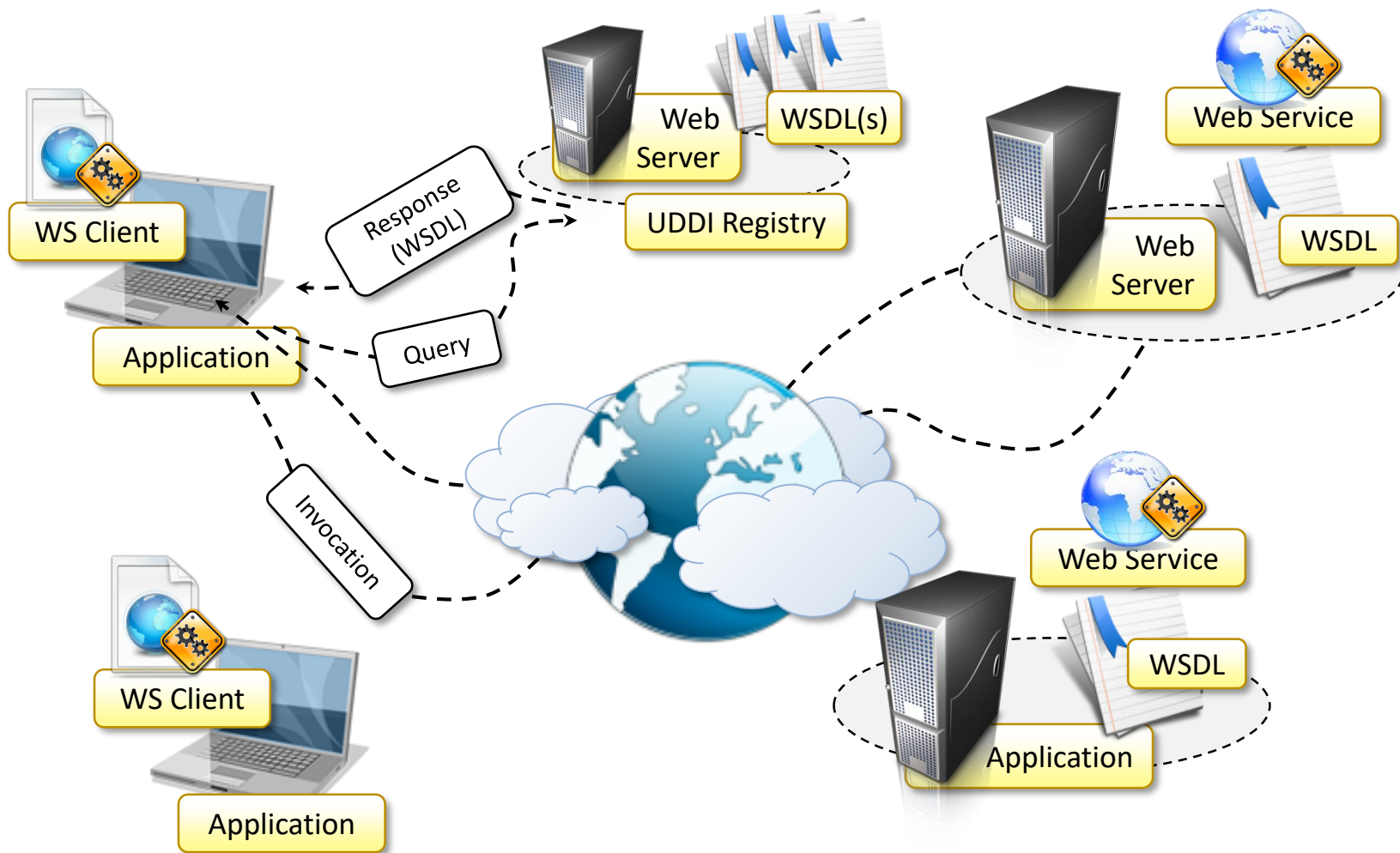


RPC

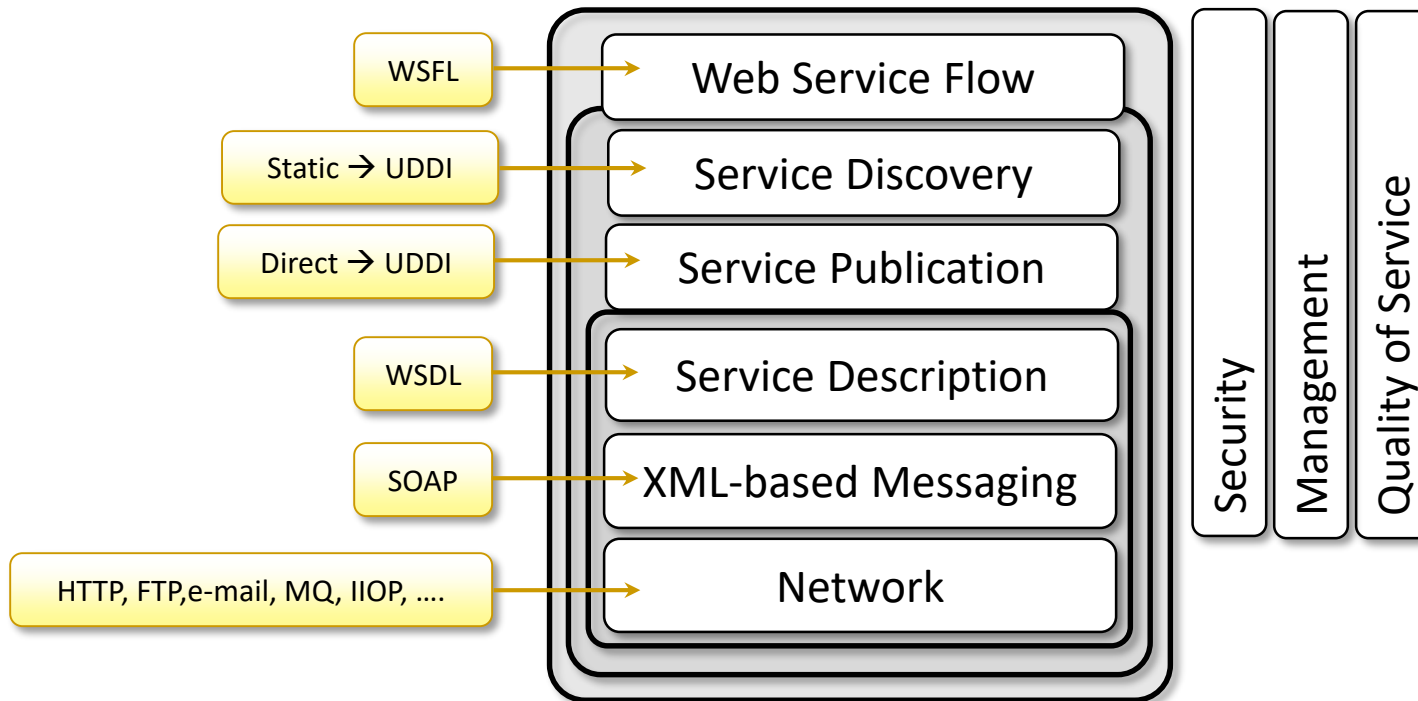


DOF interaction





WS technology Stack



SOAP Messages

```
POST /InStock HTTP/1.1
Host: www.stocks.com
Content-Type: application/soap+xml; charset=utf-8
Content-Length: <Size>
```

```
<?xml version="1.0">
```

```
<soap:Envelope xmlns:soap="http://www.w3.org/2001/12/soap-envelope"
  soap:encodingStyle="http://www.w3.org/2001/12/soap-encoding">
```

```
<soap:Header></soap:Header>
```

```
<soap:Body xmlns:m=http://www.stocks.org/stock>
```

```
<m:GetStockPrice>
```

```
<m:StockName>IBM<m:StockName>
```

```
</m:GetStockPrice>
```

```
</soap:Body>
```

```
</soap:Envelope>
```

Envelope

Header: Metadata & Assertions

Body: Method Call

SOAP Messages

```
POST /InStock HTTP/1.1
Host: www.stocks.com
Content-Type: application/soap+xml; charset=utf-8
Content-Length: <Size>
```

```
<?xml version="1.0">
```

```
<soap:Envelope xmlns:soap="http://www.w3.org/2001/12/soap-envelope"
  soap:encodingStyle="http://www.w3.org/2001/12/soap-encoding">
```

```
<soap:Header></soap:Header>
```

```
<soap
```

```
<m:
```

```
<m
```

```
</m
```

```
</so
```

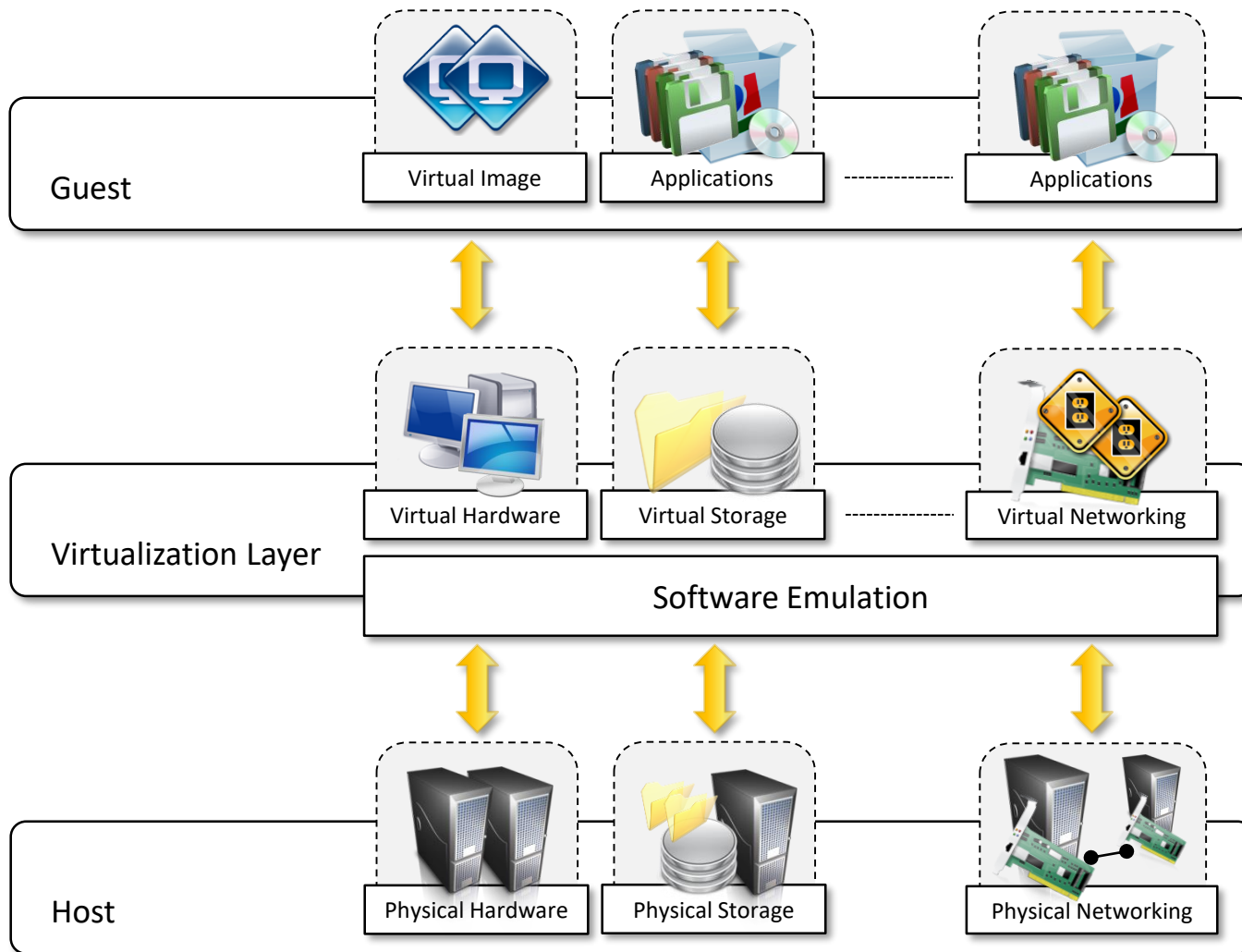
```
</soap:Envelope>
```

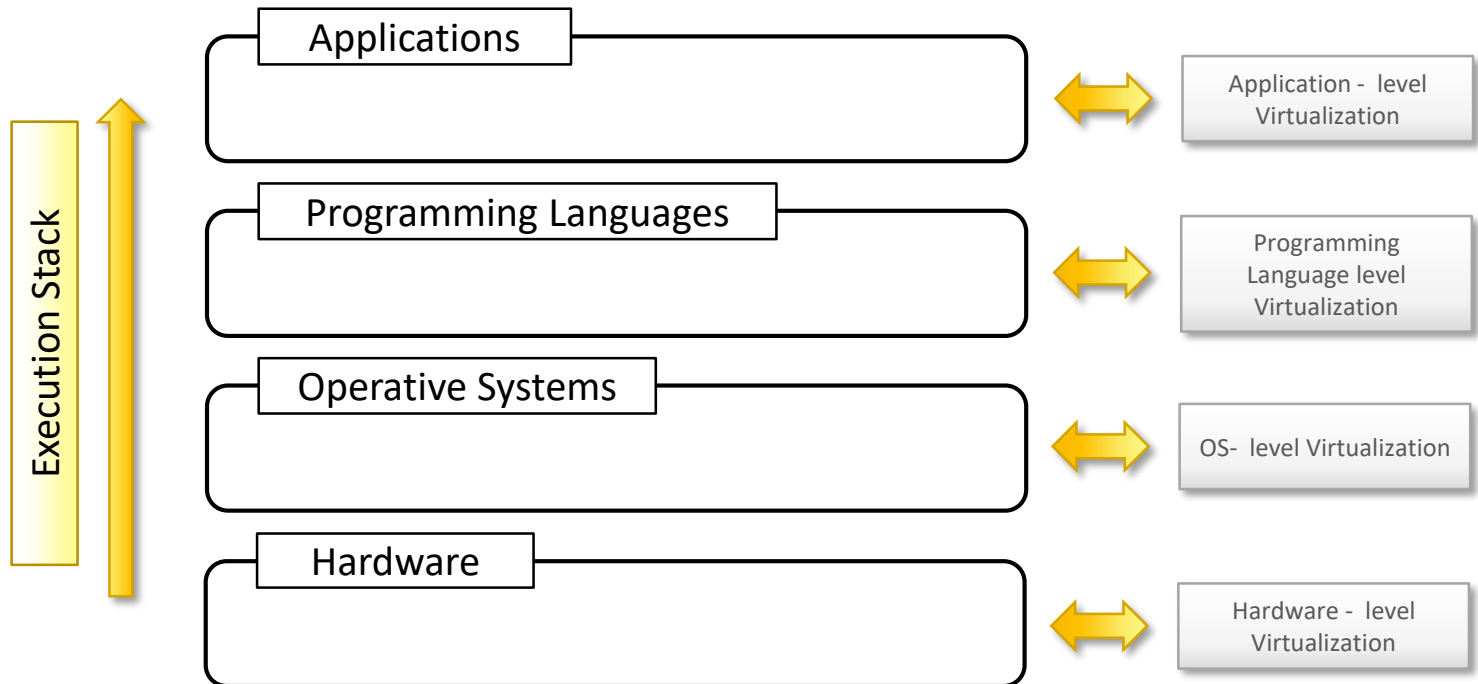
Envelope

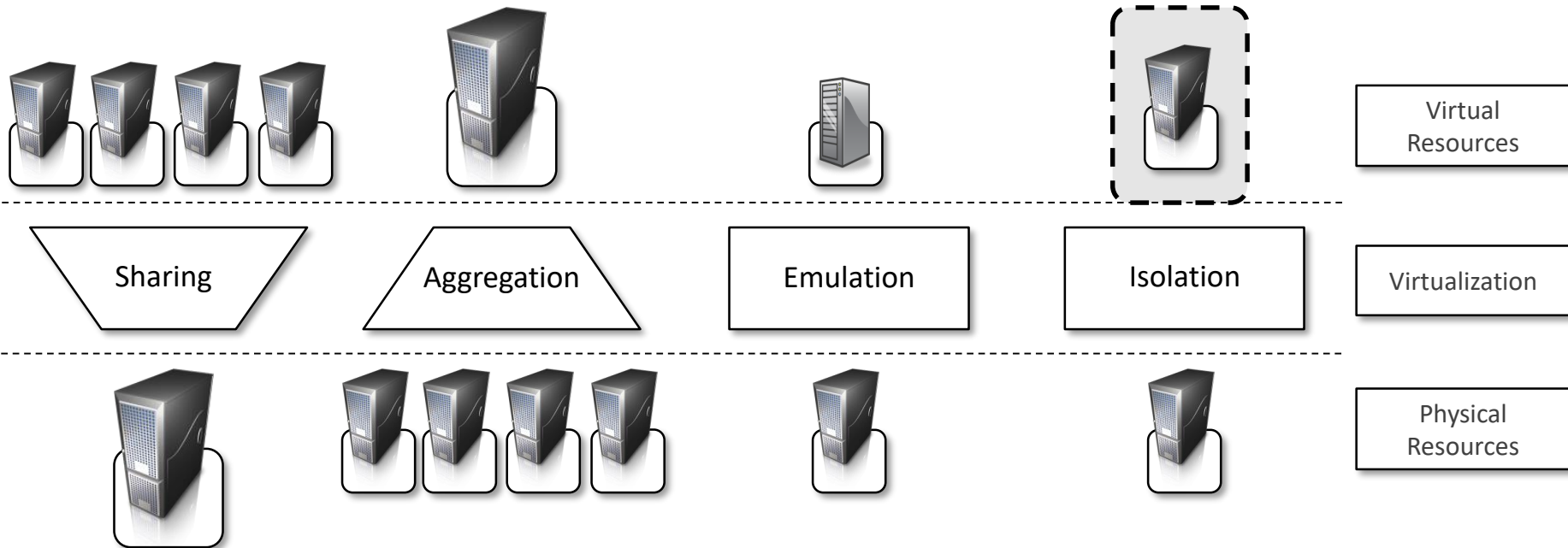
Header: Metadata & Assertions

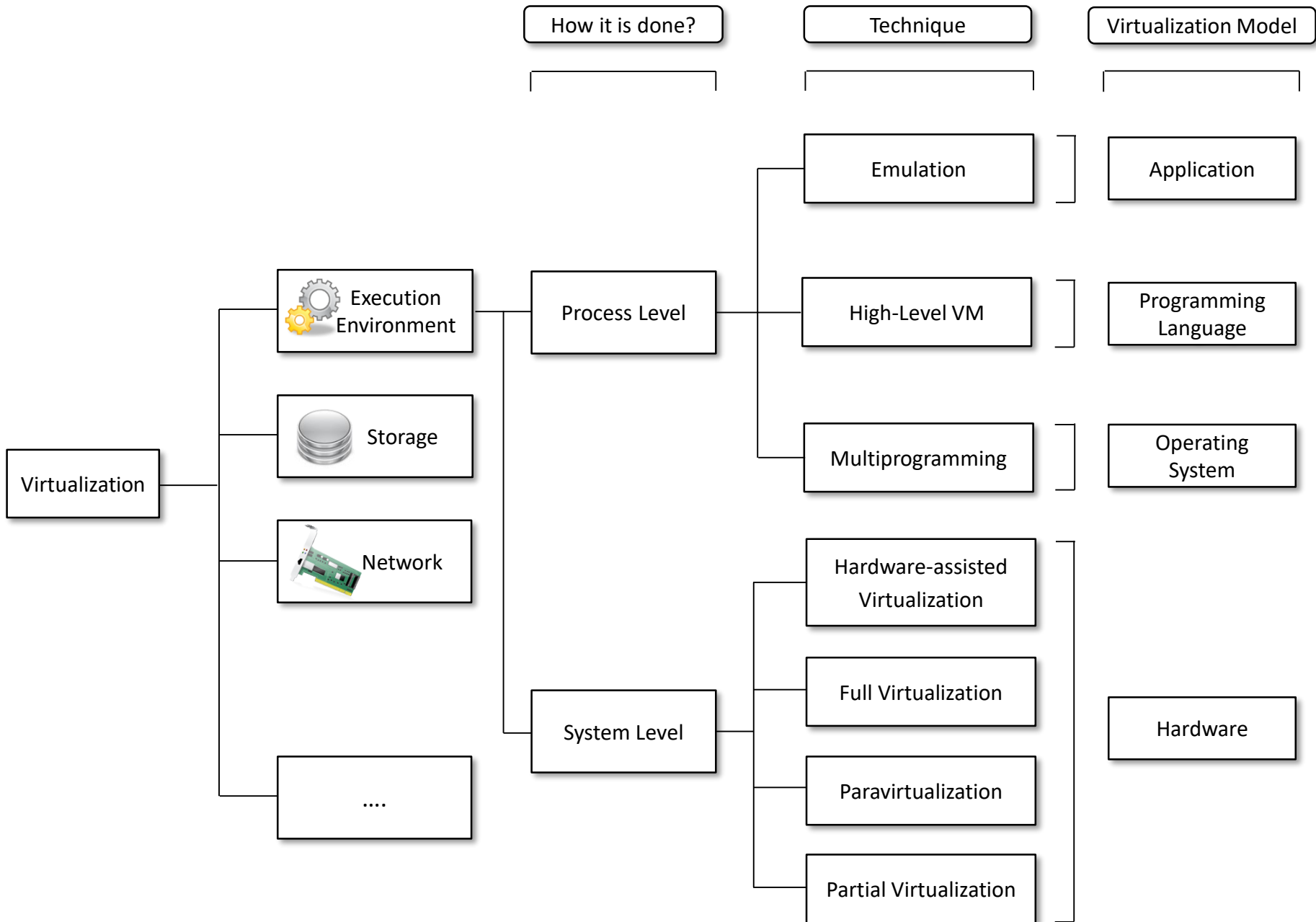
Body: Execution Result

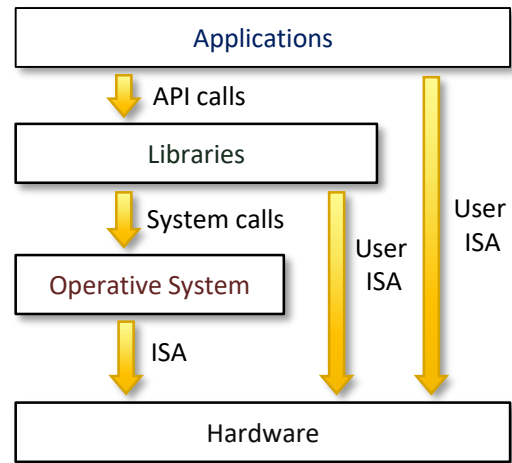
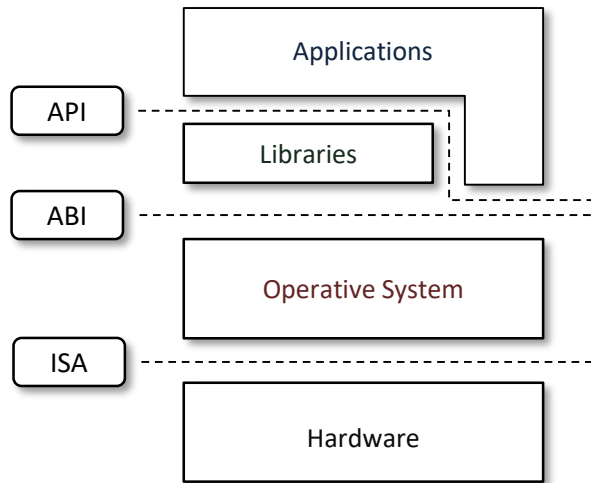
Chapter 3 – Virtualisation

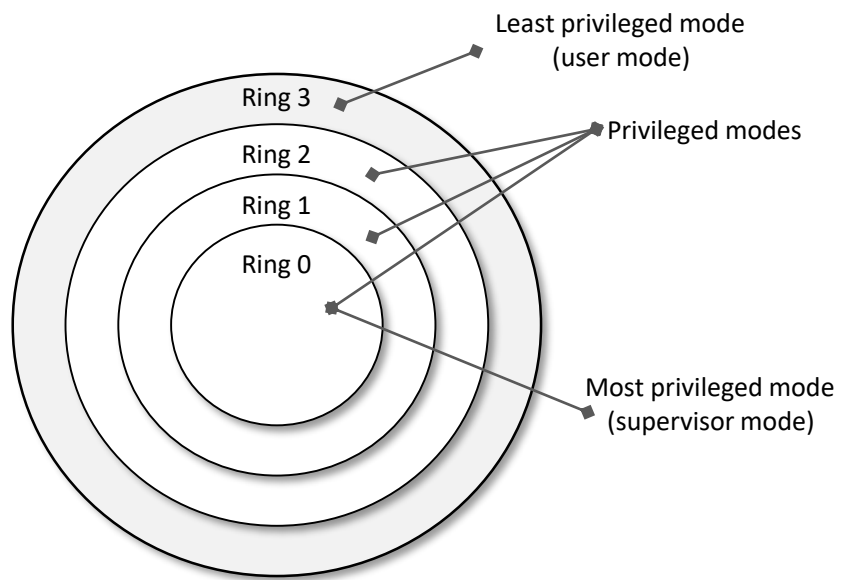


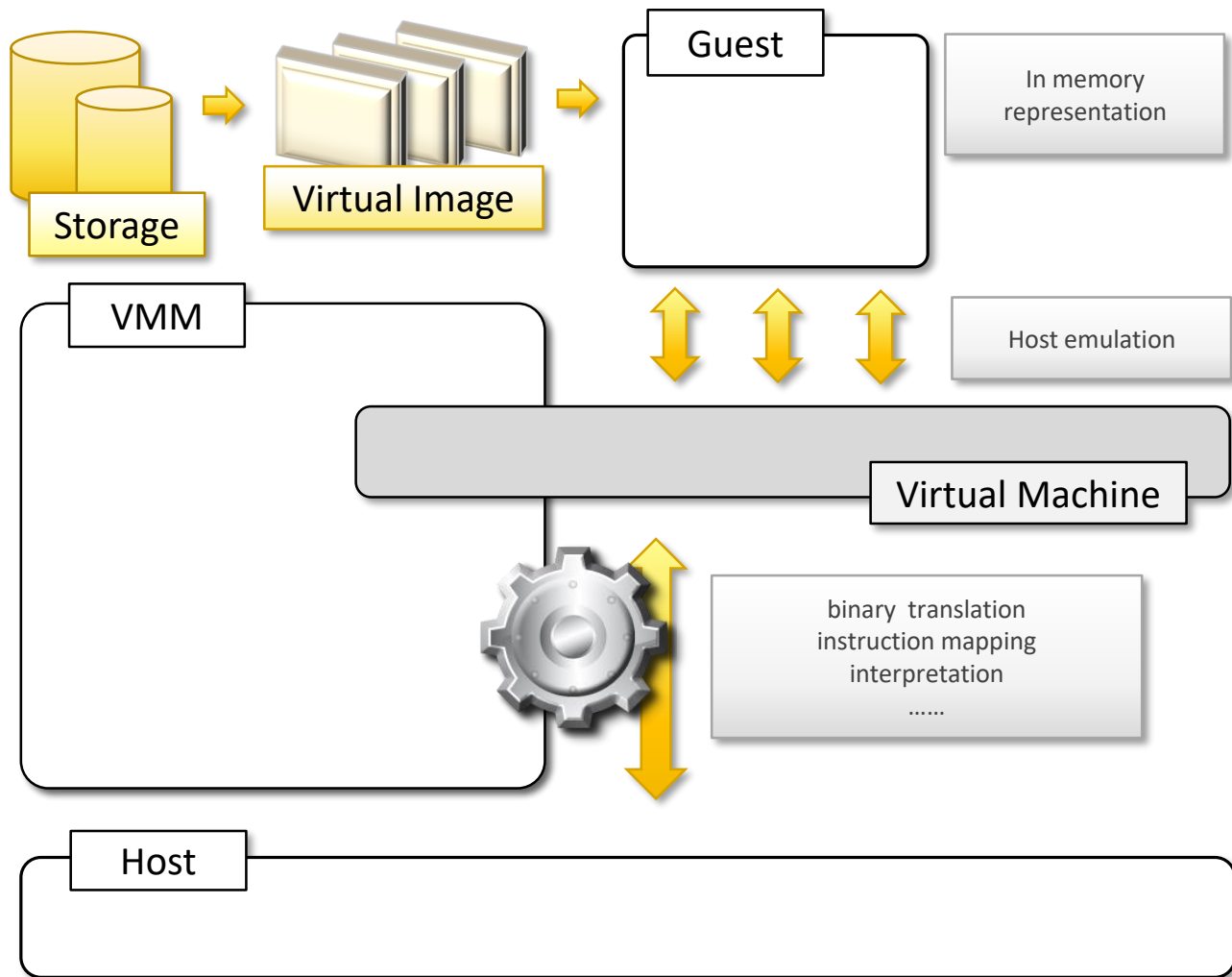


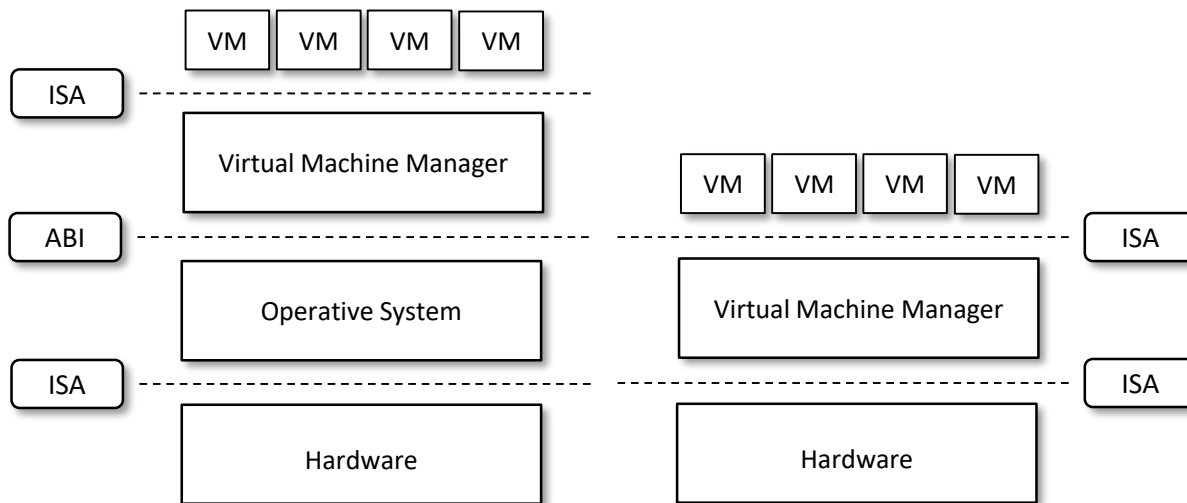


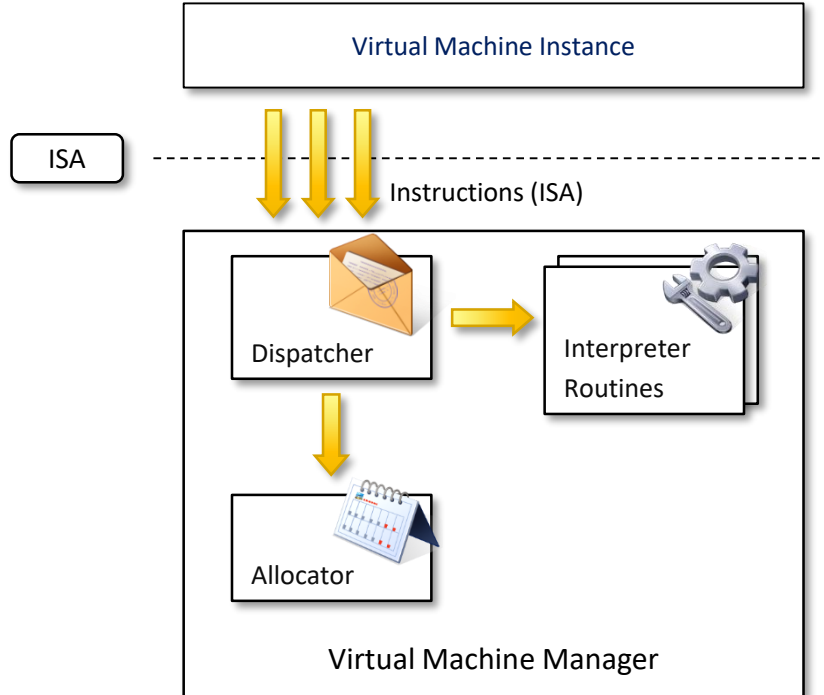


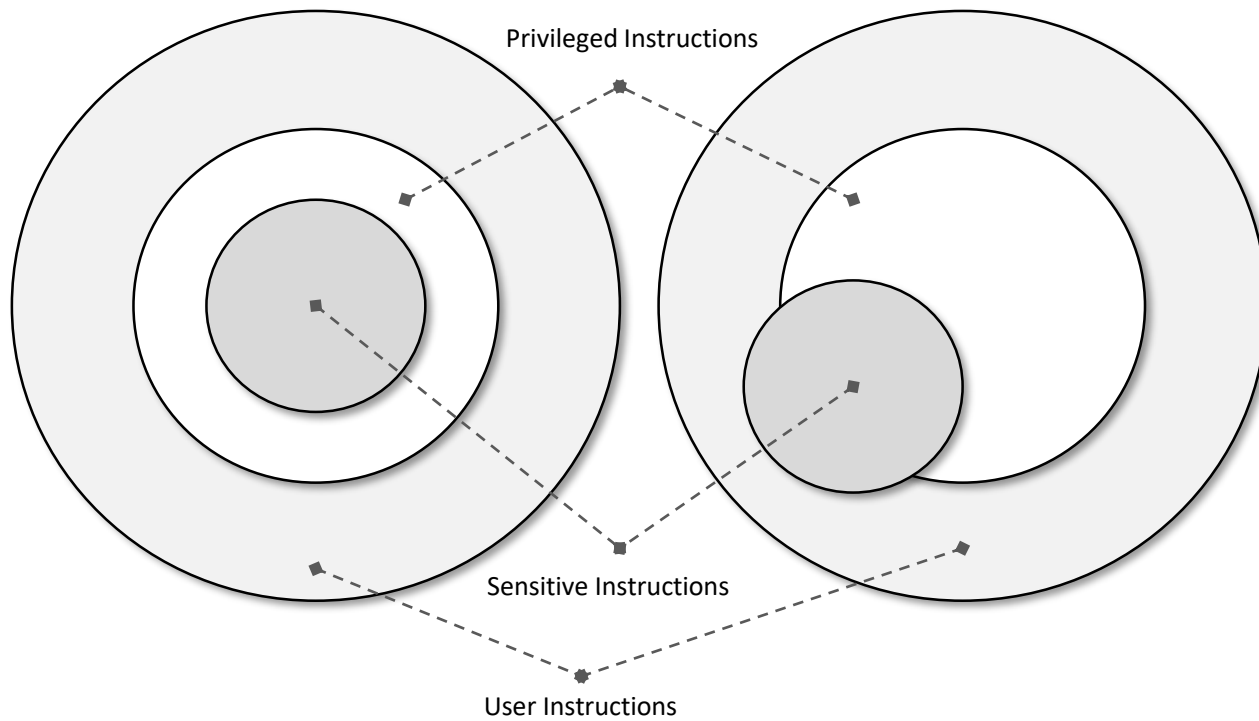


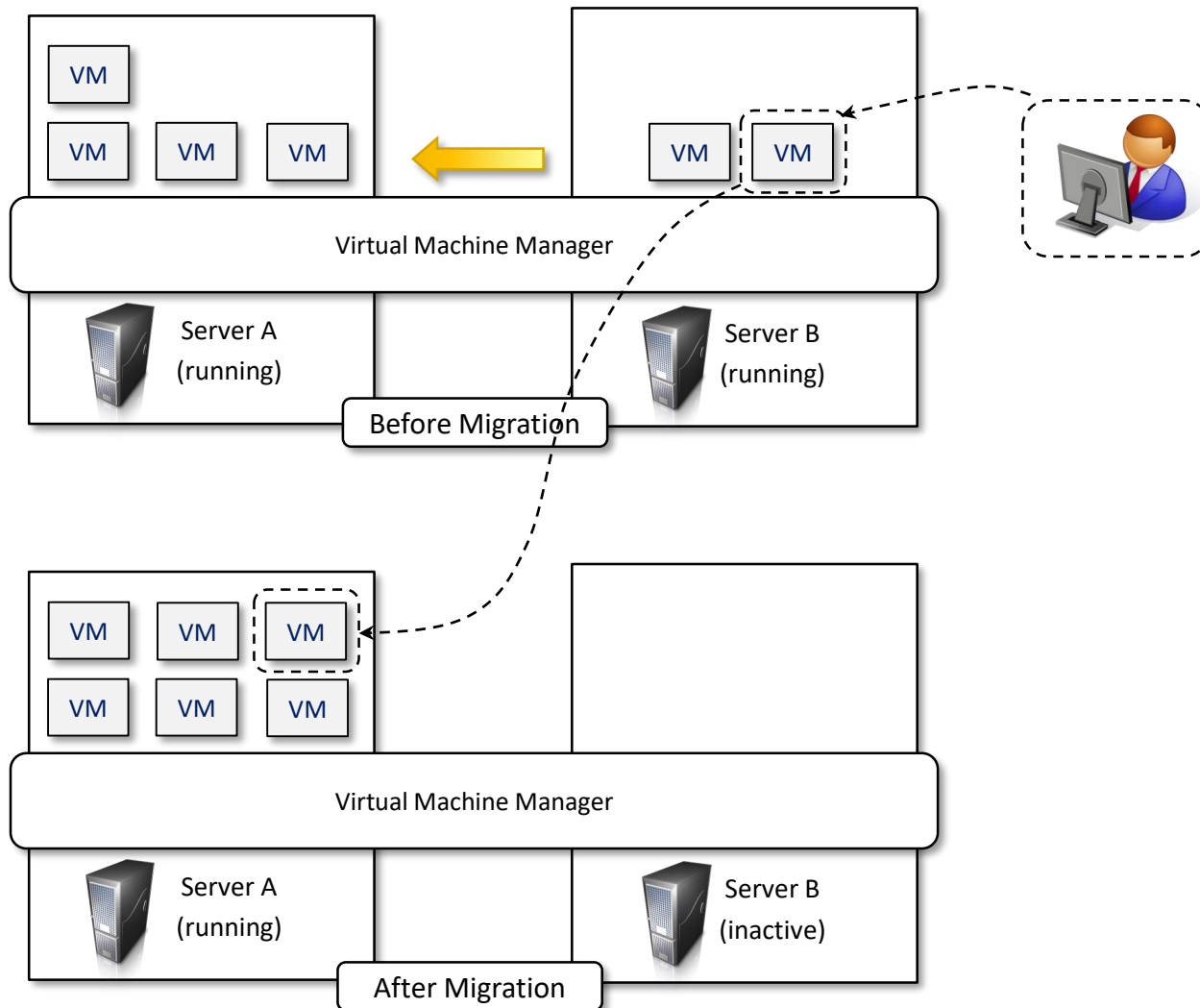


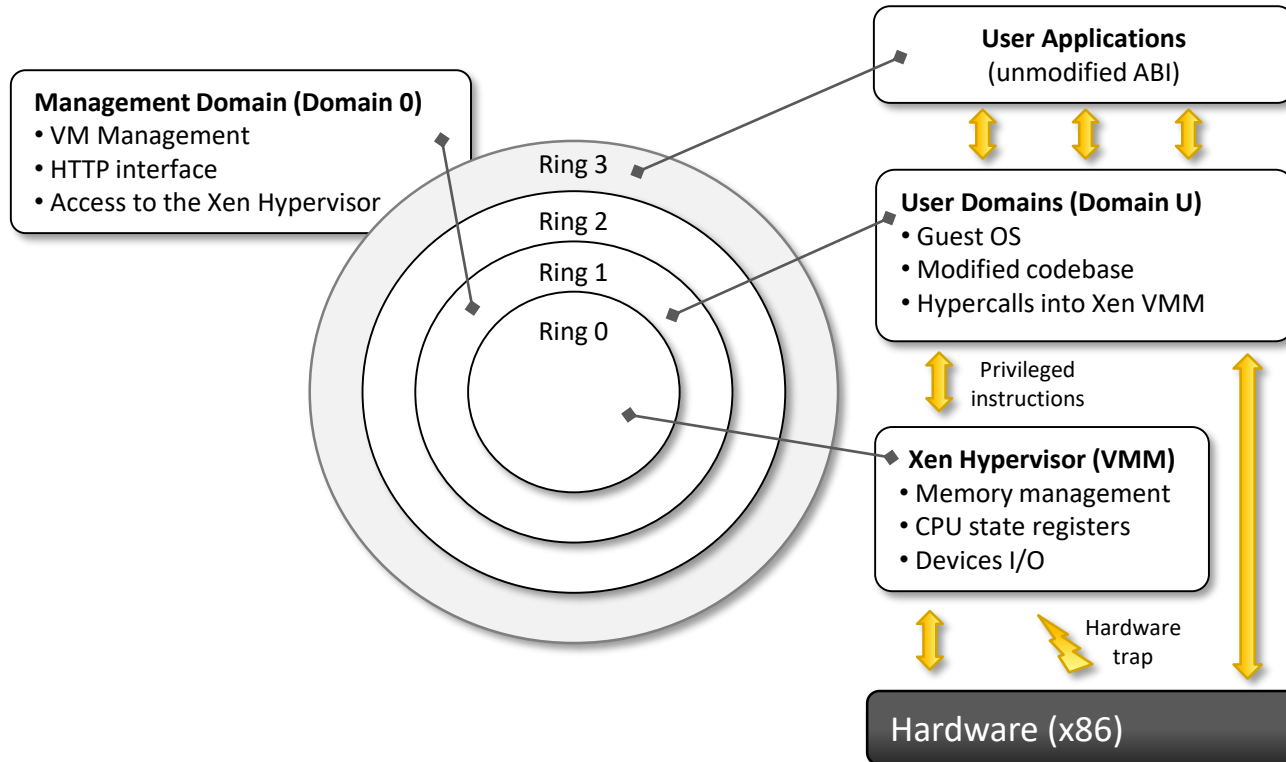


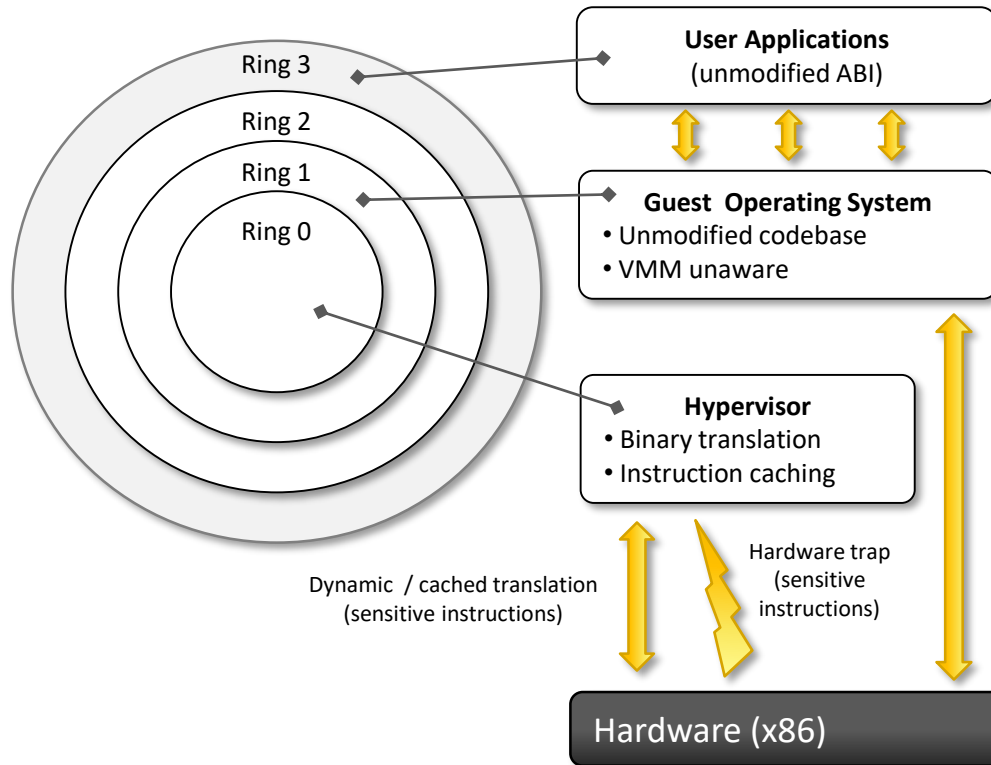


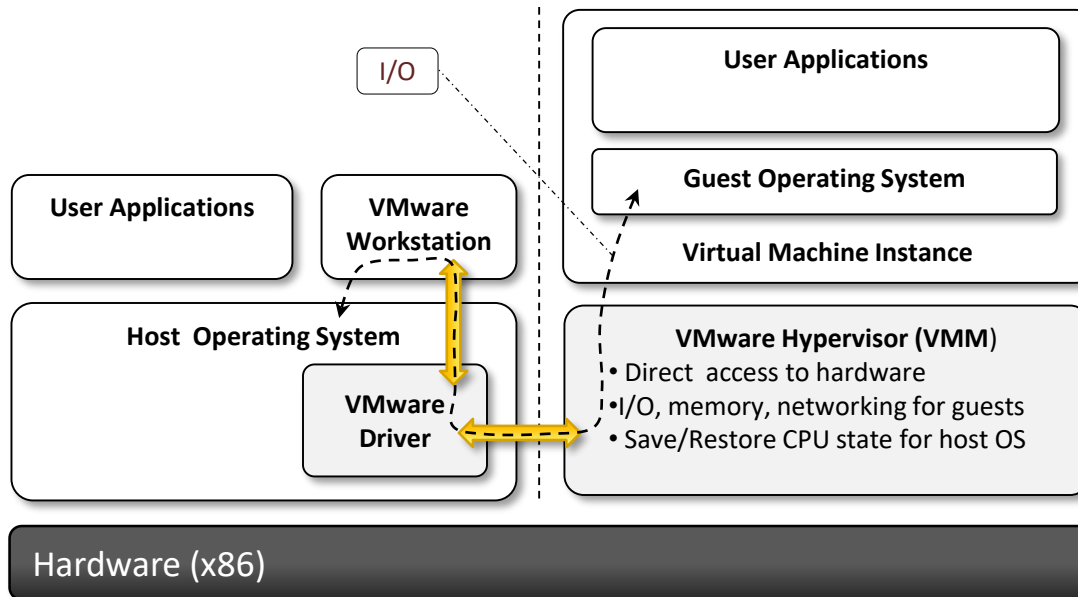


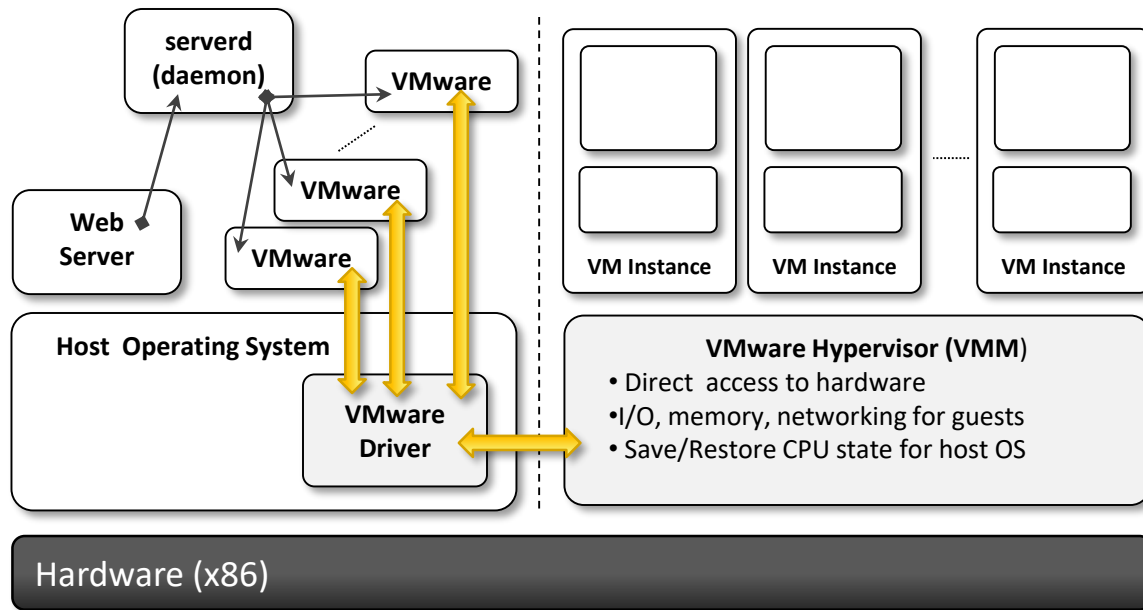


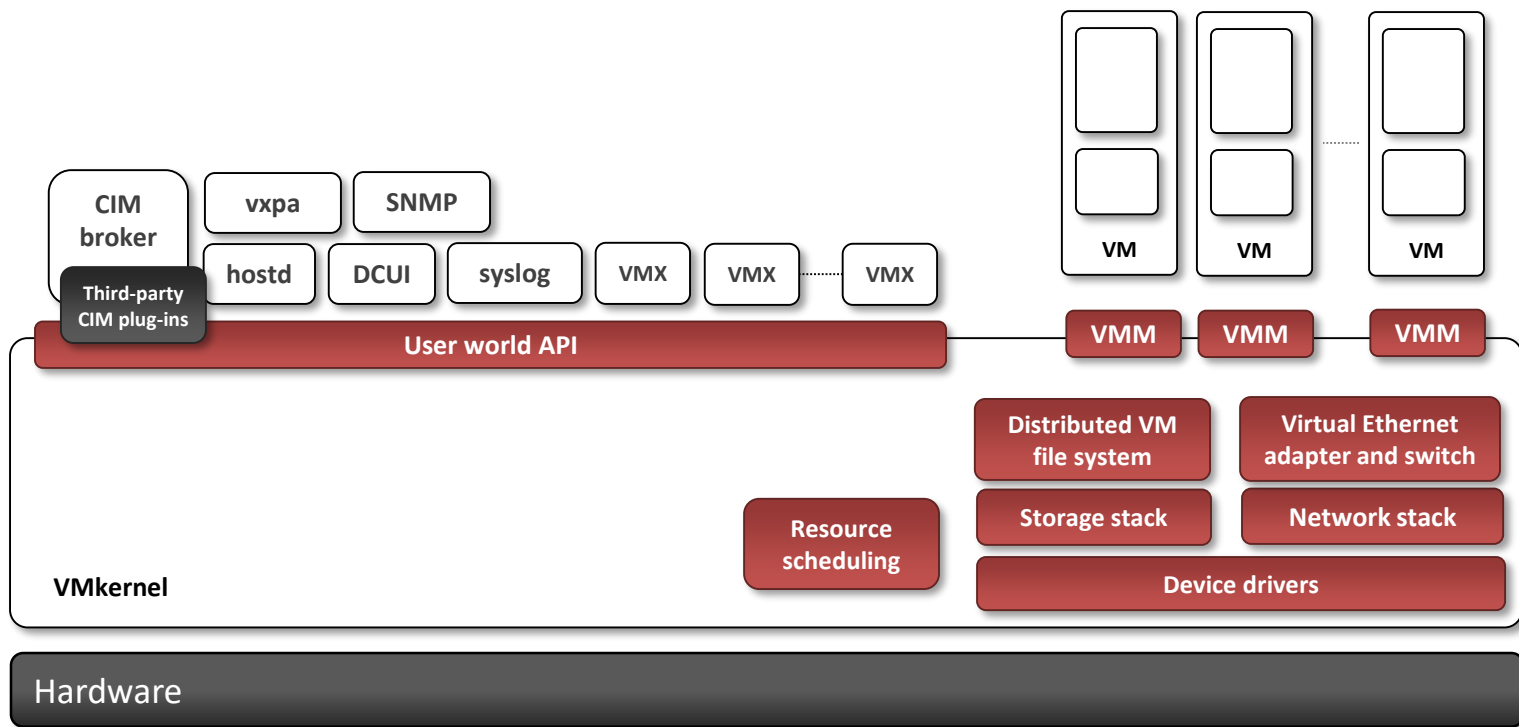


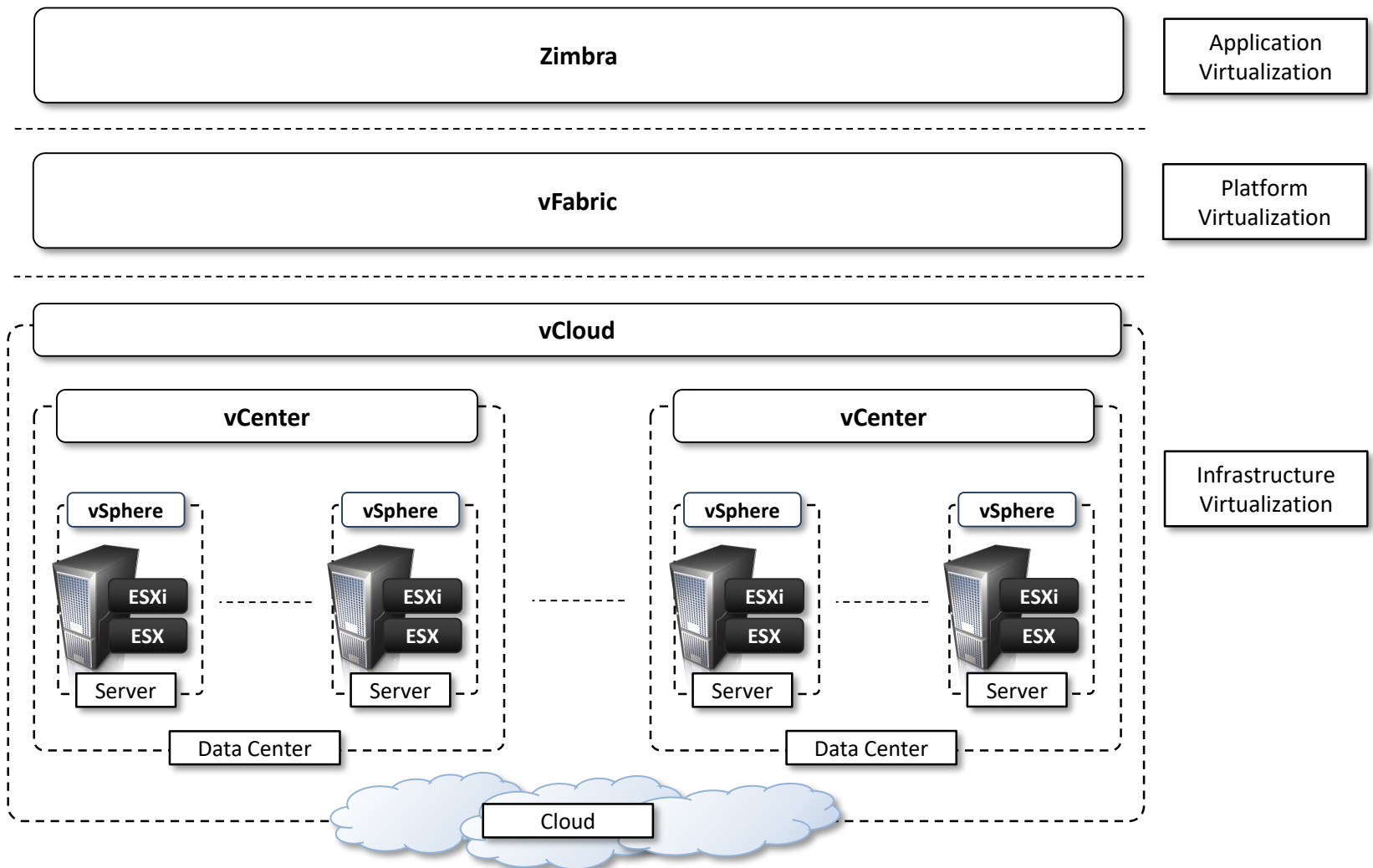


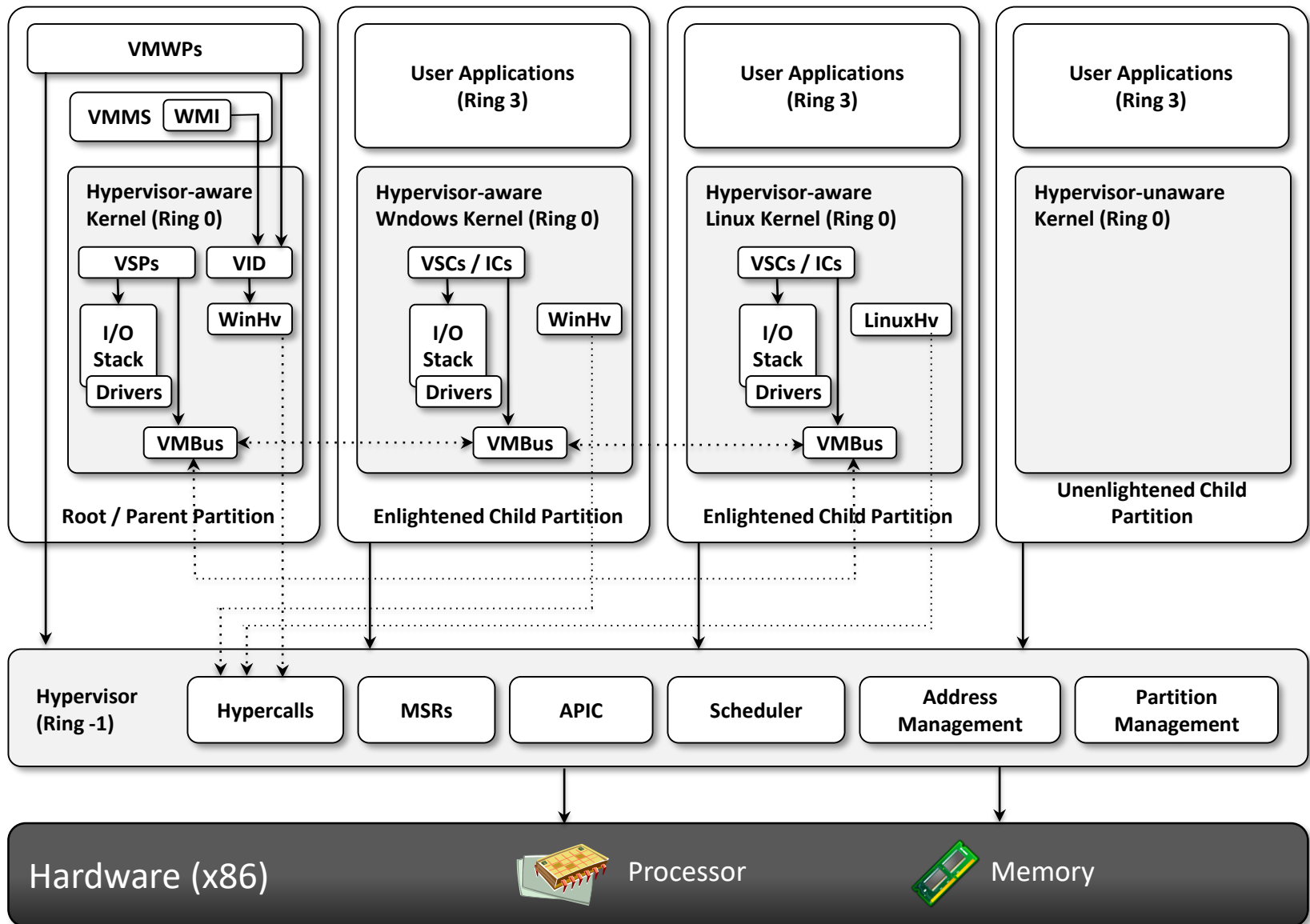




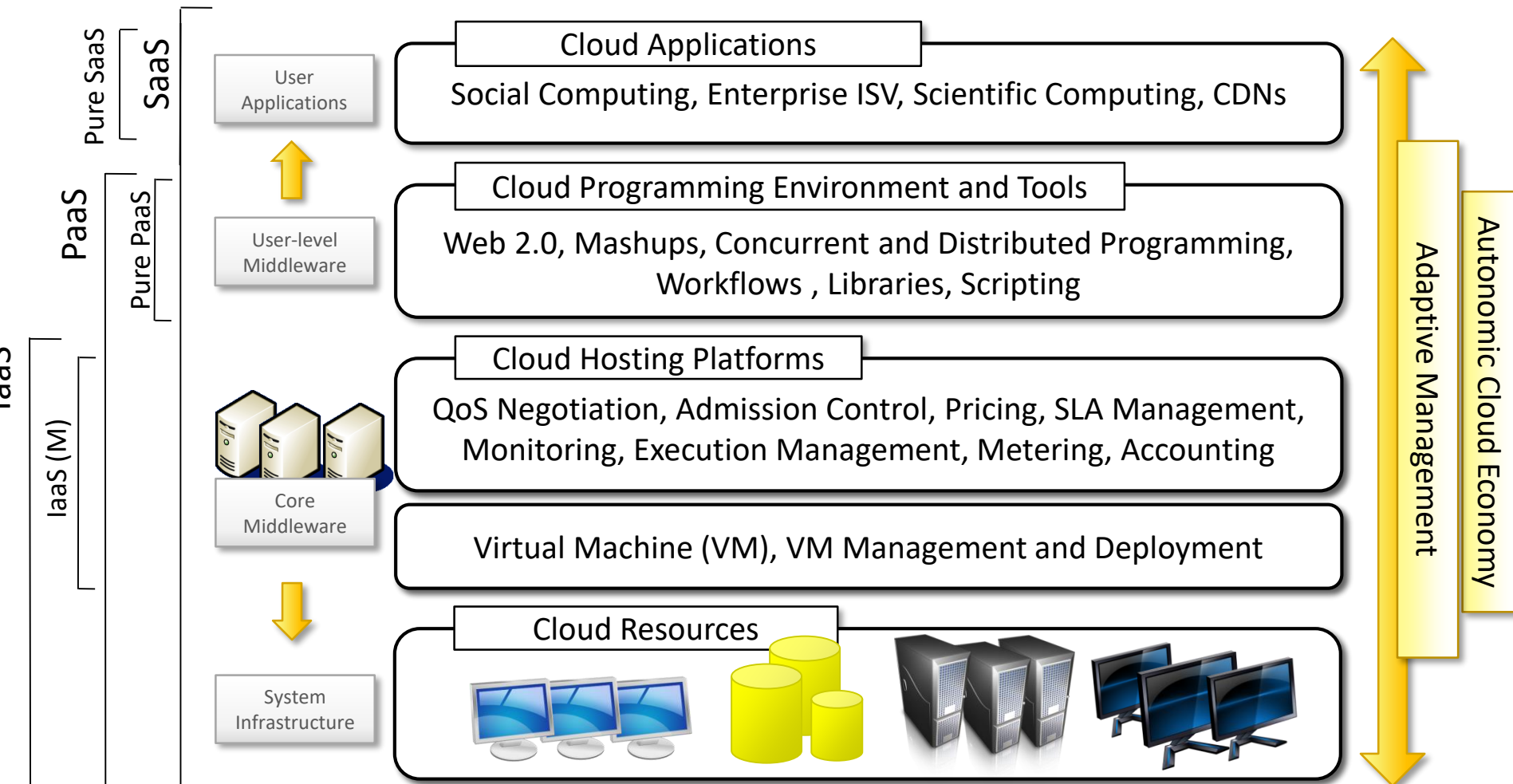








Chapter 4 – Cloud Computing Architecture



Web based Management Interface

Web Services, Portals, REST API



Infrastructure Management Software



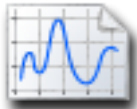
Pricing / Billing



QoS SLA Management



Scheduling



Monitoring



Reservation



VM Image Repository



VM Pool Management



Provisioning

Physical Infrastructure



Datacenter



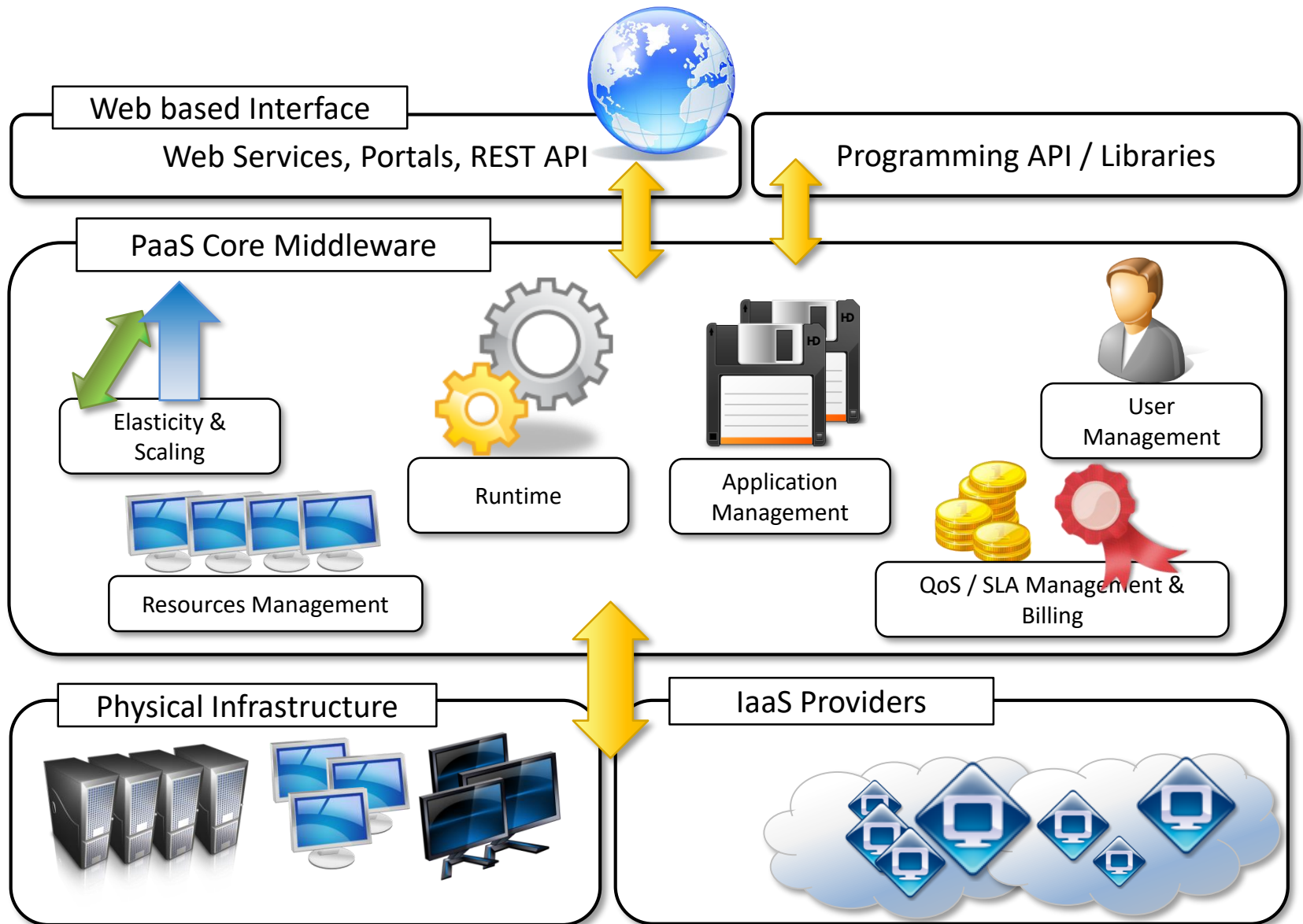
Cluster

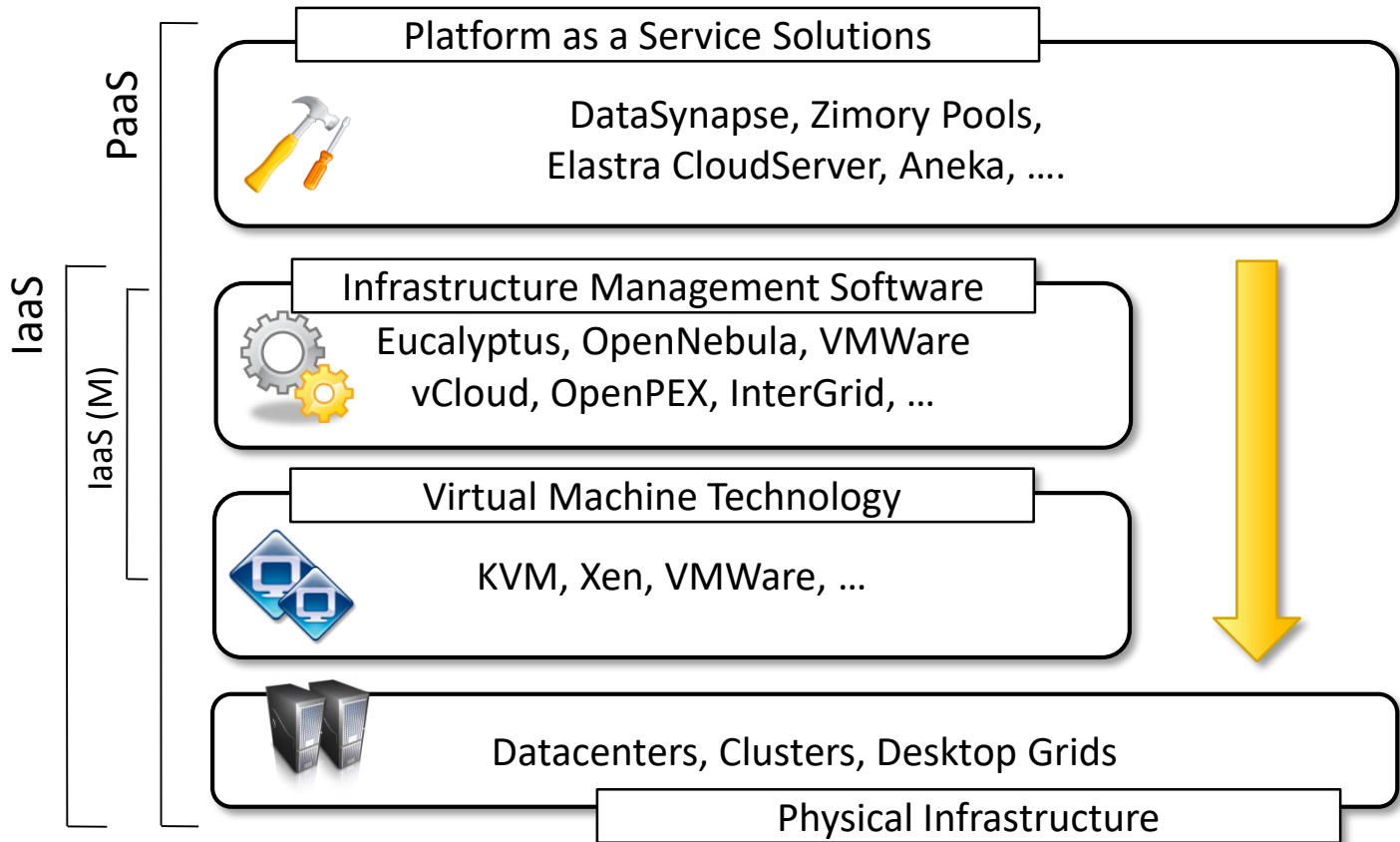


Desktop /
Heterogeneous Resources

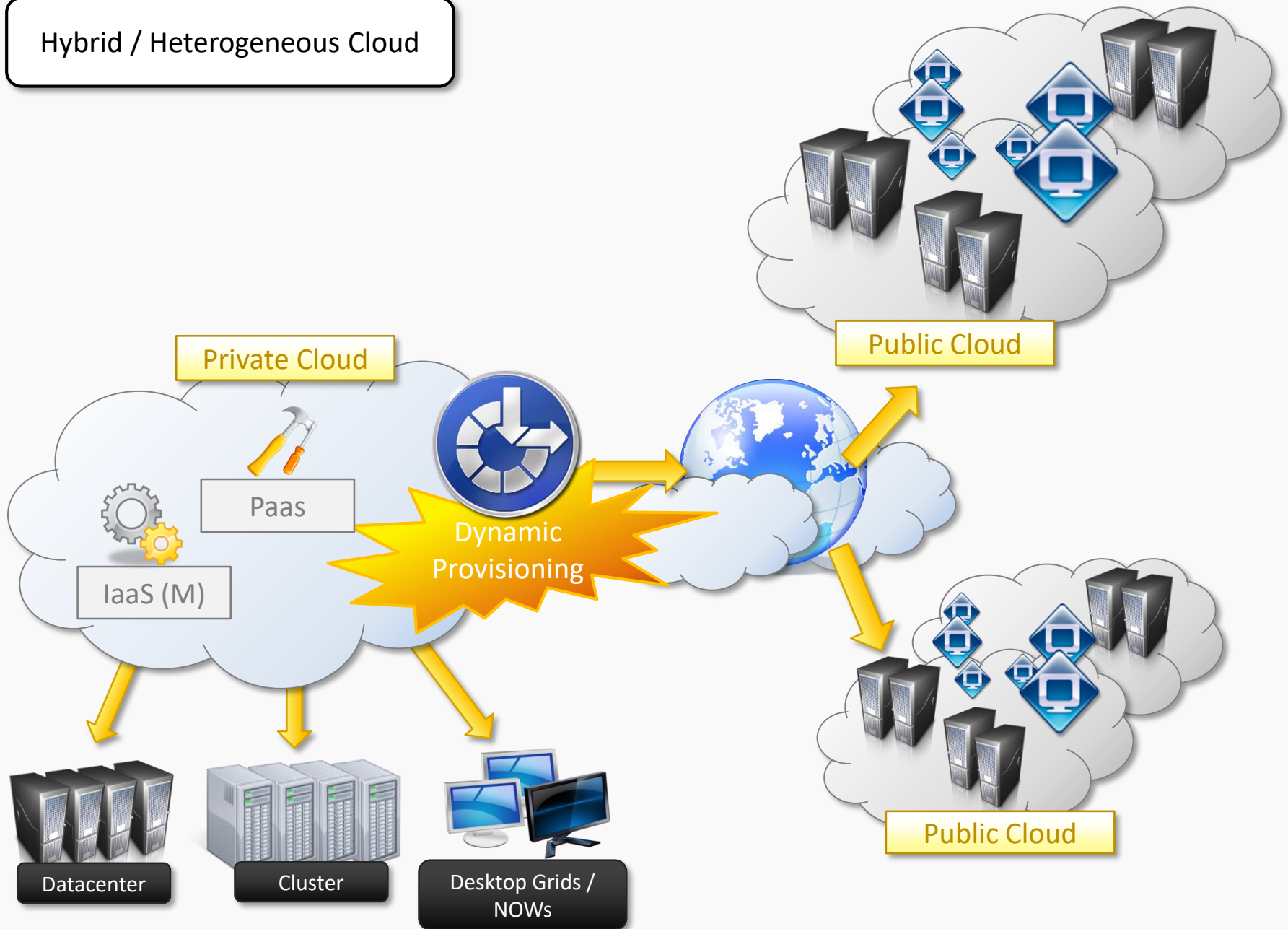


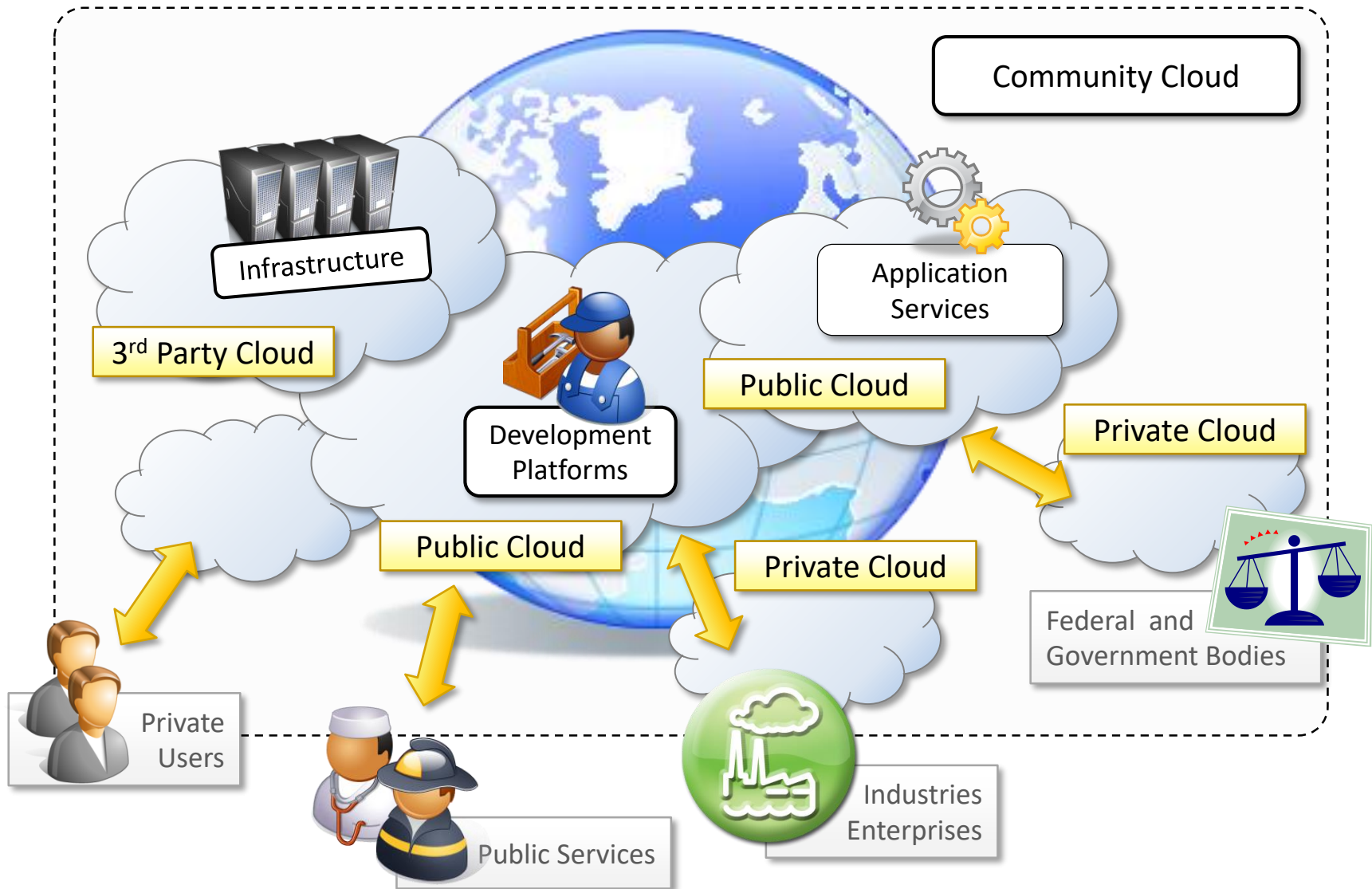
Third Party IaaS Cloud





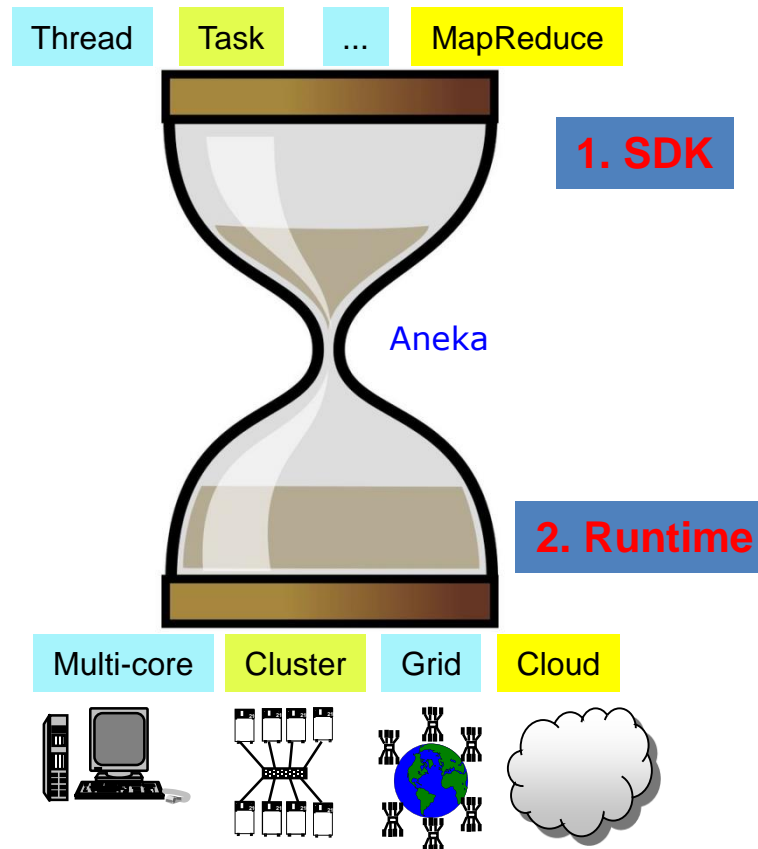
Hybrid / Heterogeneous Cloud



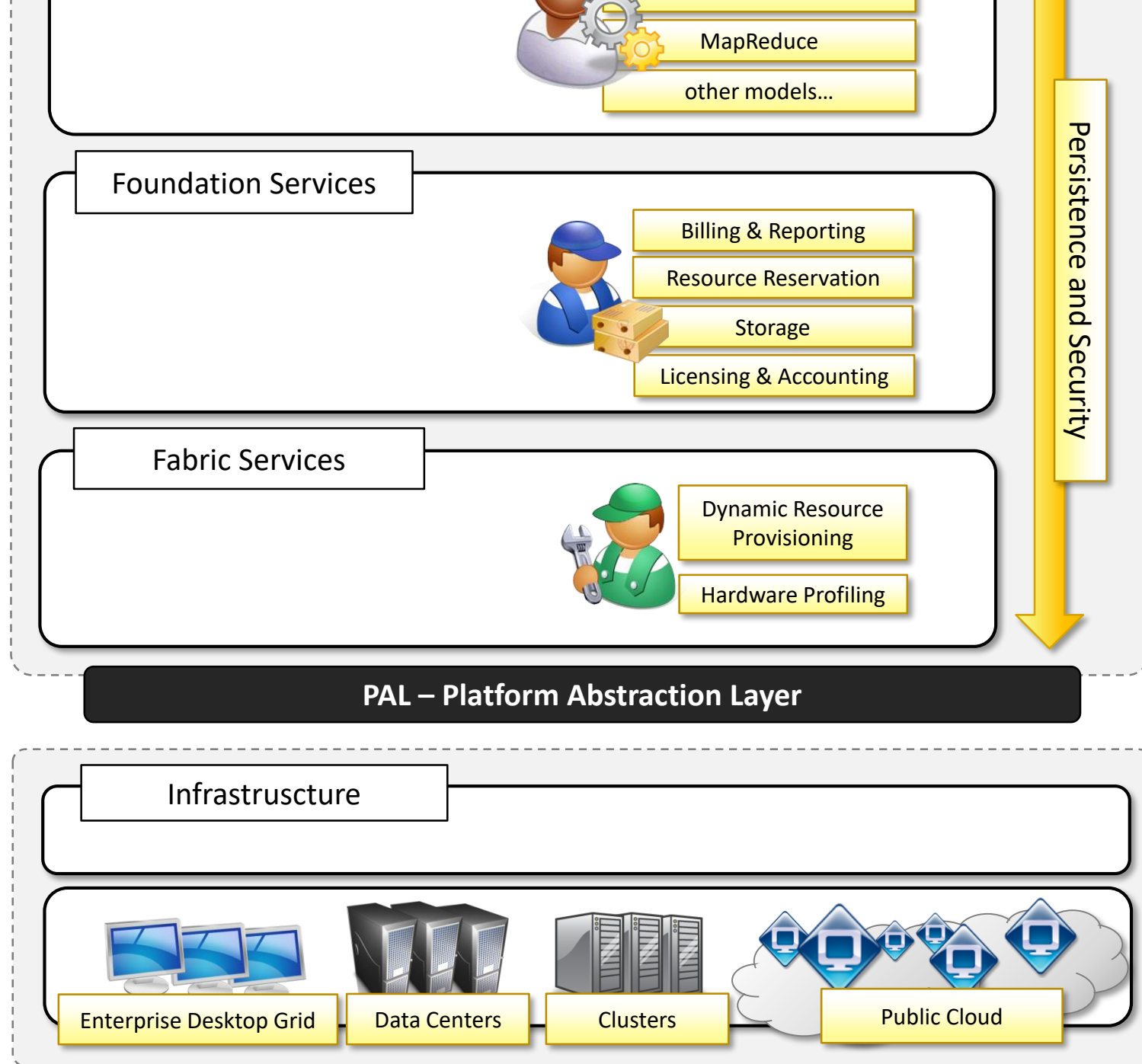


Chapter 5 – Aneka: Cloud Application Platform

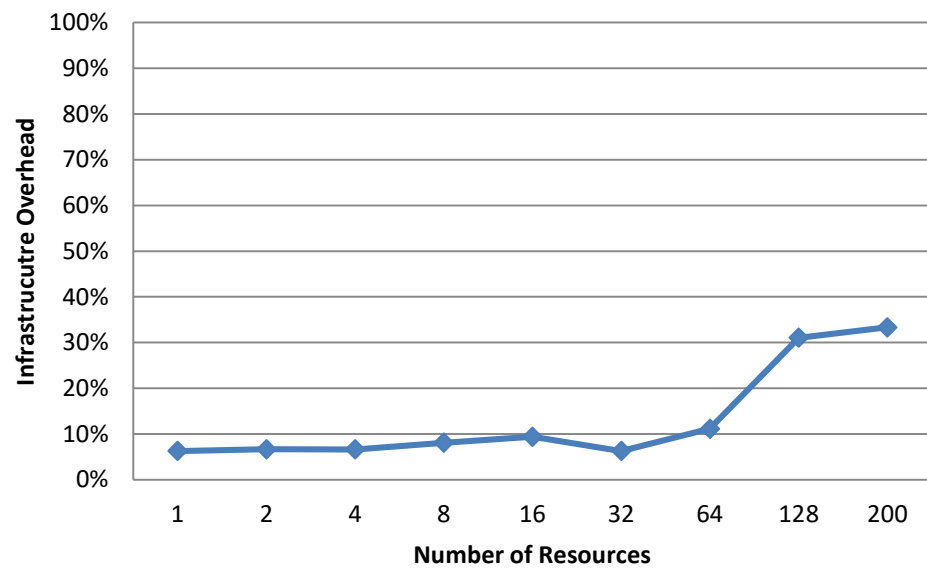
Multiple Applications

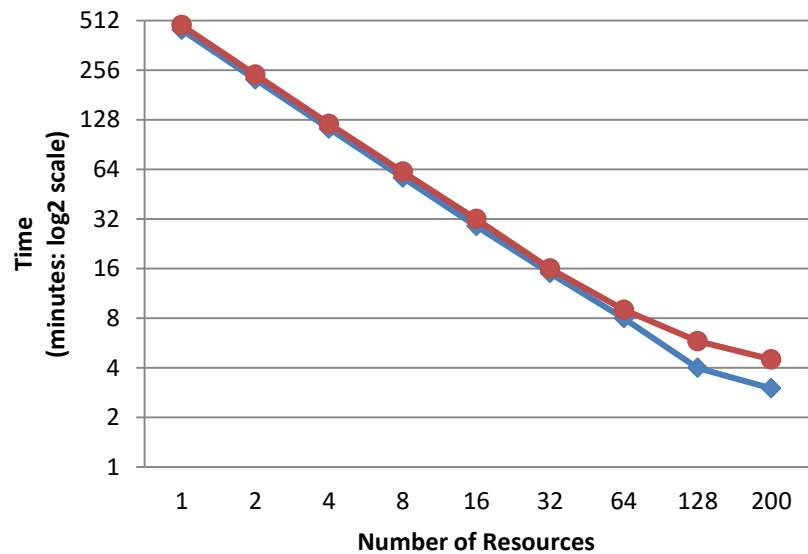
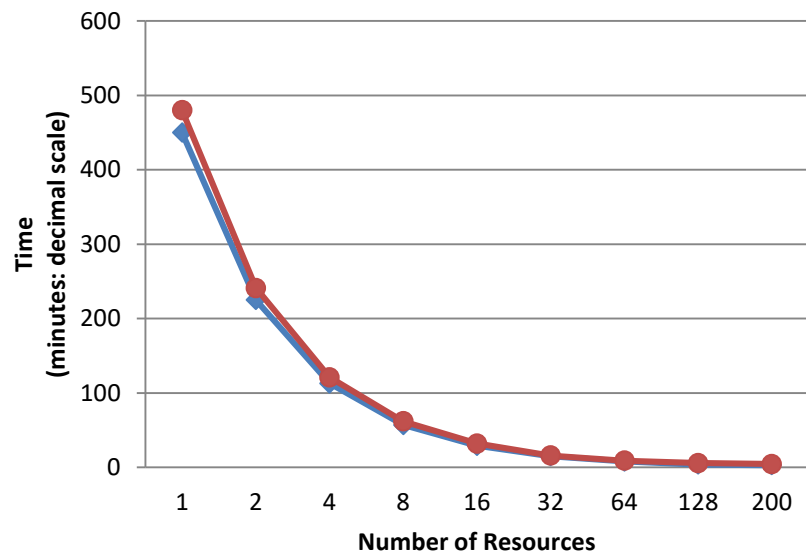


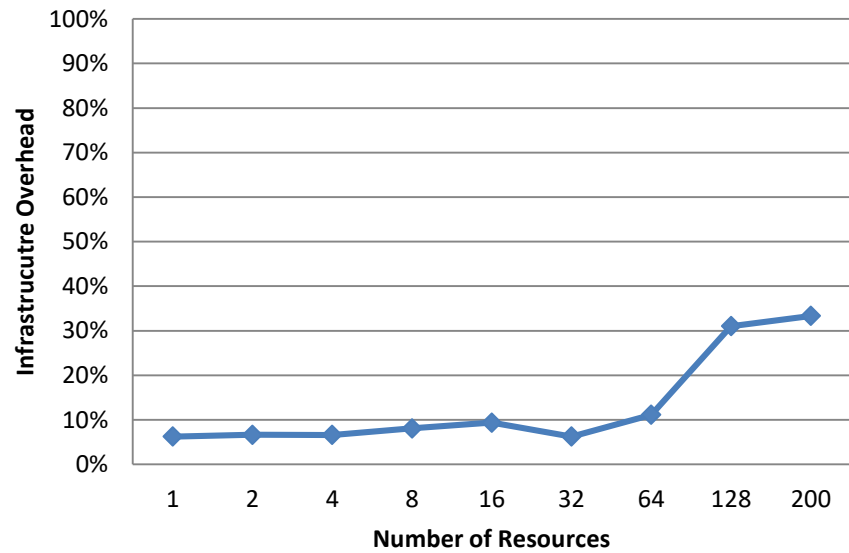
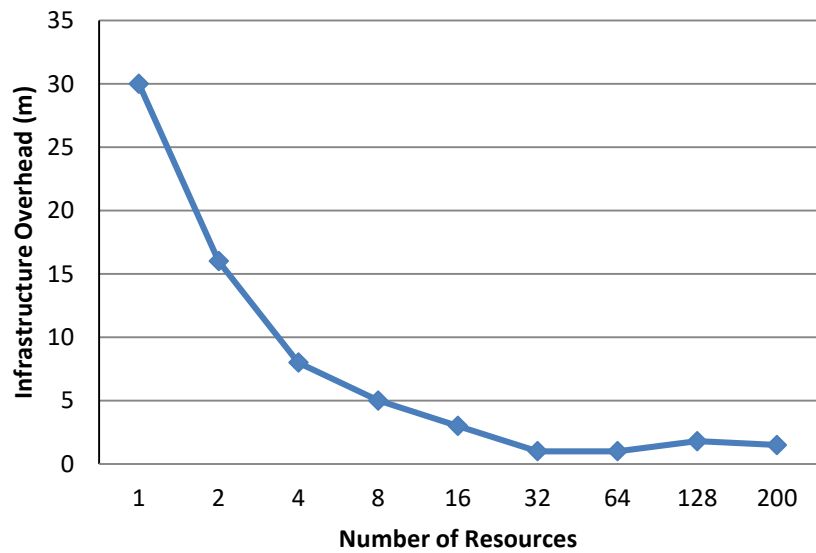
Multiple Infrastructures

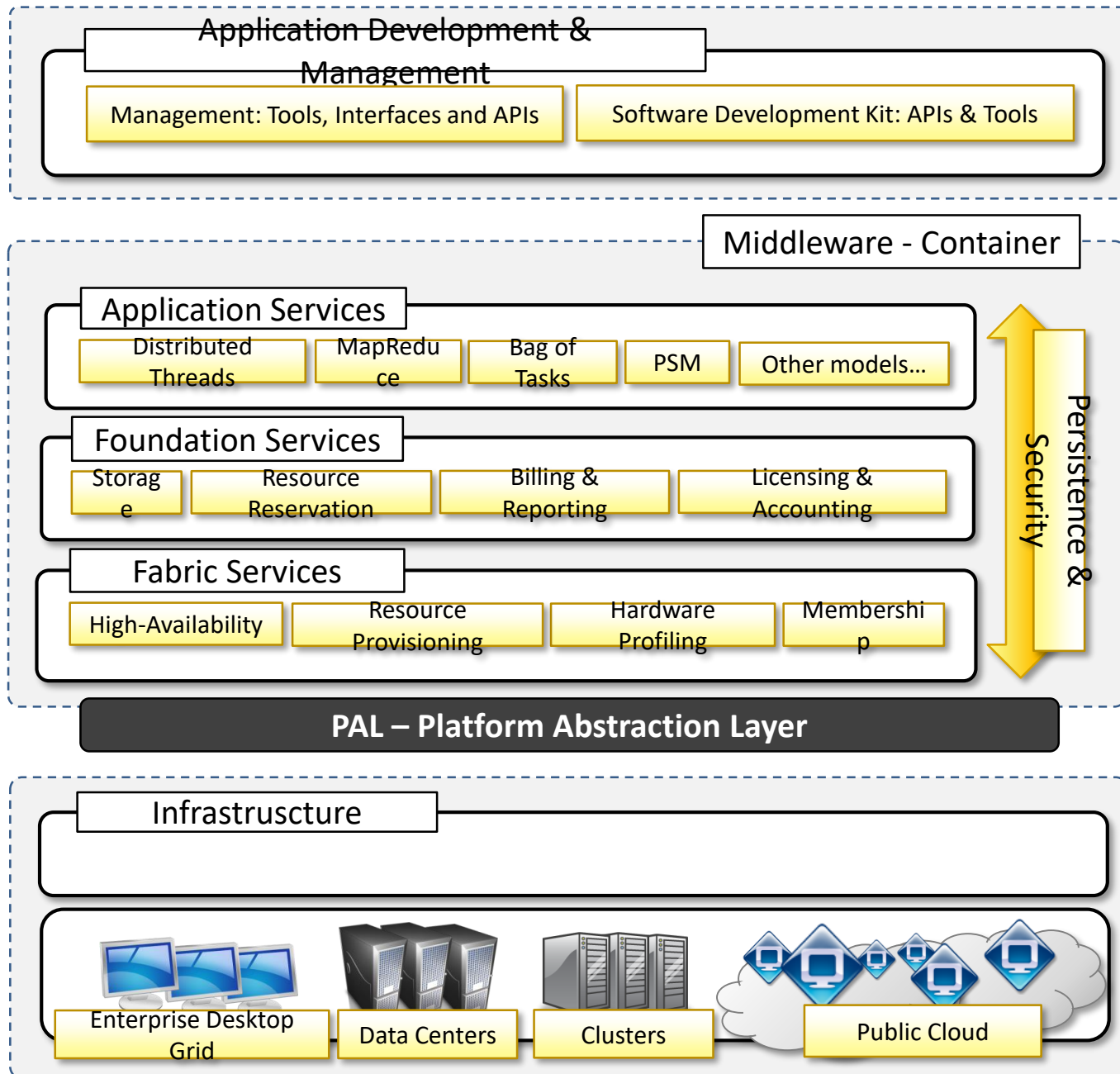


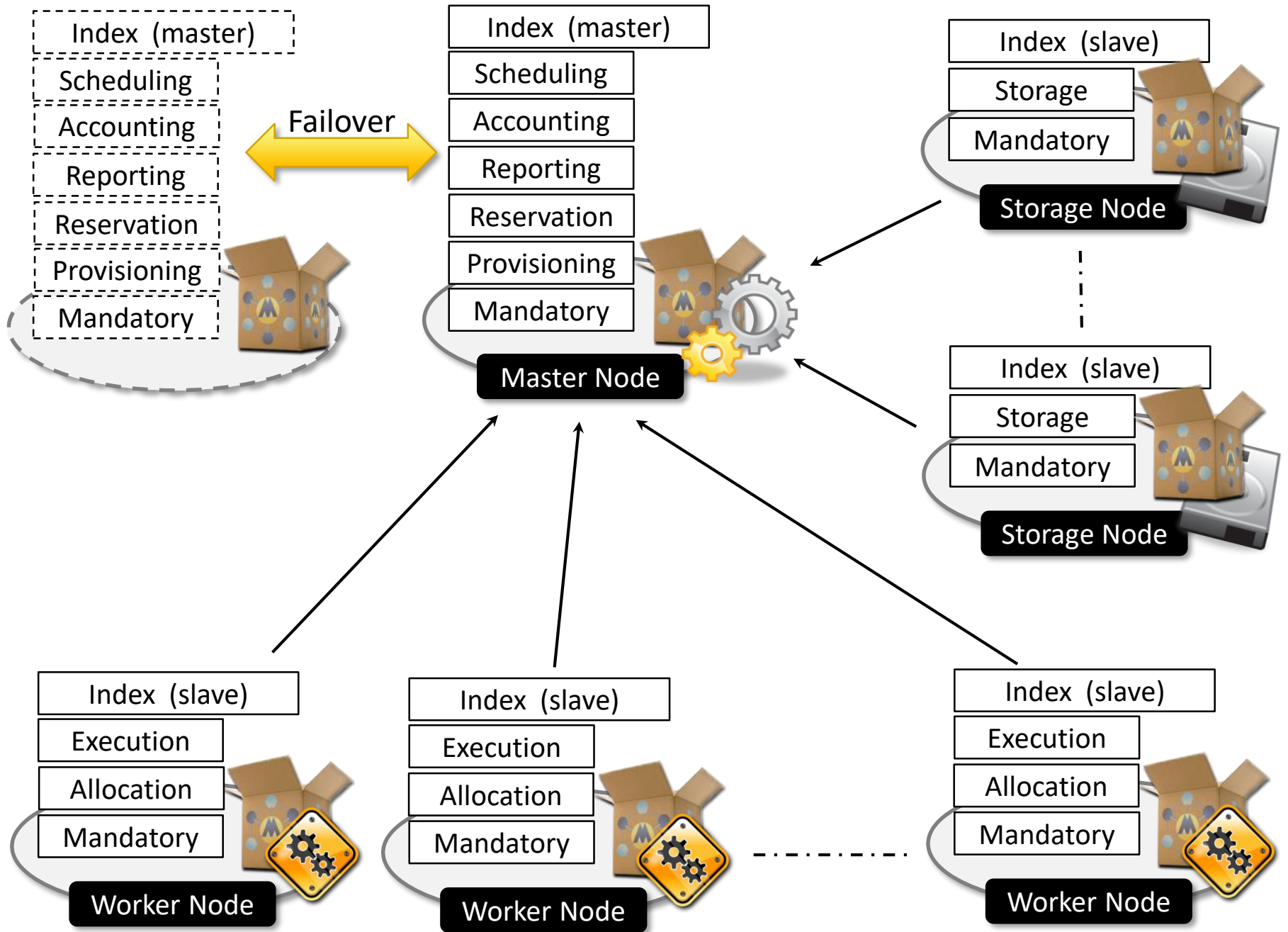


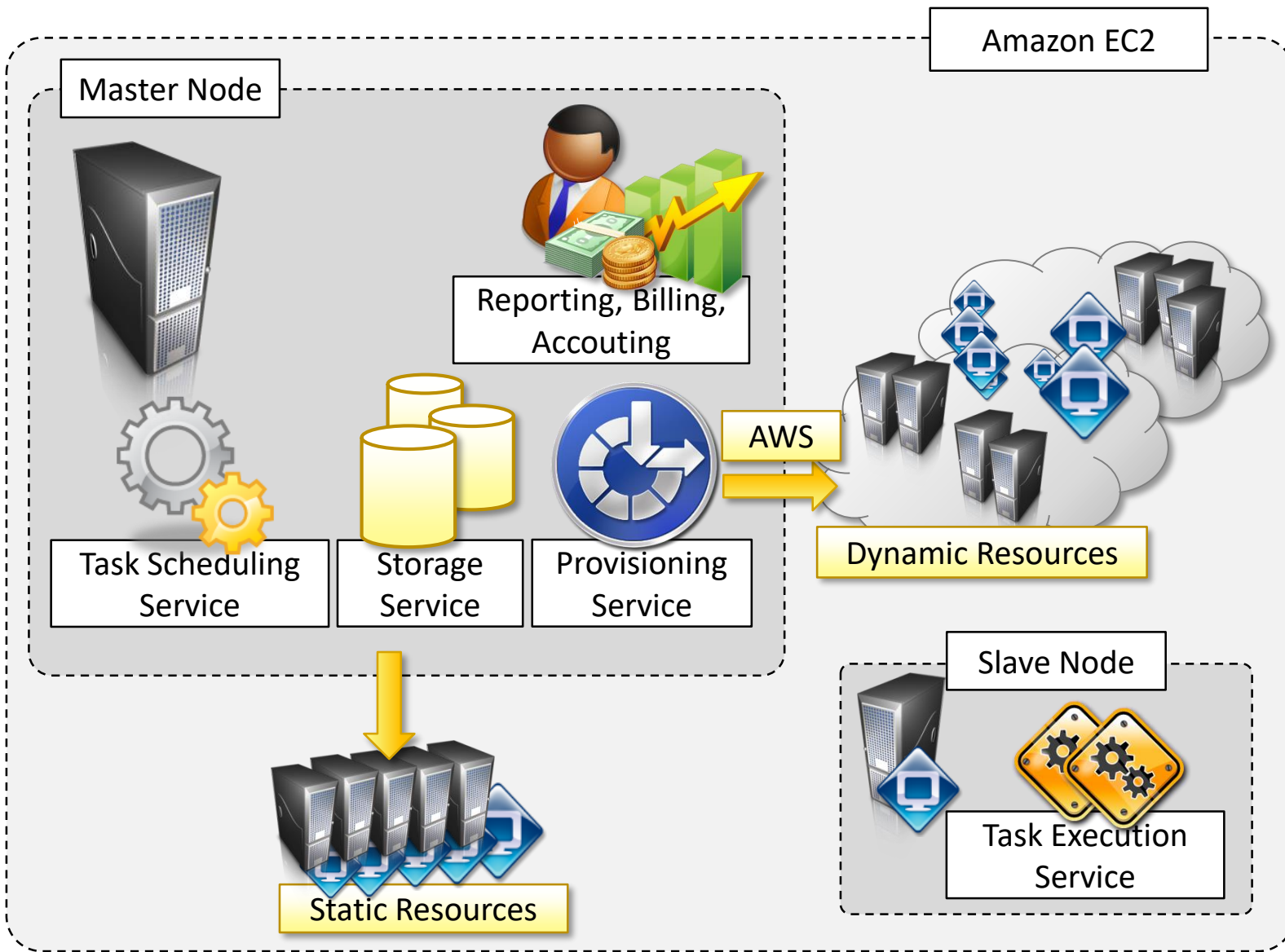














Reporting, Billing,
Accounting



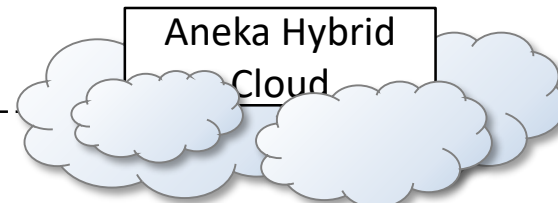
Application
Management &
Scheduling



Provisioning
Service



High
Performance
and QoS



GO GRID



Public Clouds



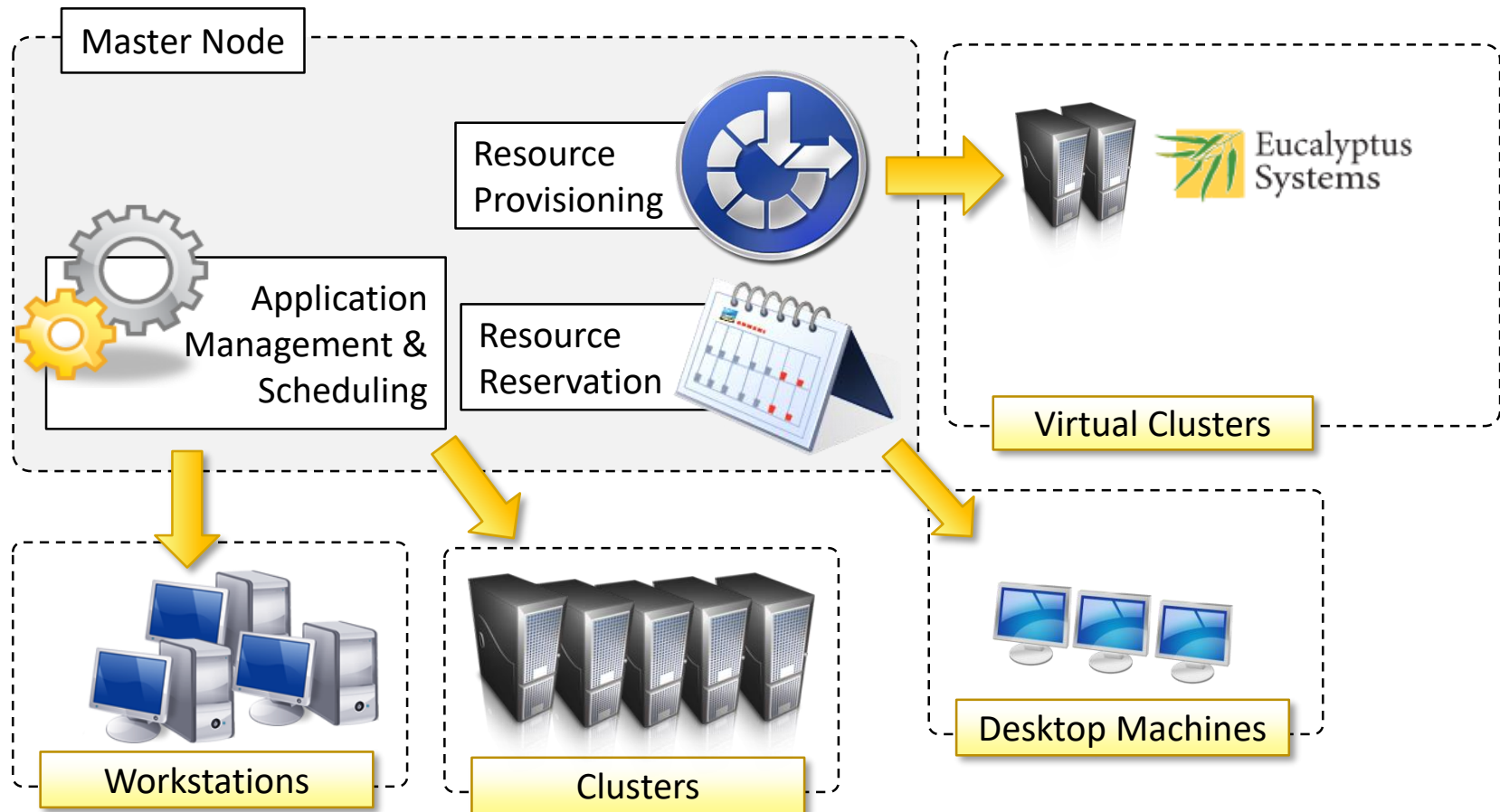
Low priority
workloads

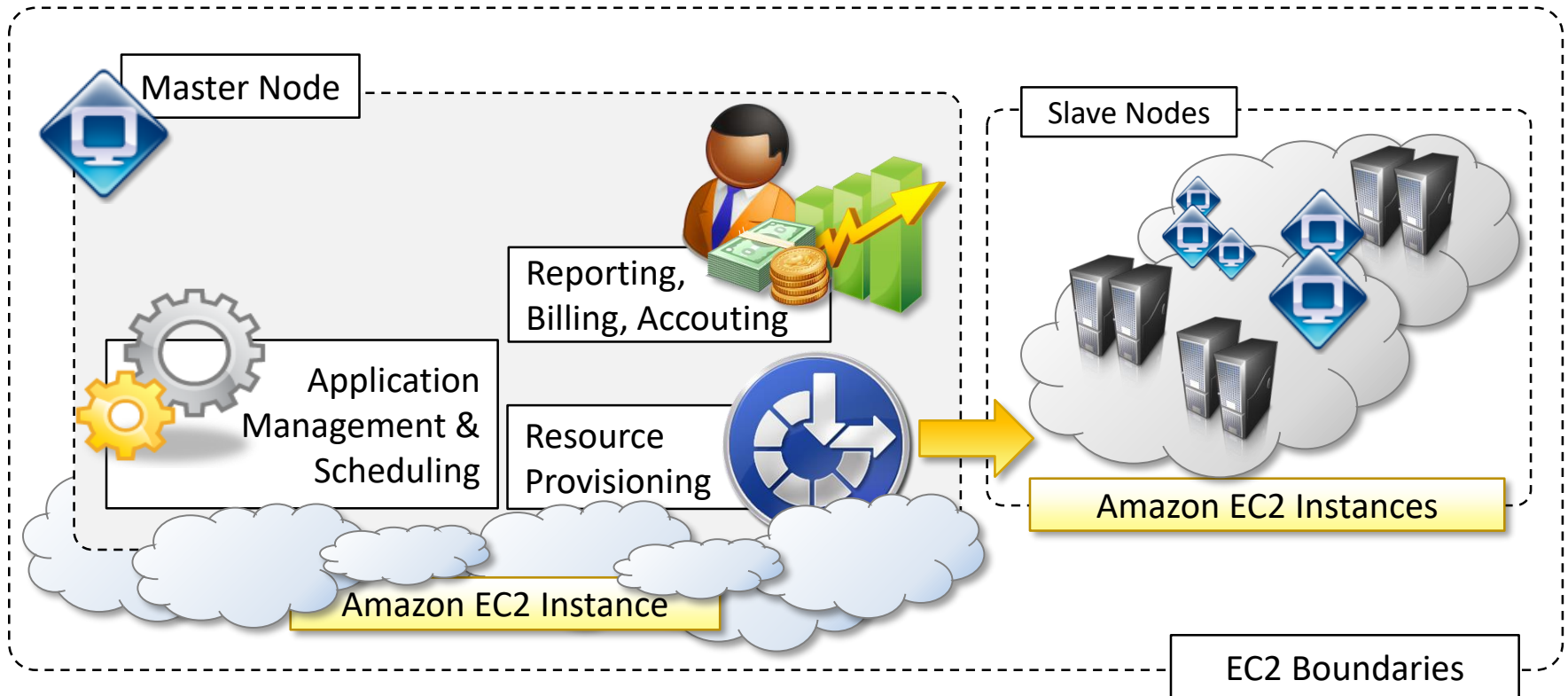


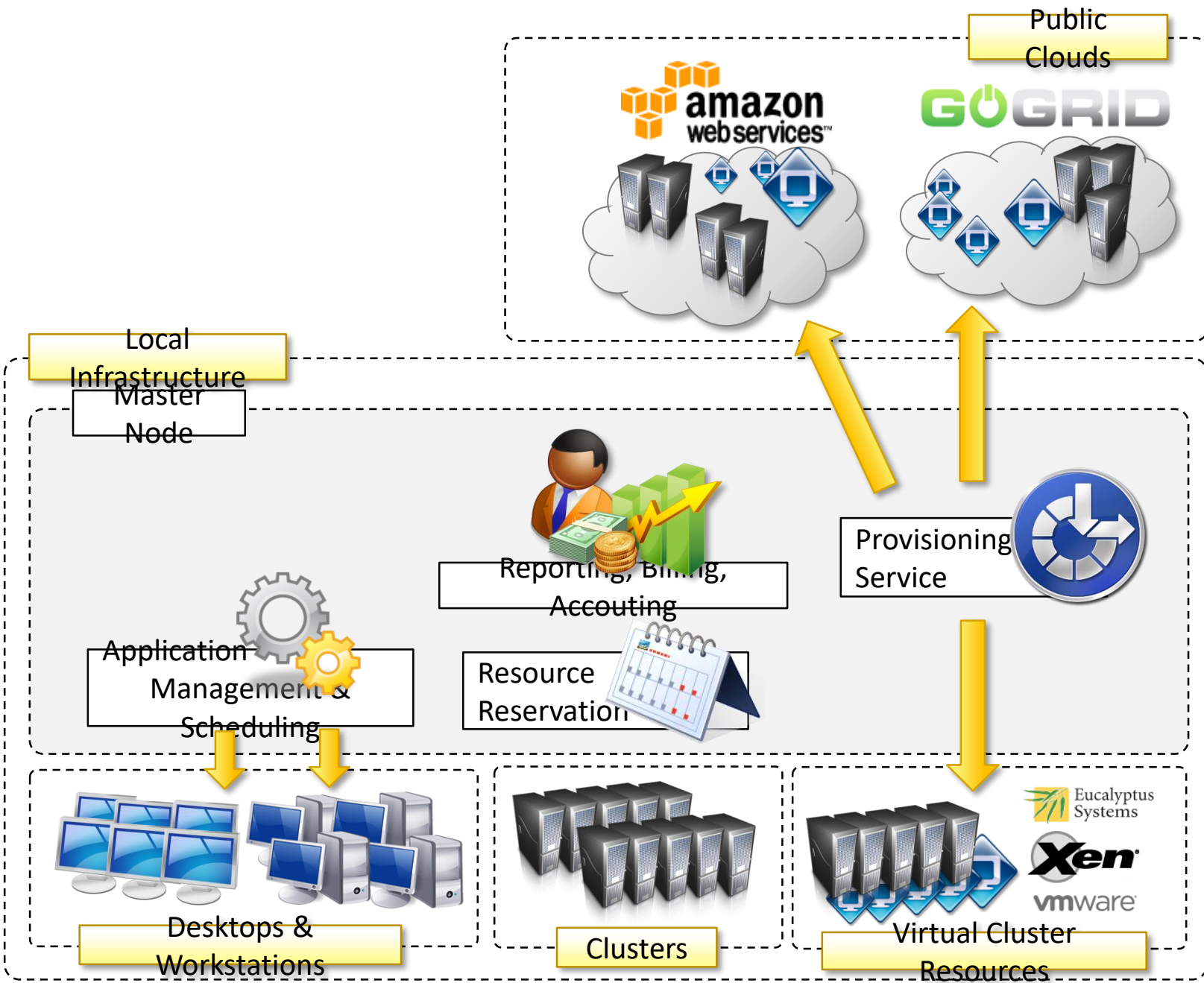
Desktops &
Workstations

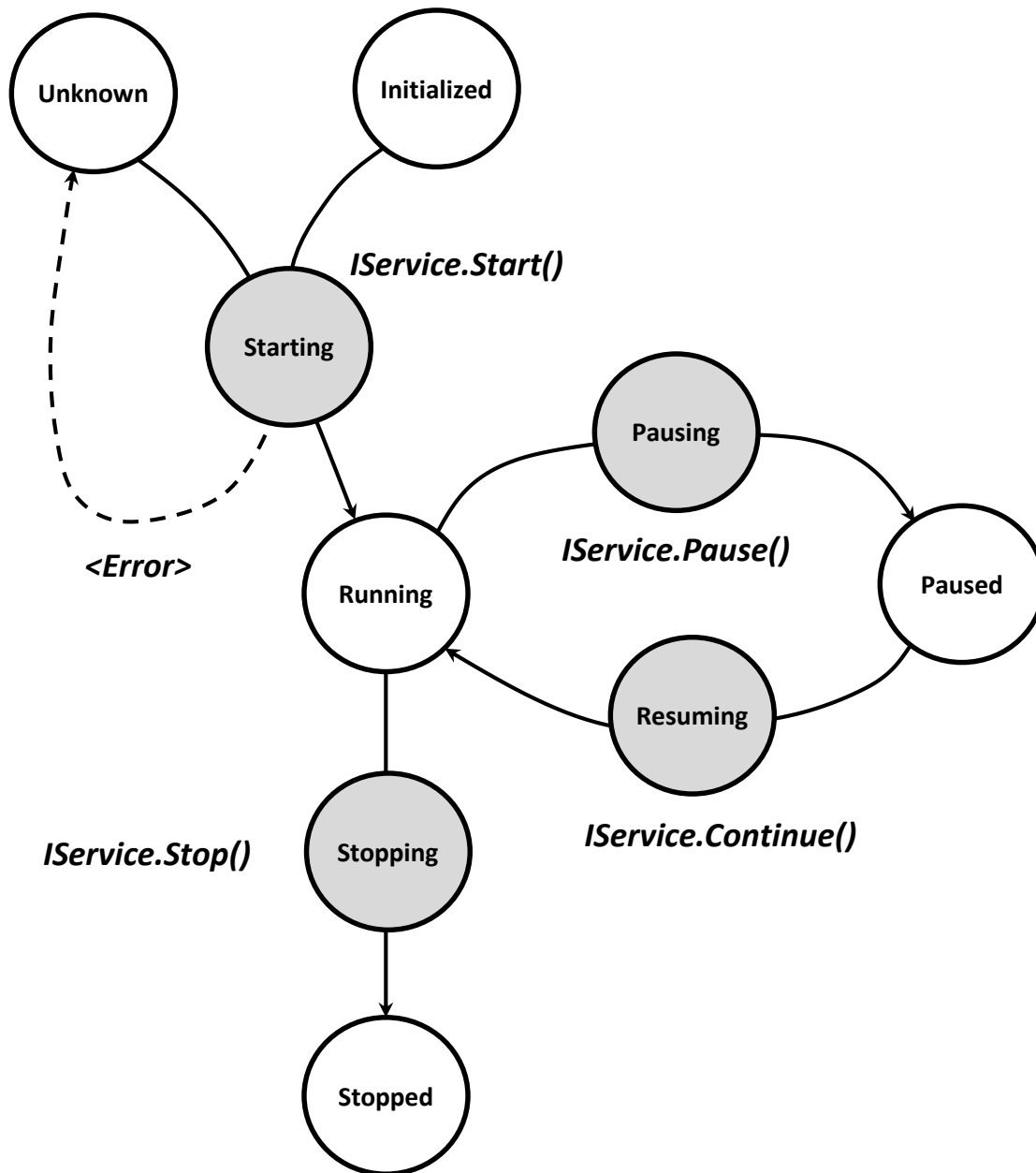


Cluster
Resources

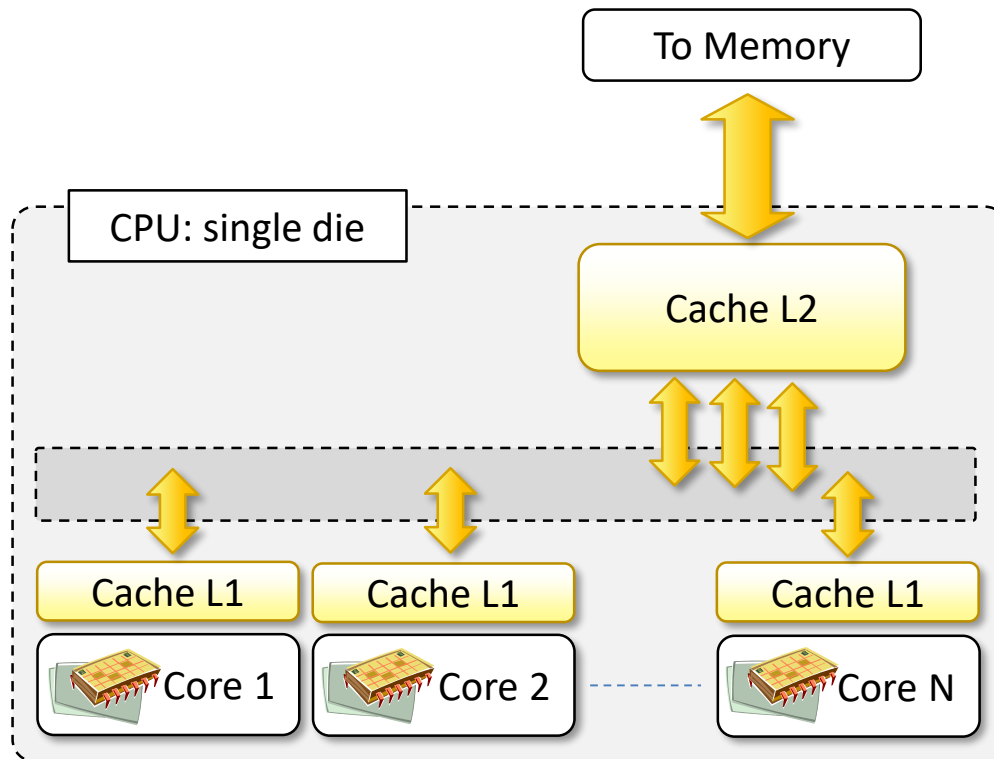


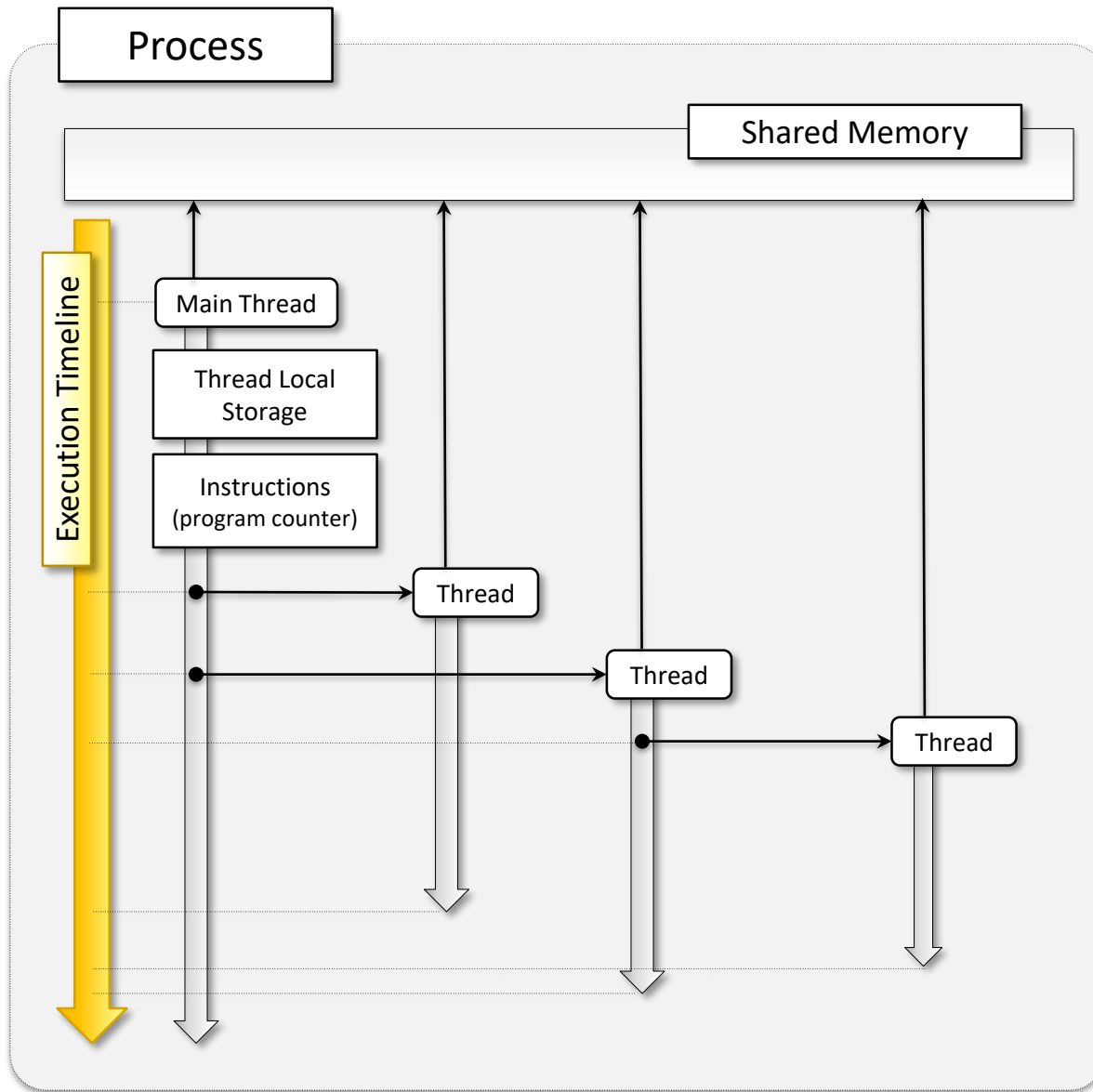


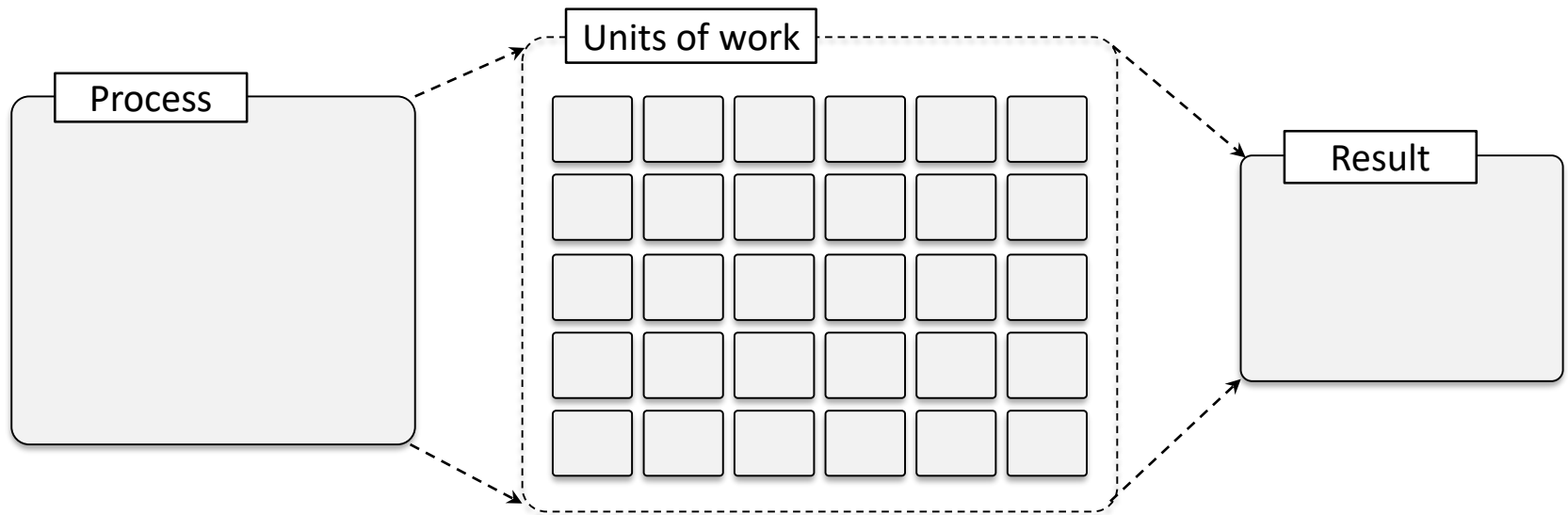




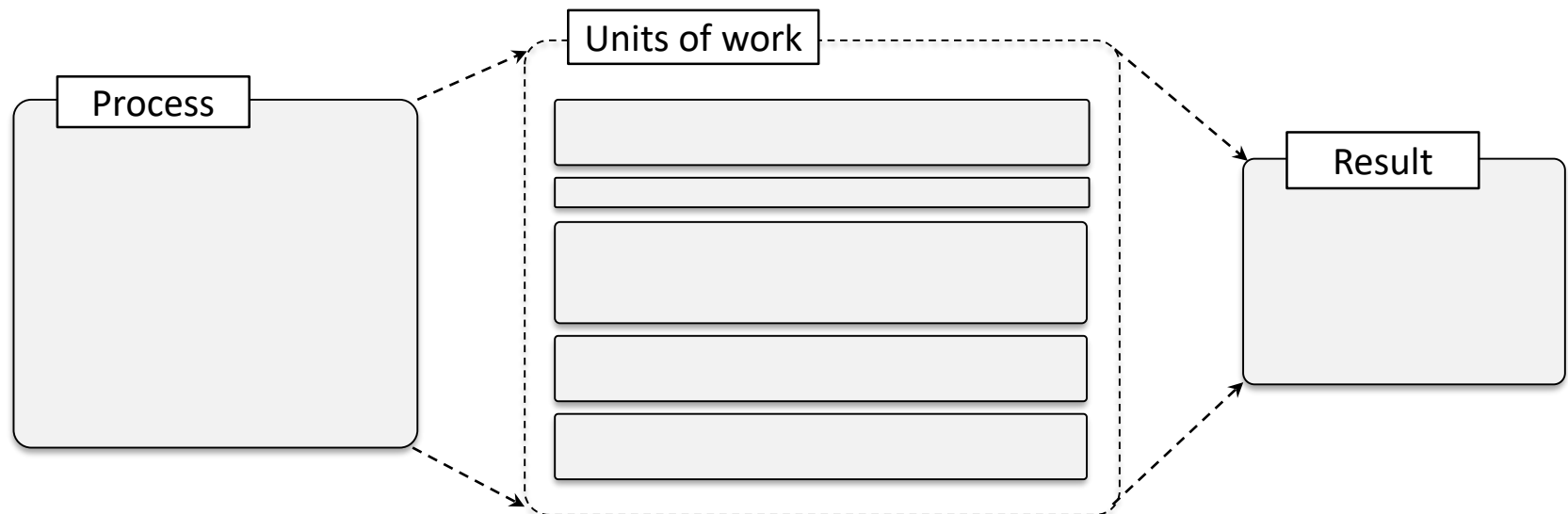
Chapter 6 – Concurrent Computing: Thread Programming



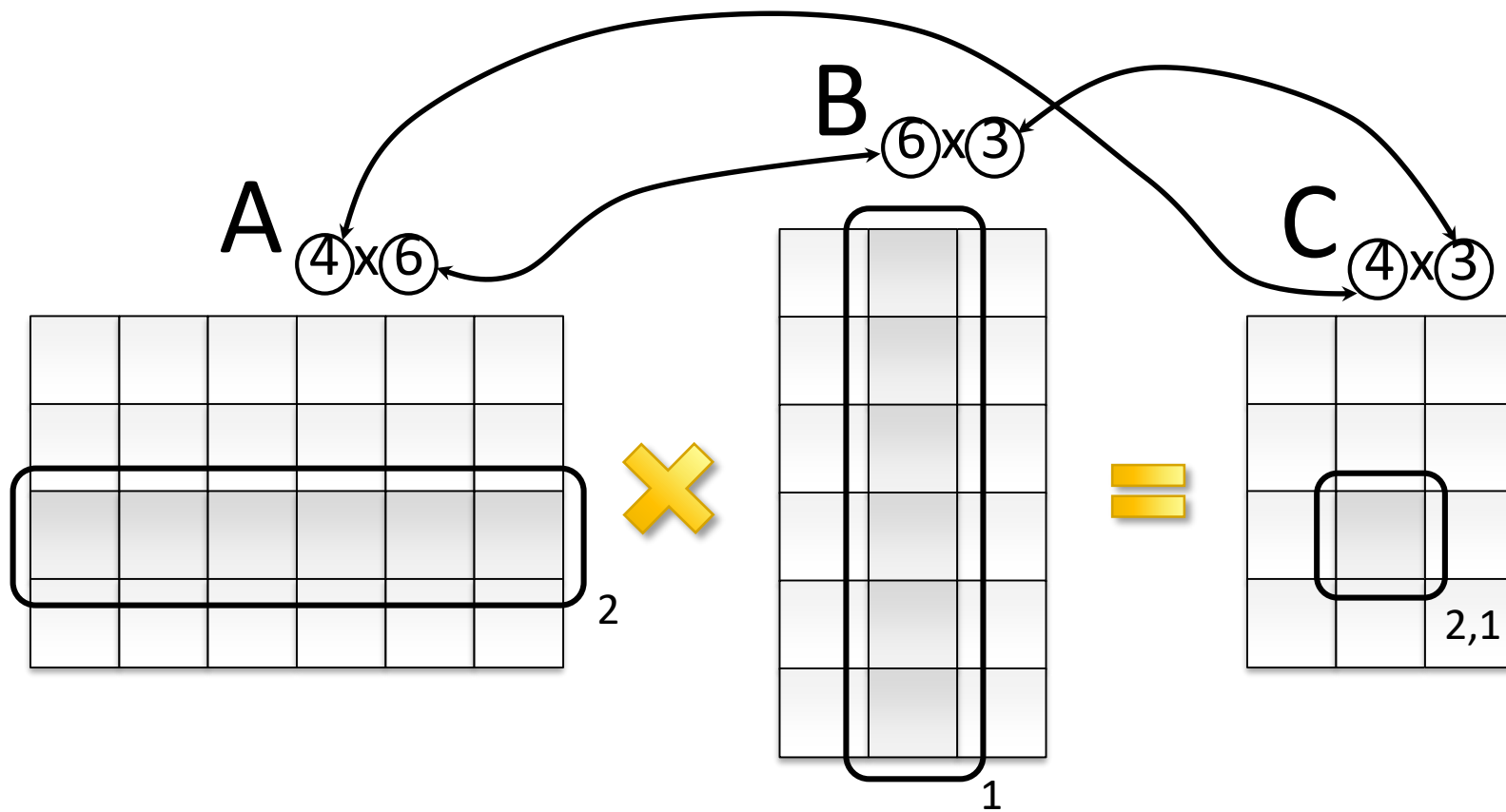


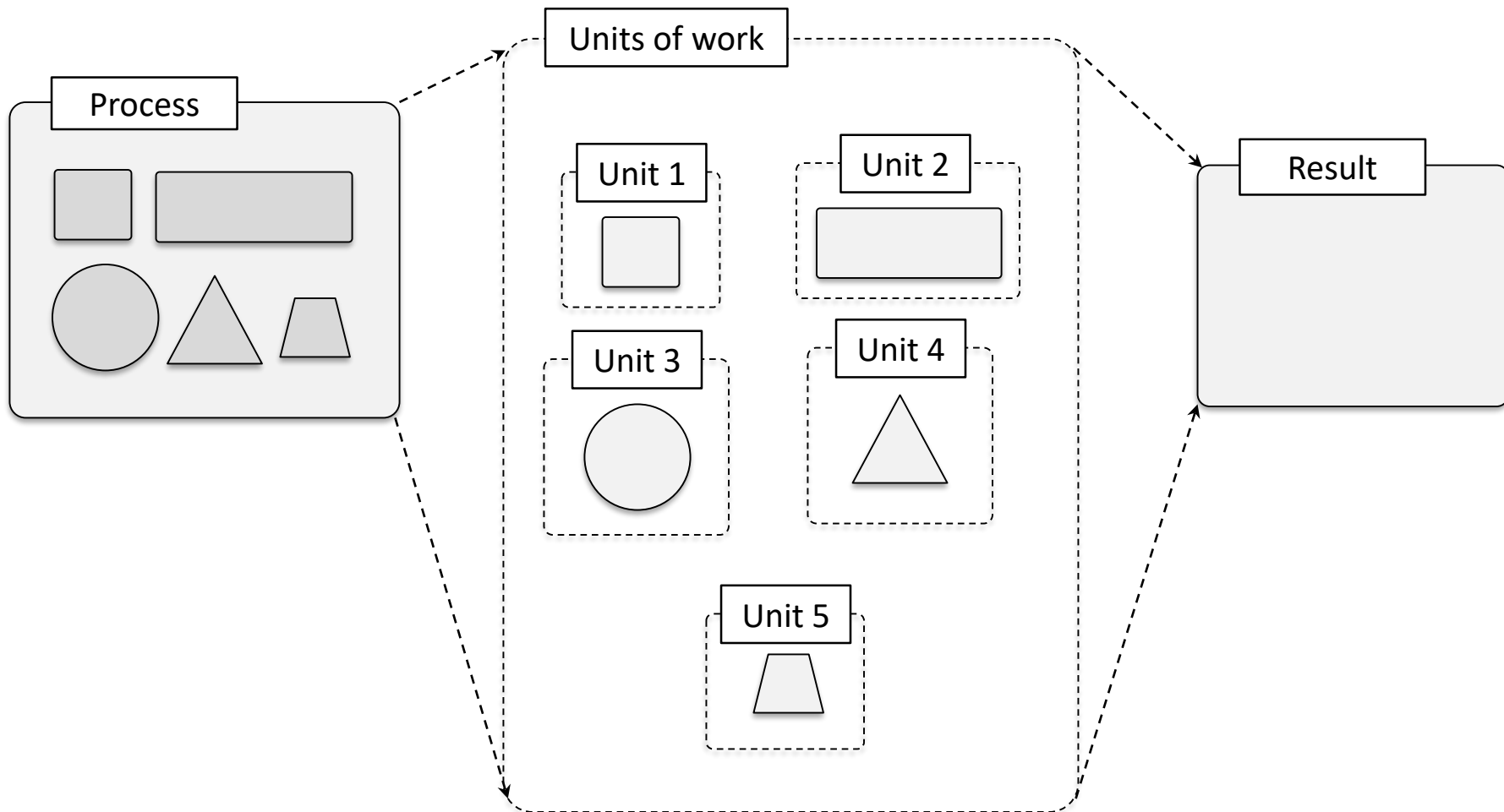


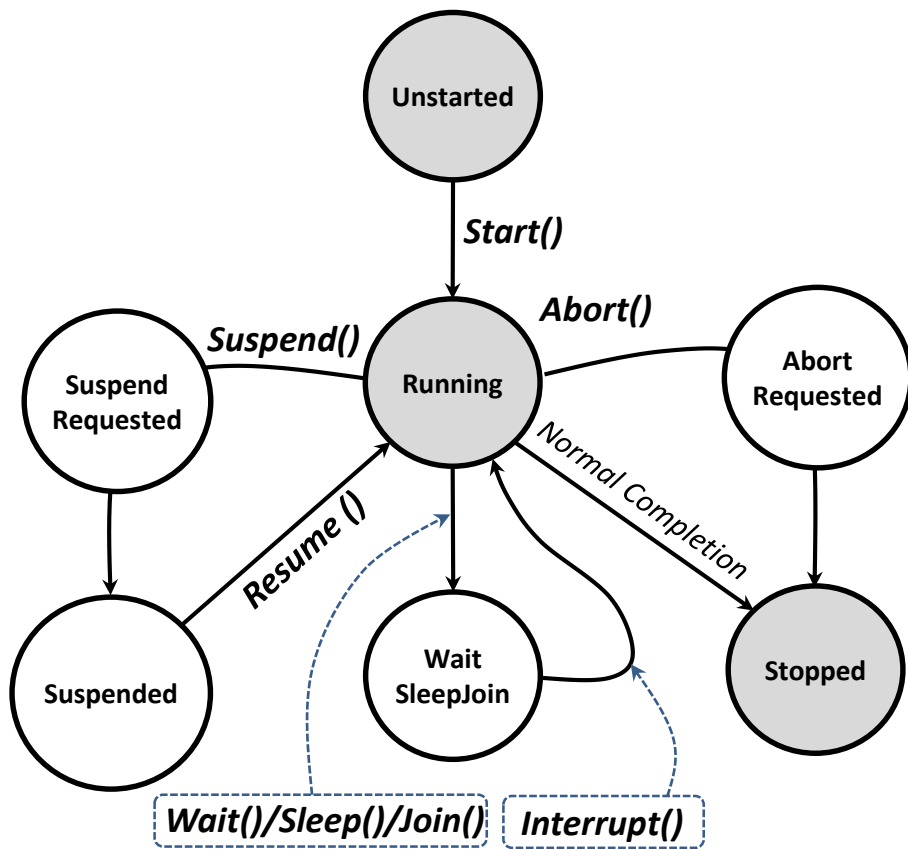
a. Embarrassingly parallel



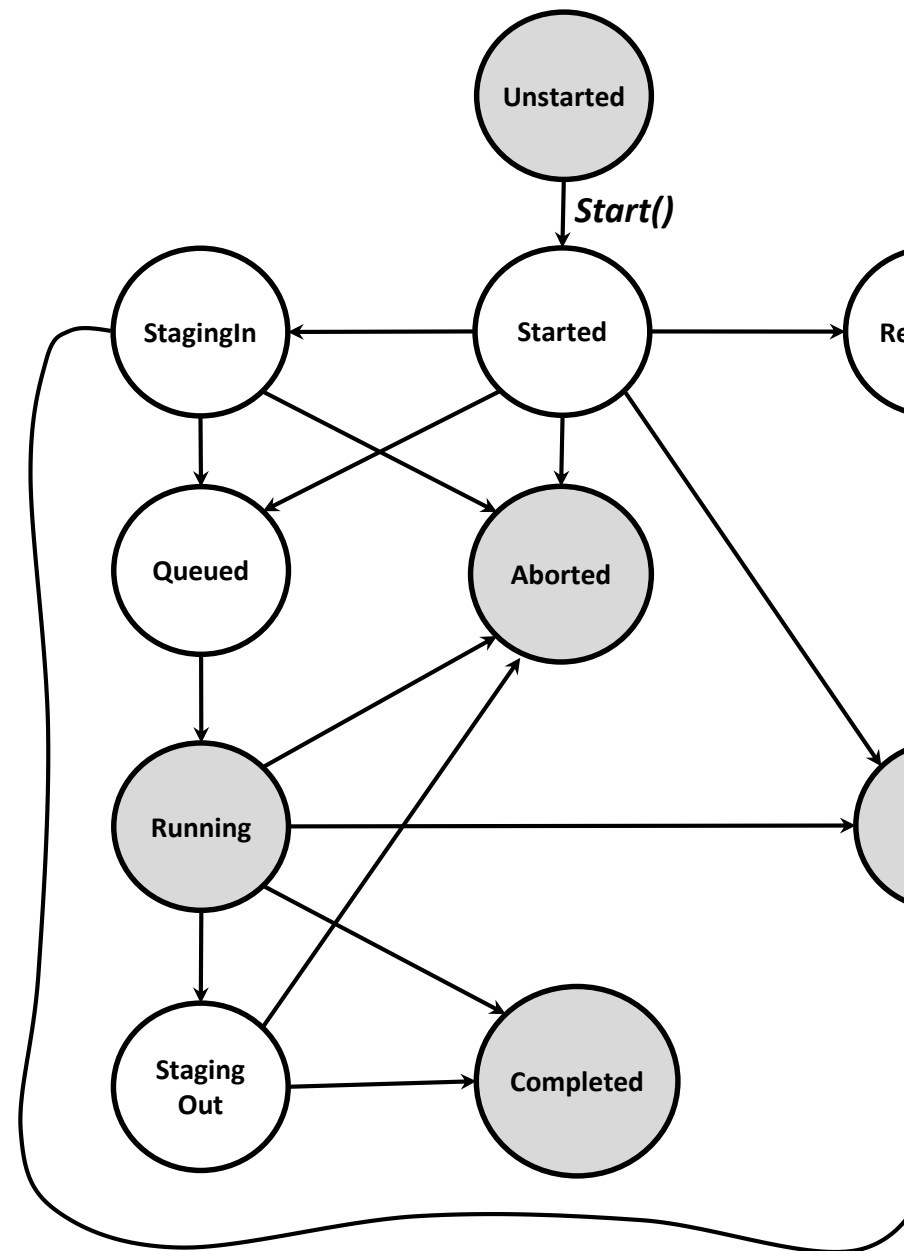
b. Inherently sequential





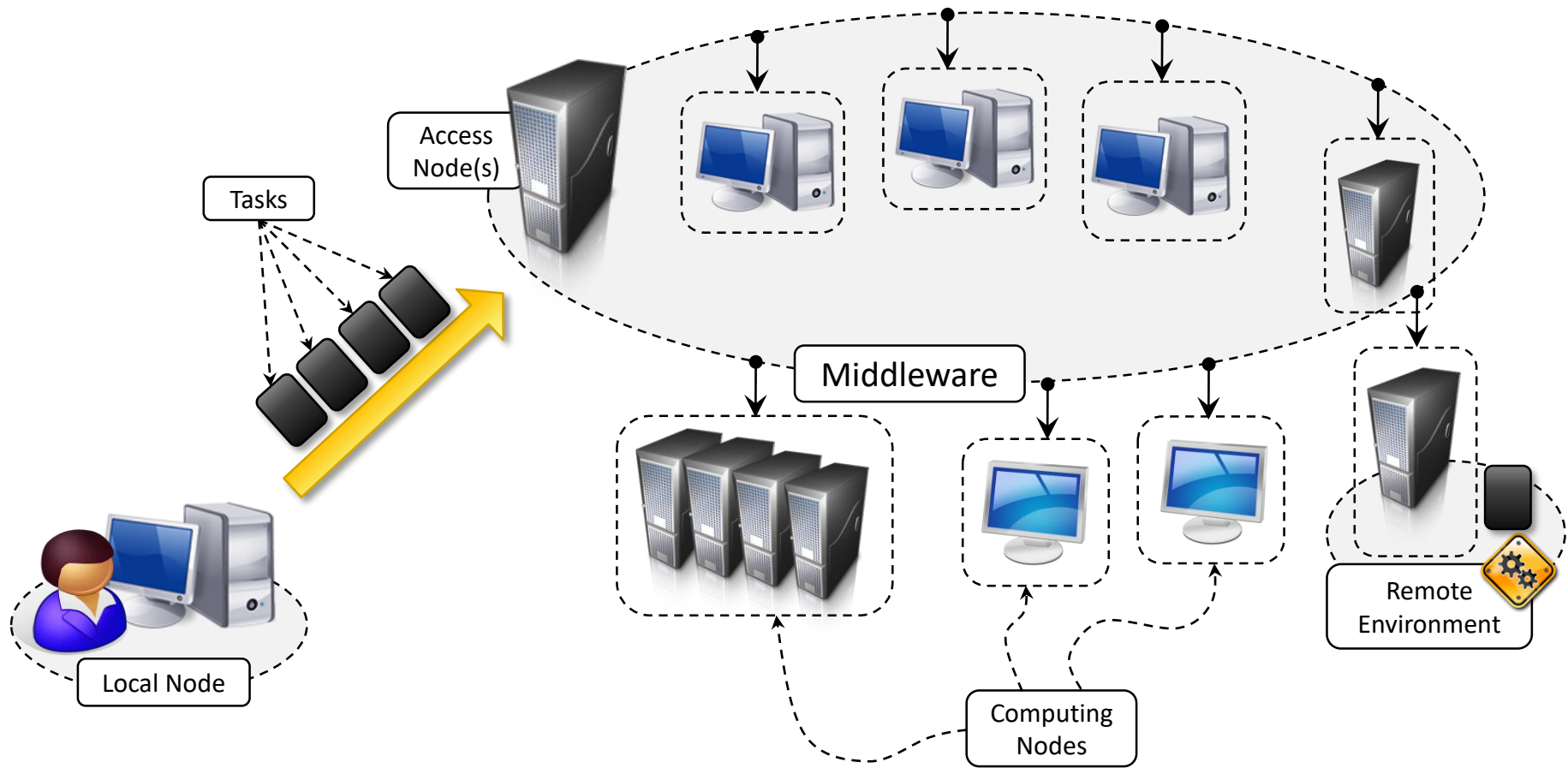


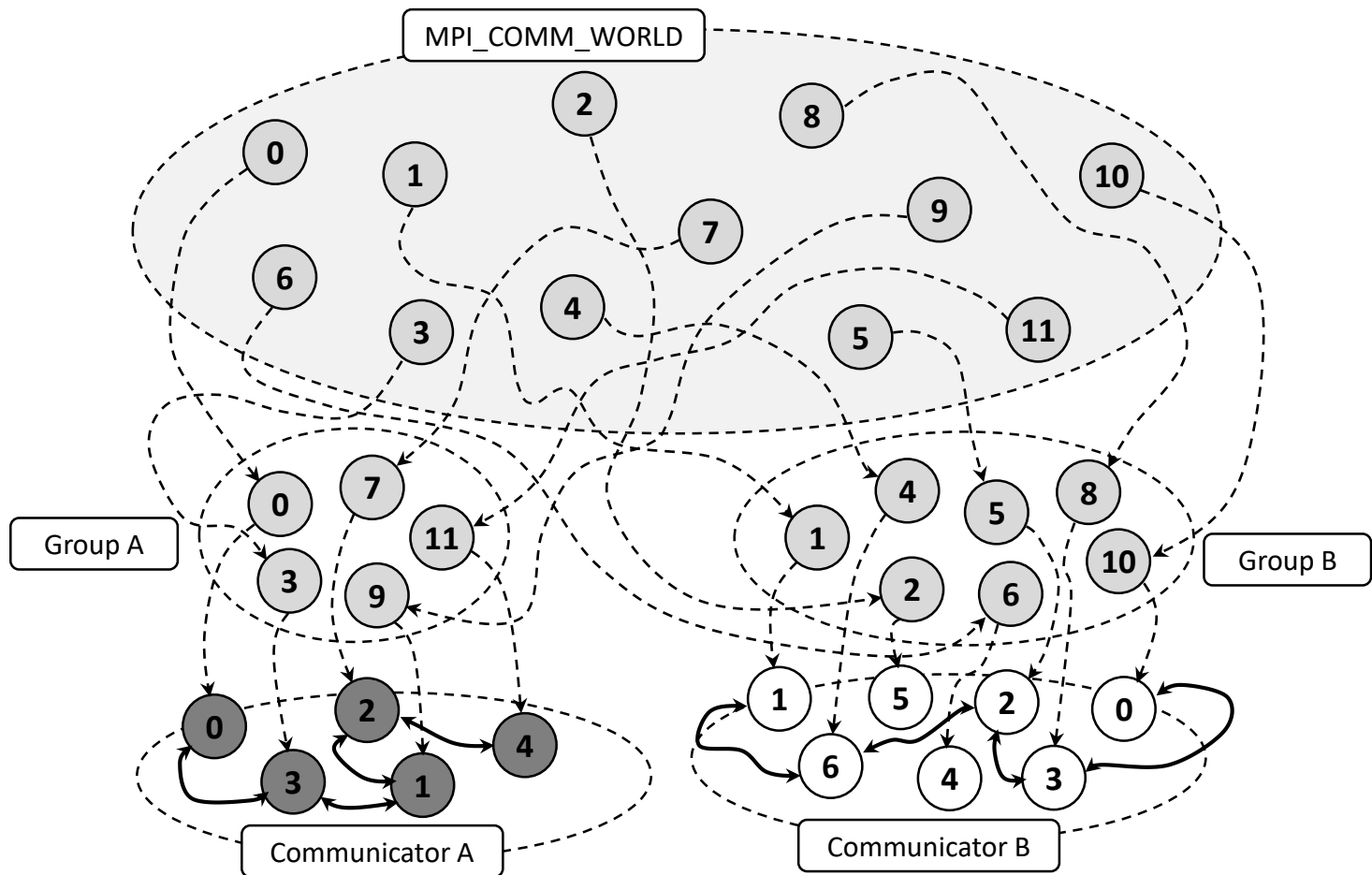
a. System.Threading.Thread life cycle.

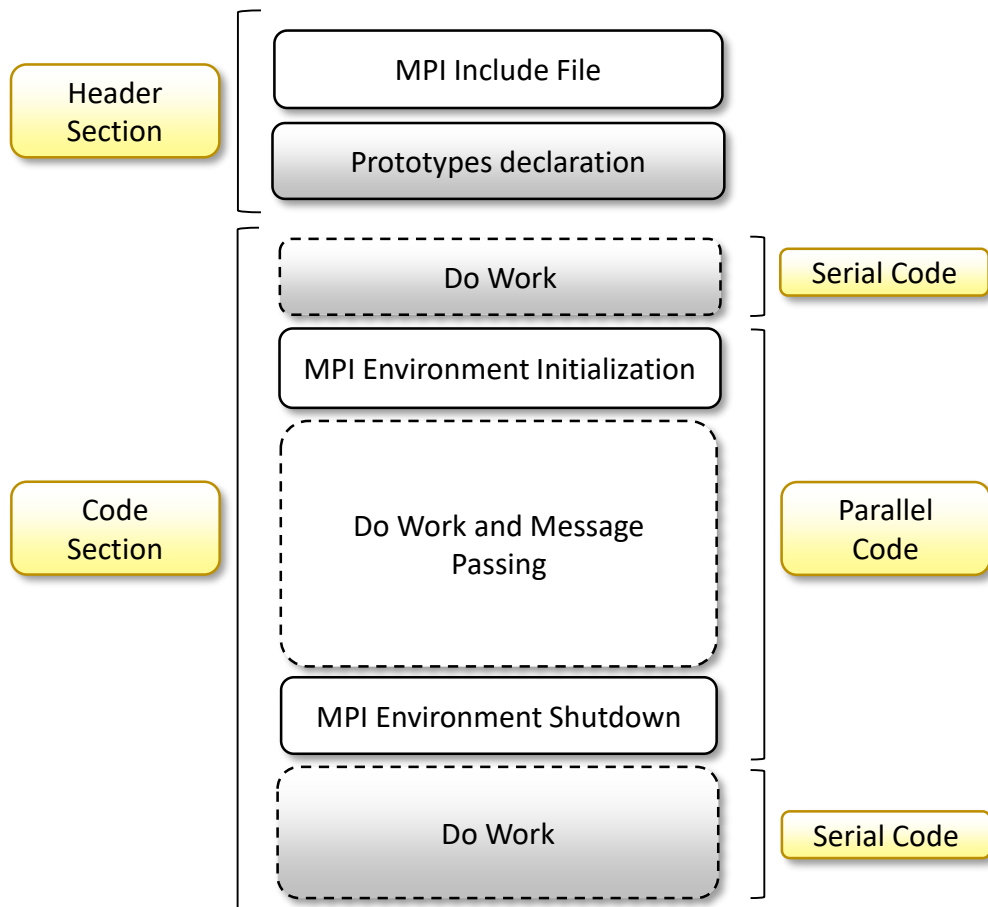


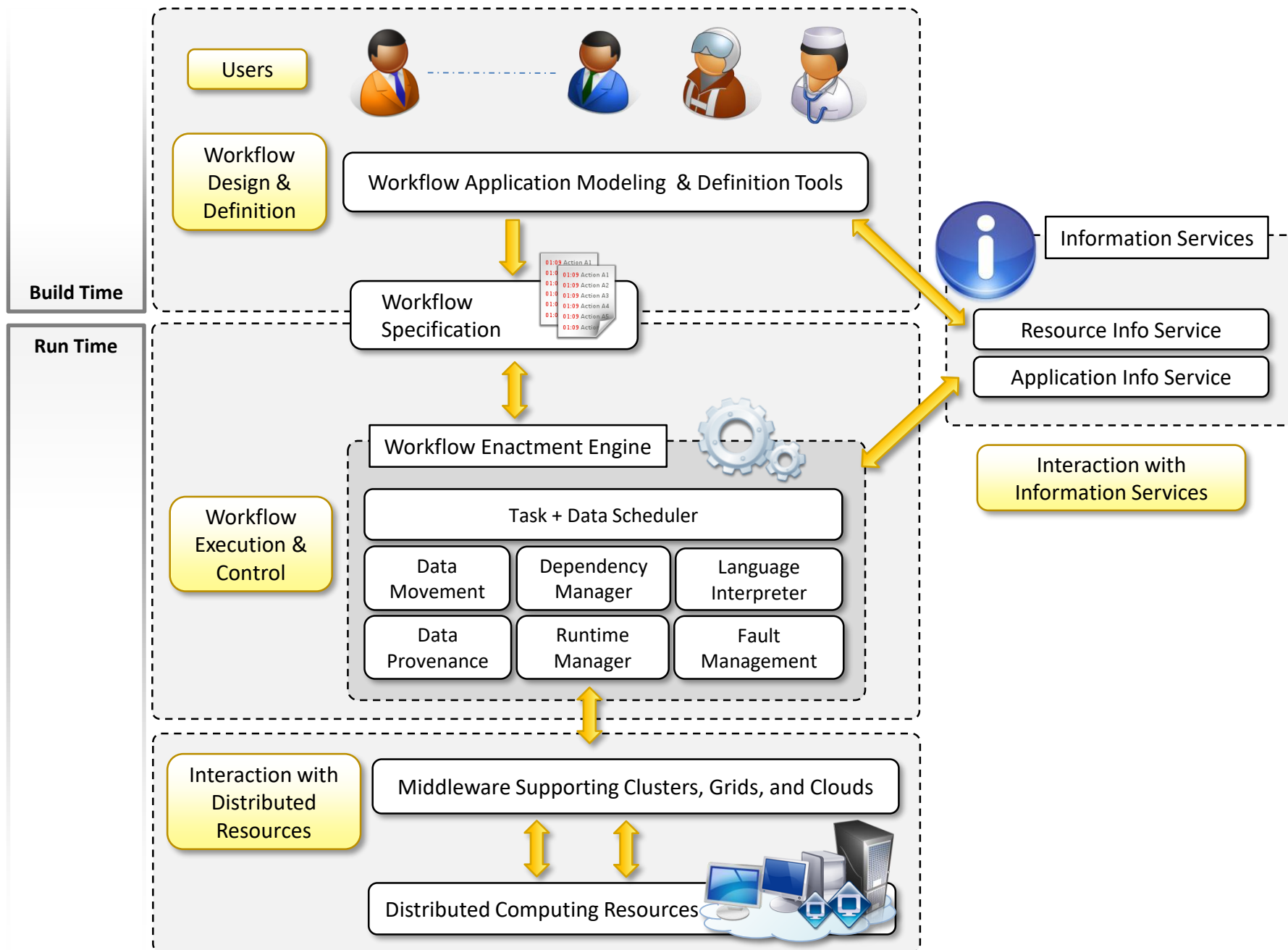
b. Aeka.Threading.AekaThread life cycle

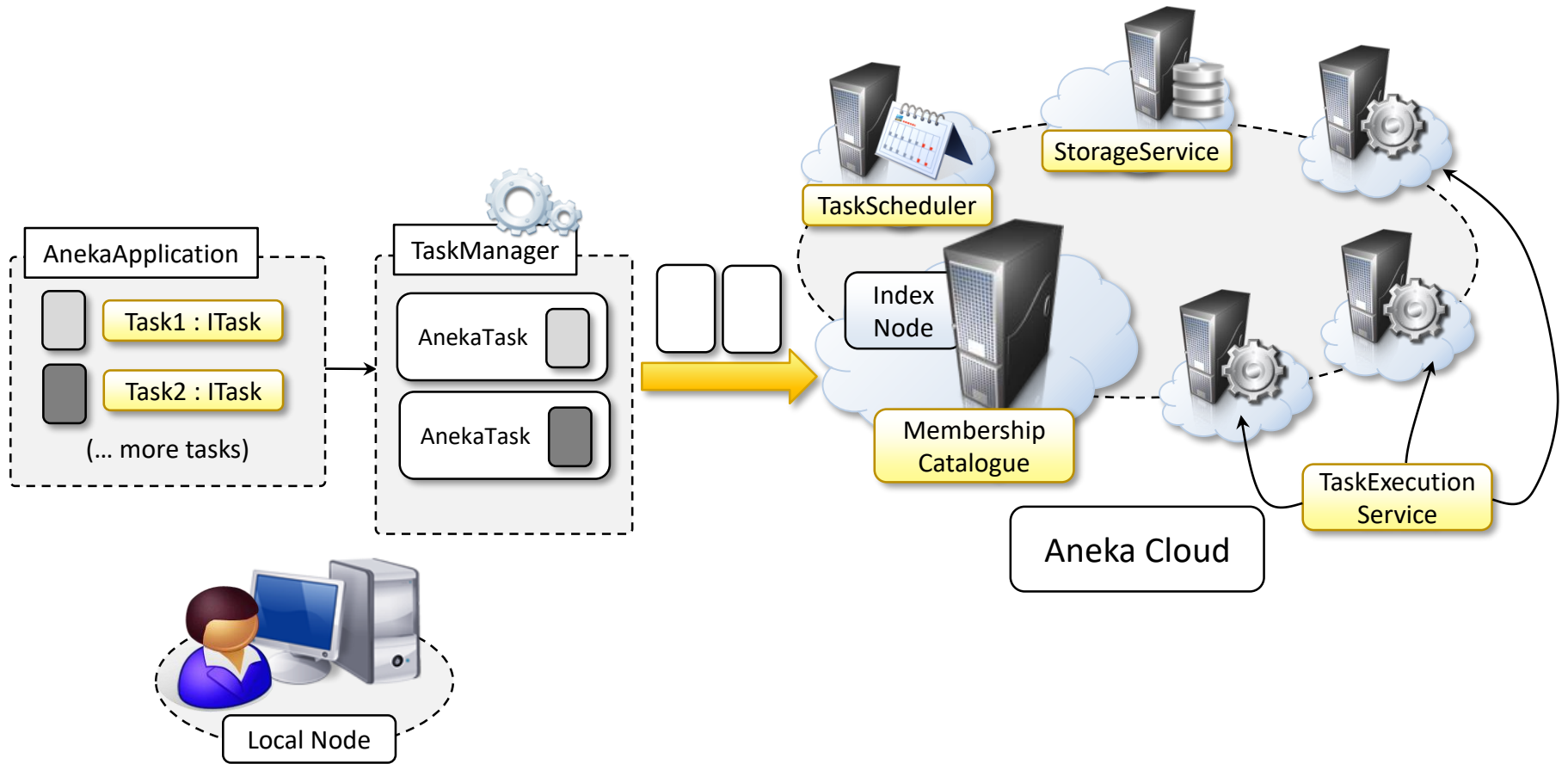
Chapter 7 – High-Throughput Computing: Task Programming

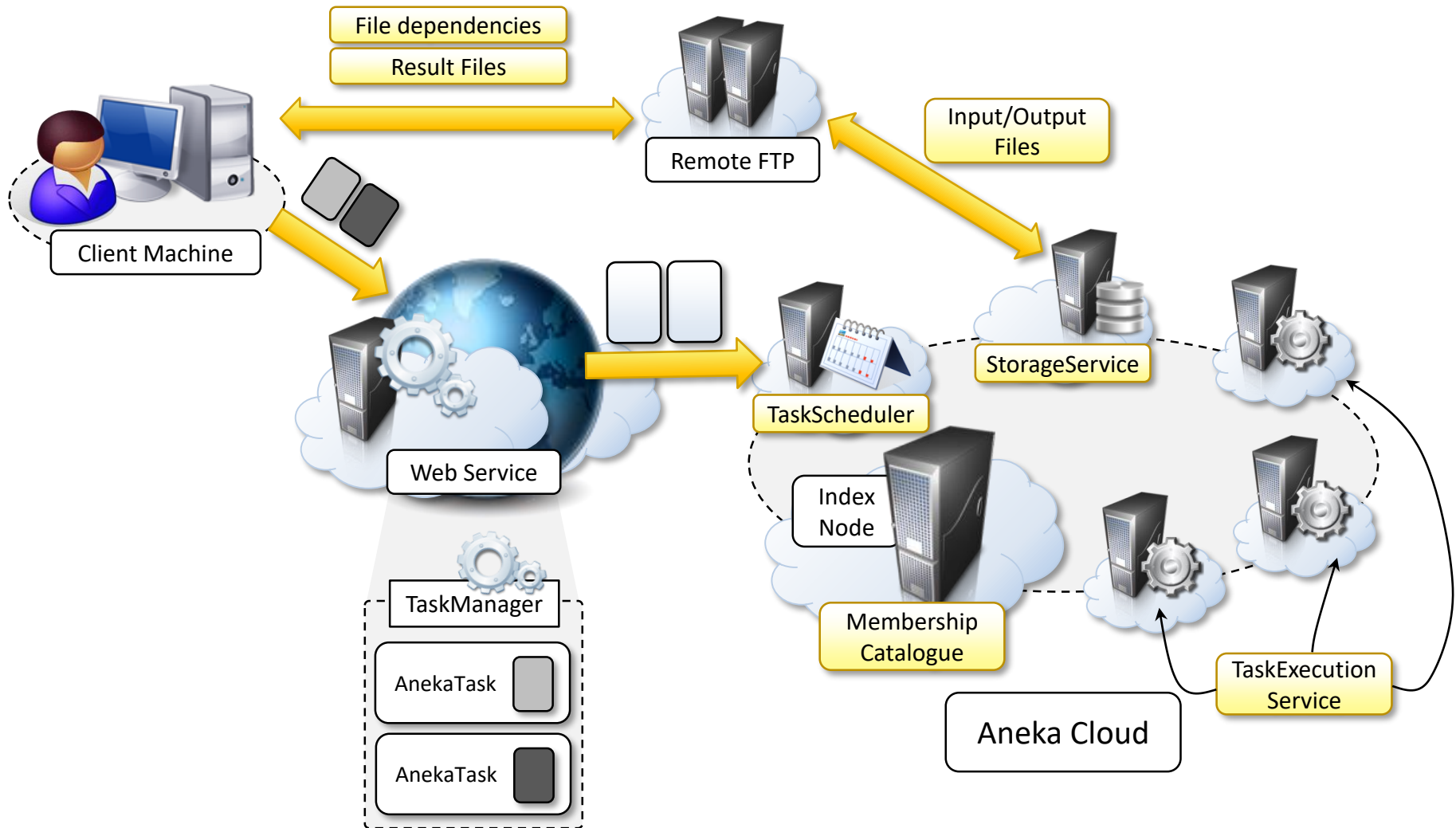


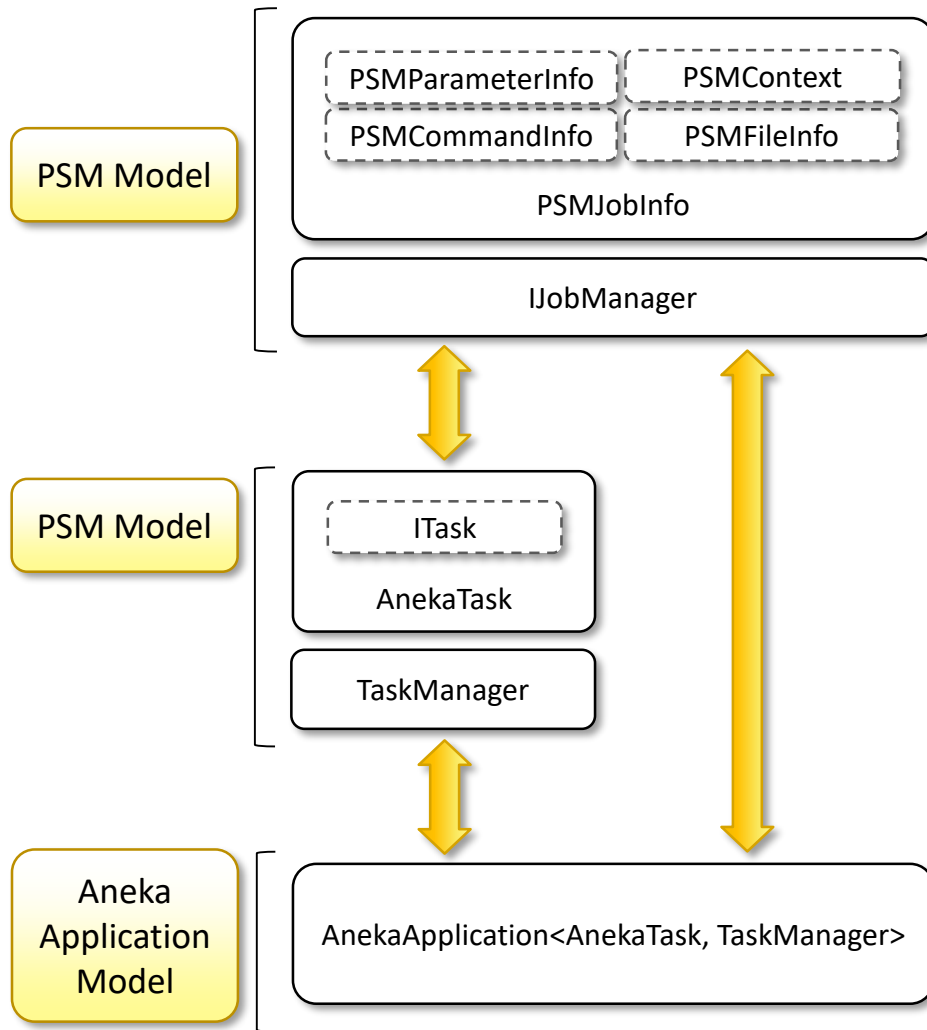


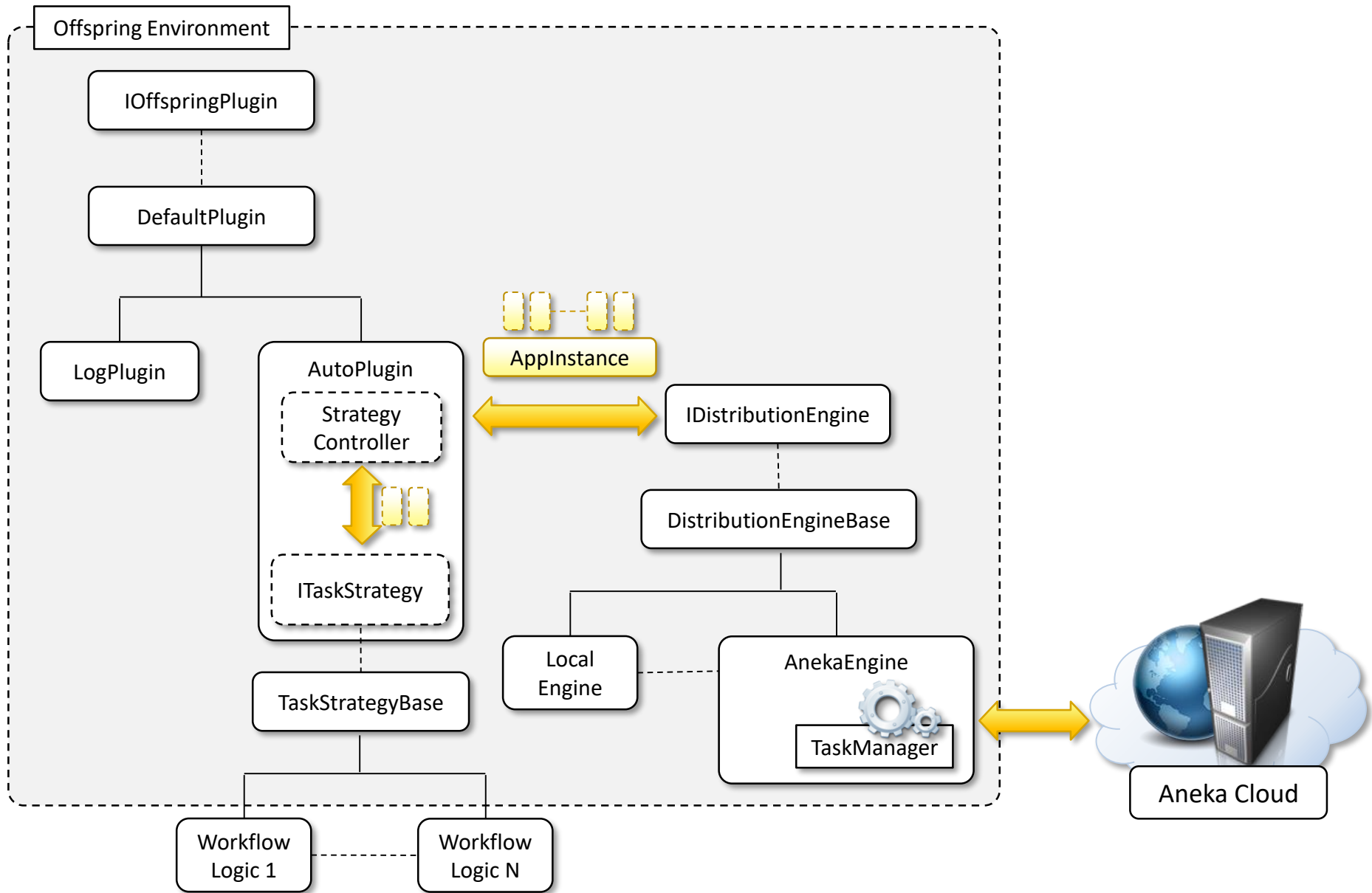












StrategyController

Control Thread
(Strategy Management)

Init Application

Init Strategy

Submit Tasks

Wait

No

Yes

Complete
or Stop?

Release Strategy

Shutdown
Application

Monitoring Thread
(Feedback from Distribution Engine)

Task
Feedback

Task Failed?

No

Yes

Invoke OnSuccess

Invoke OnFailed

New Task?

No

Yes

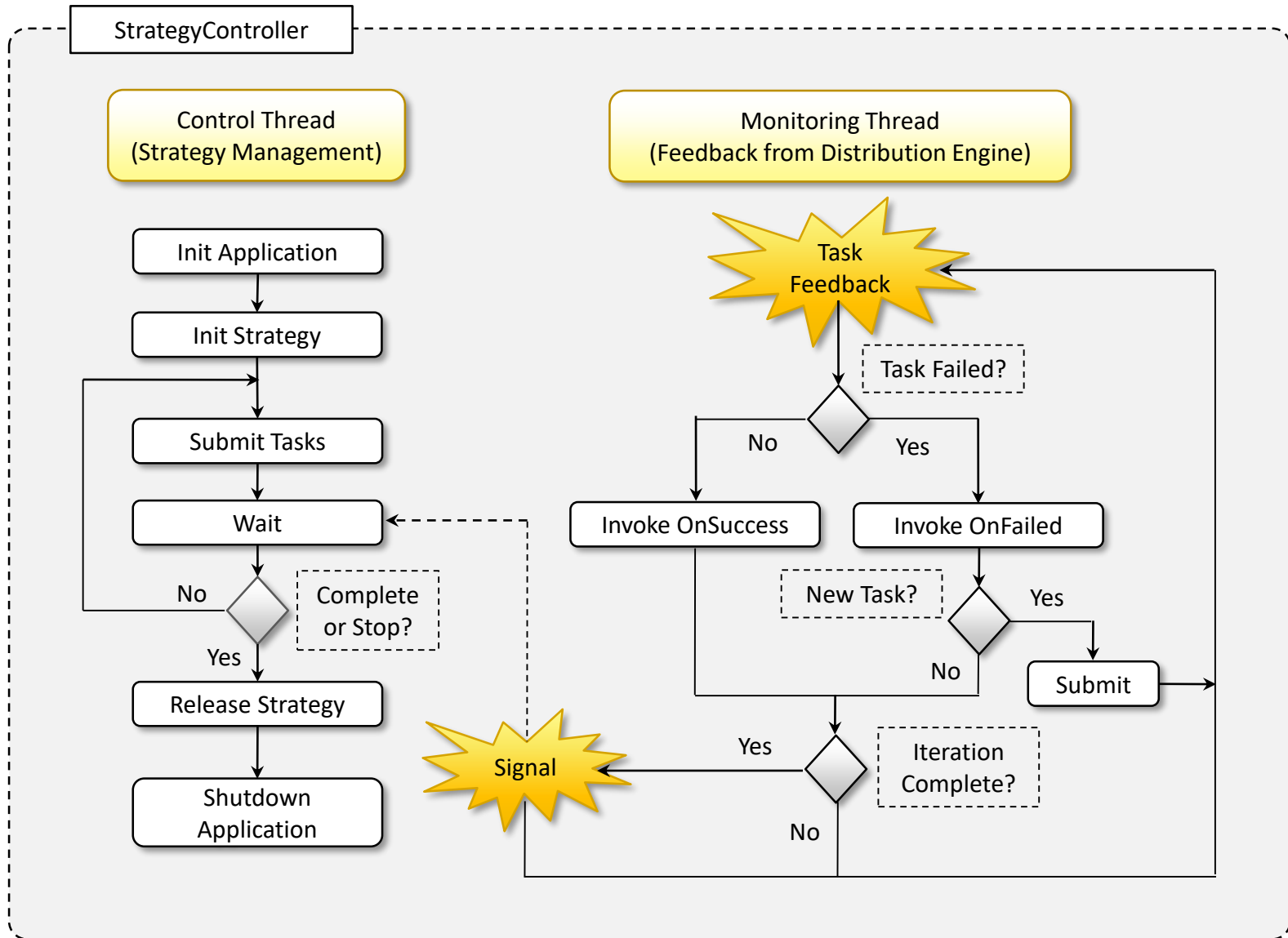
Submit

Yes

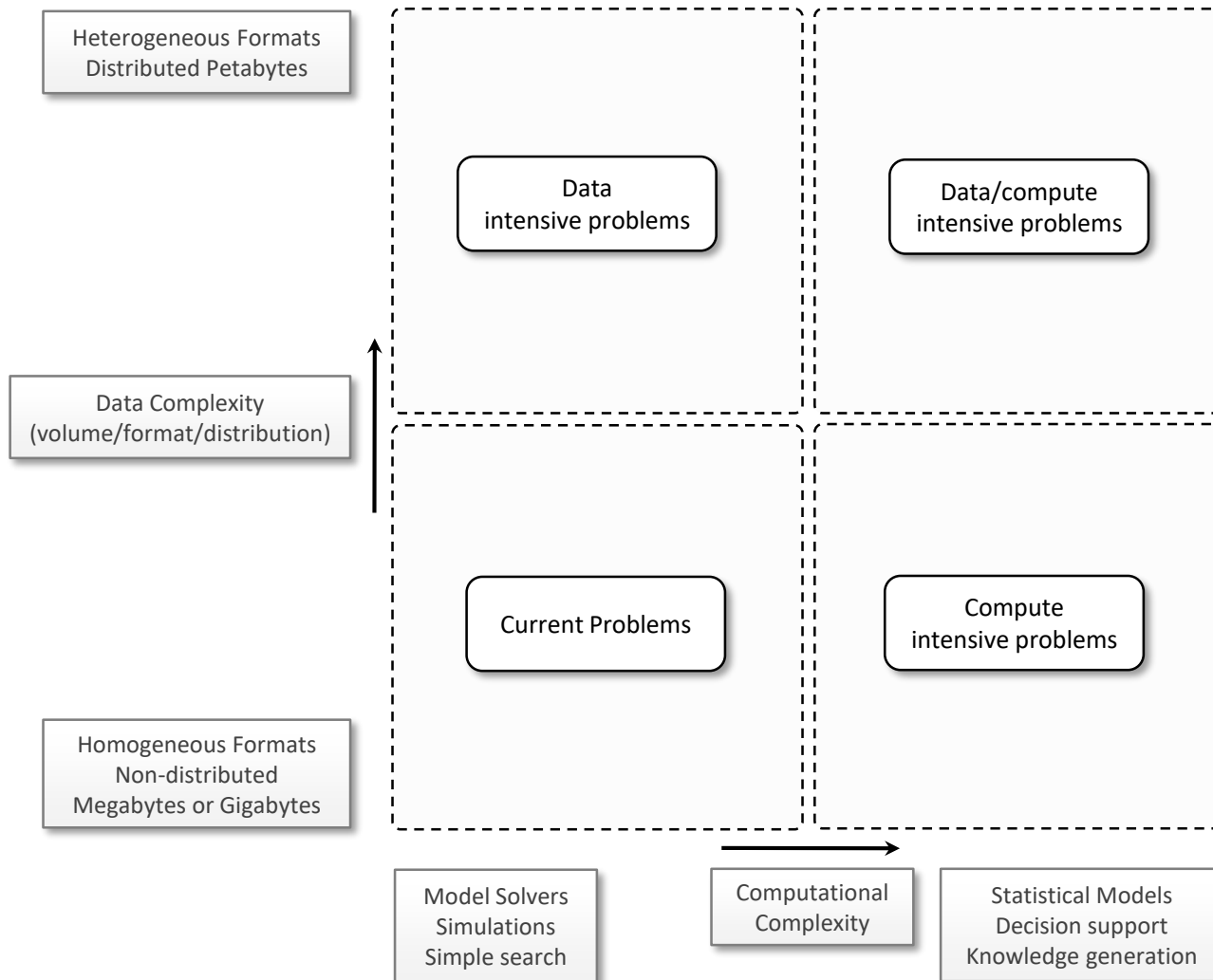
No

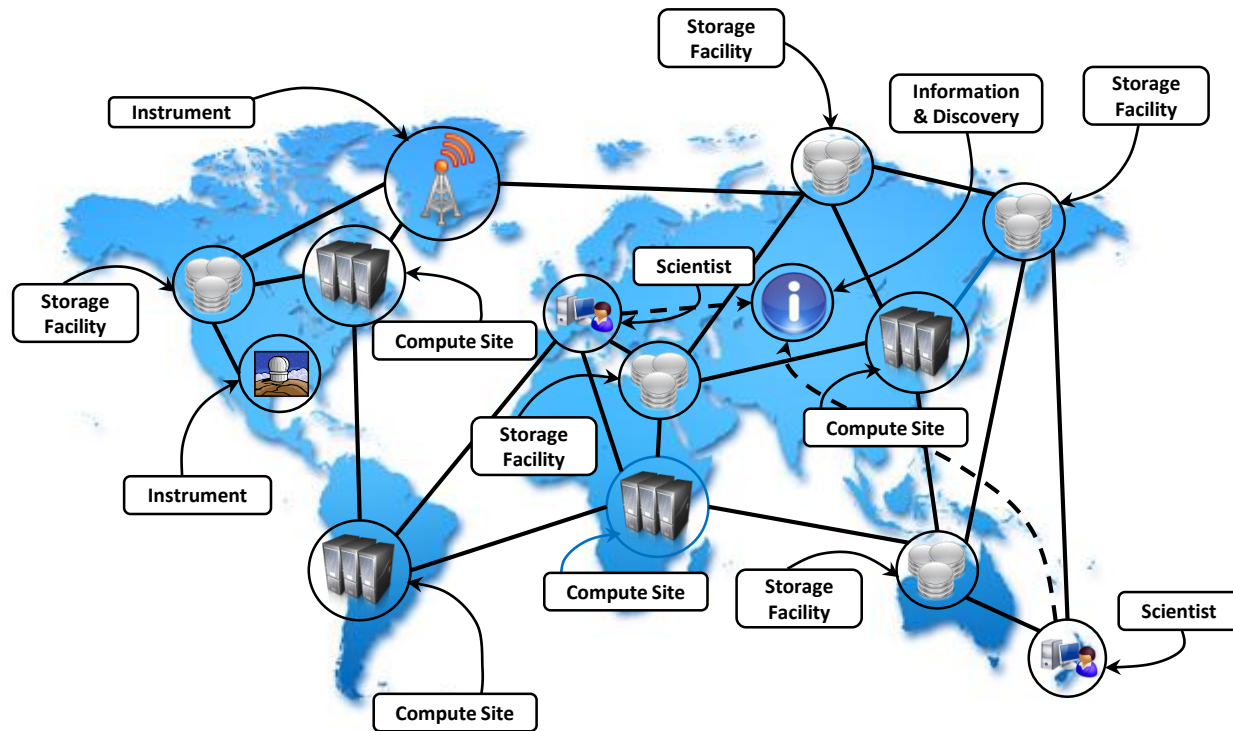
Iteration
Complete?

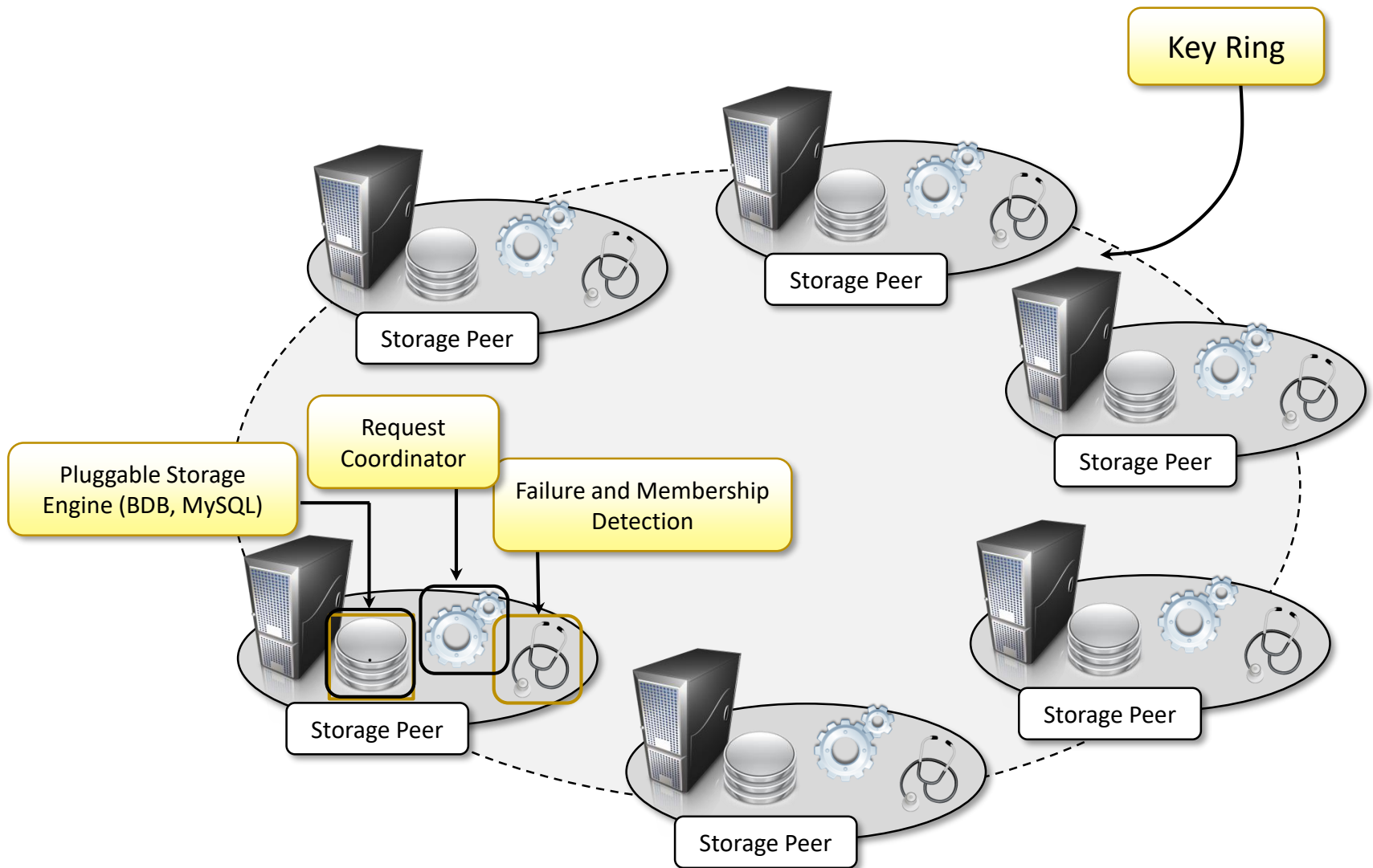
Signal

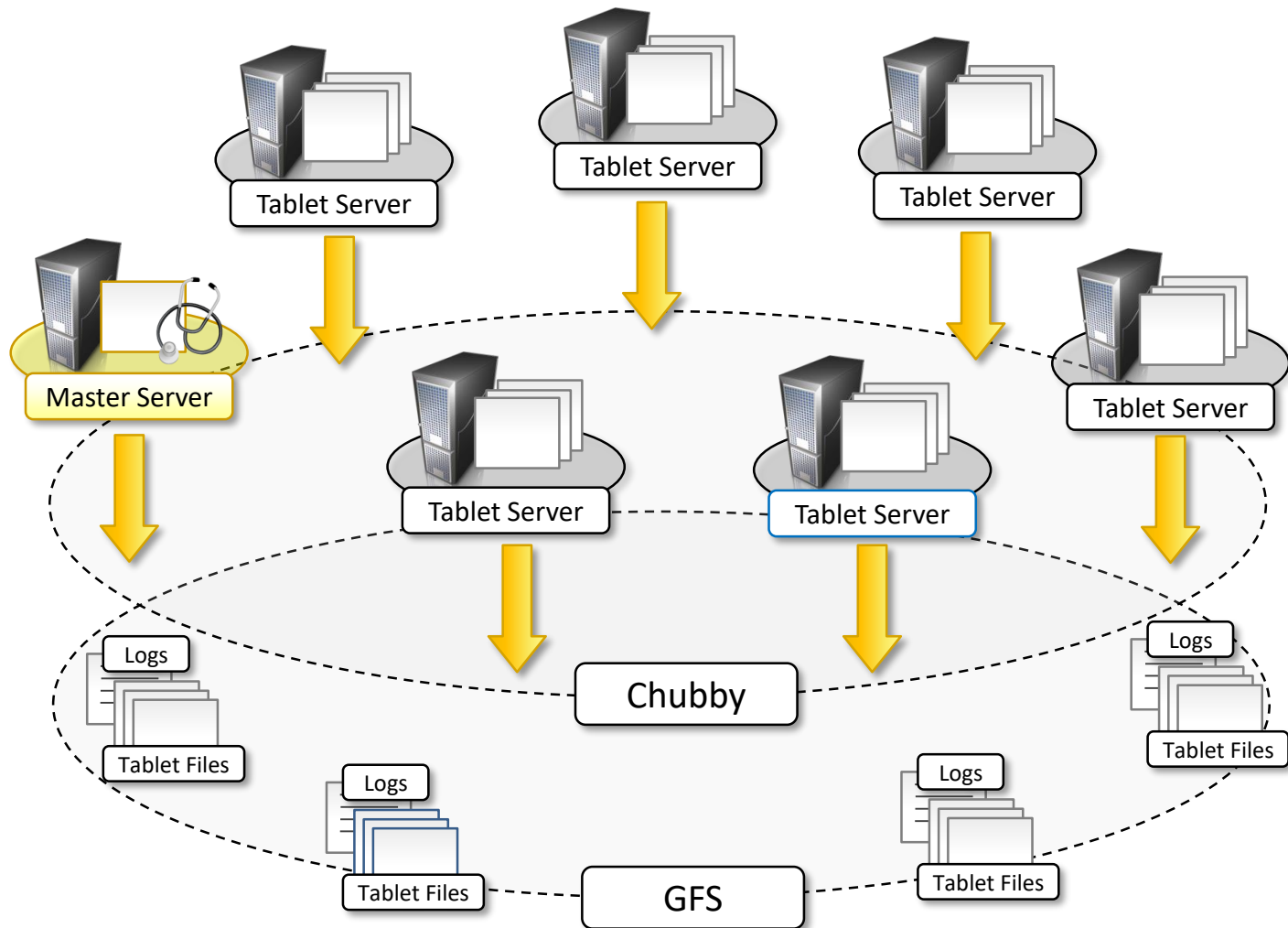


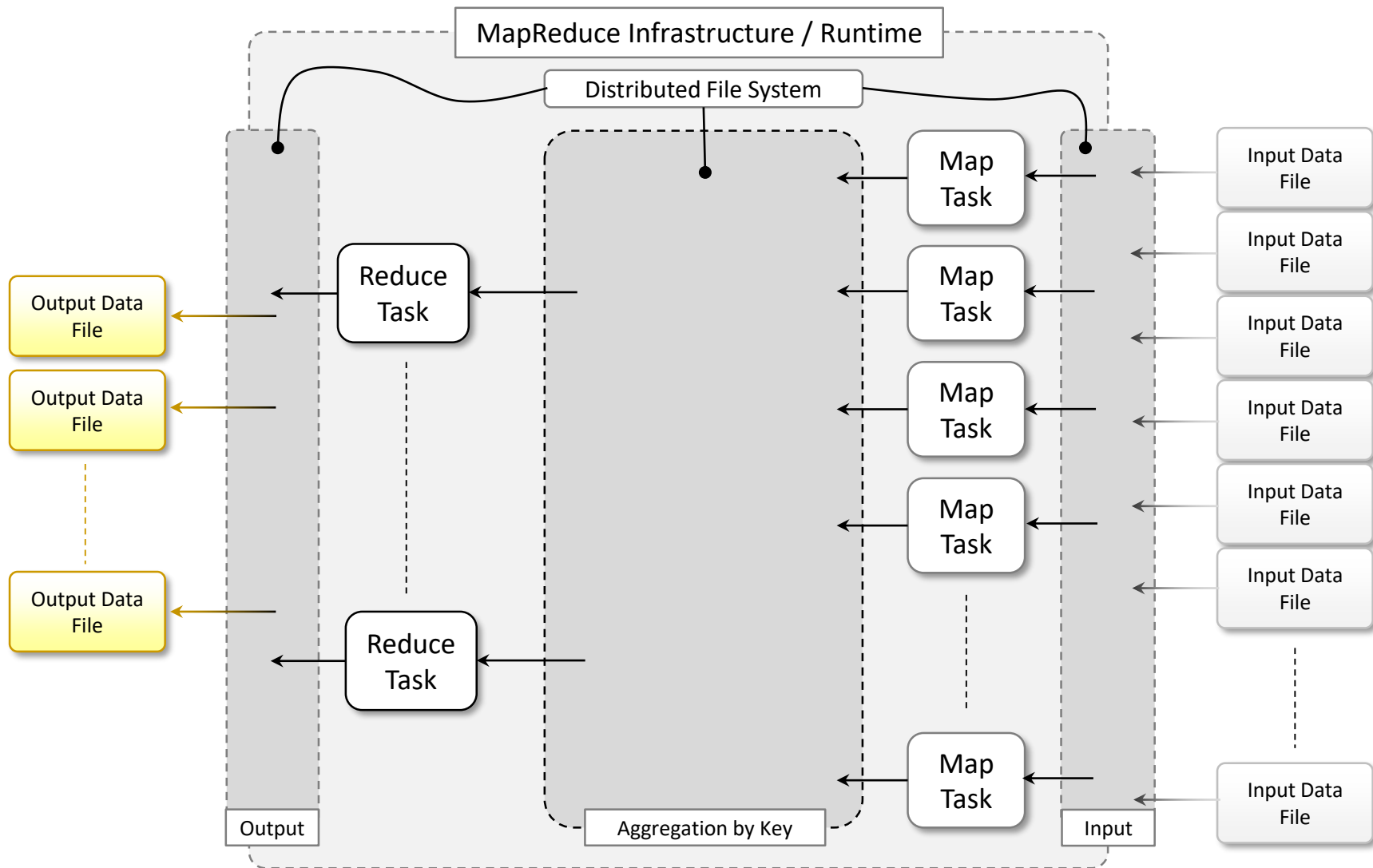
Chapter 8 – Data Intensive Computing: Map-Reduce Programming

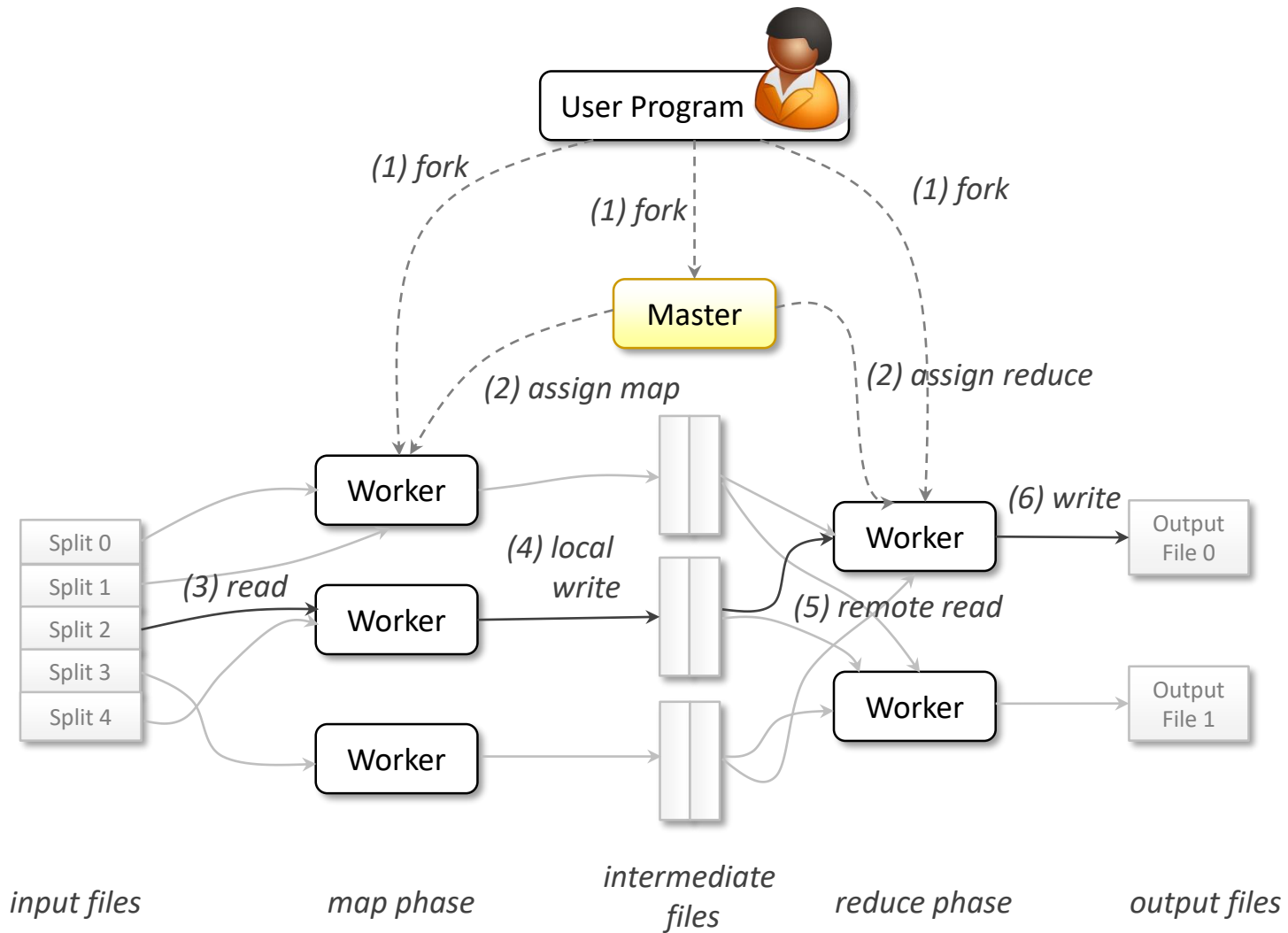


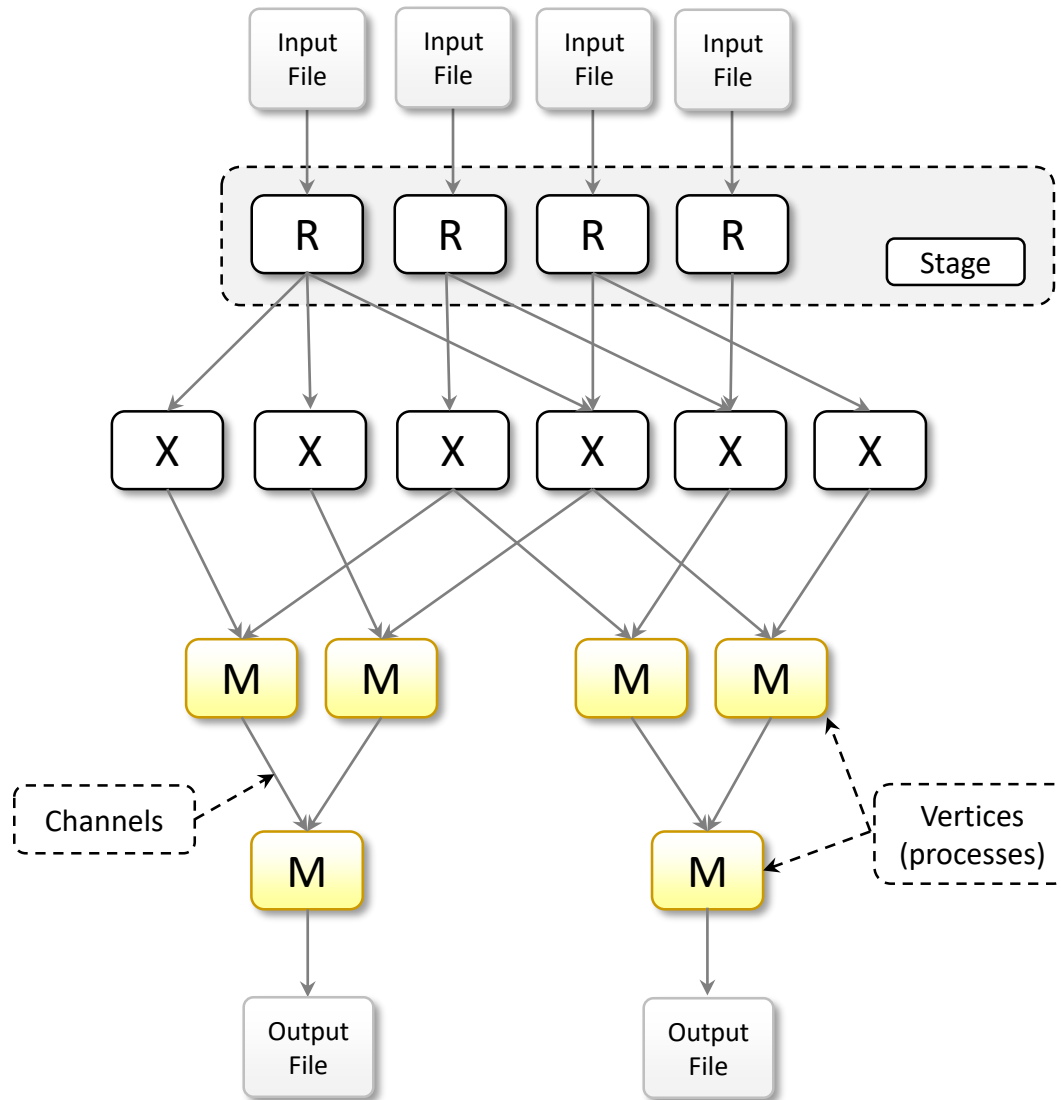


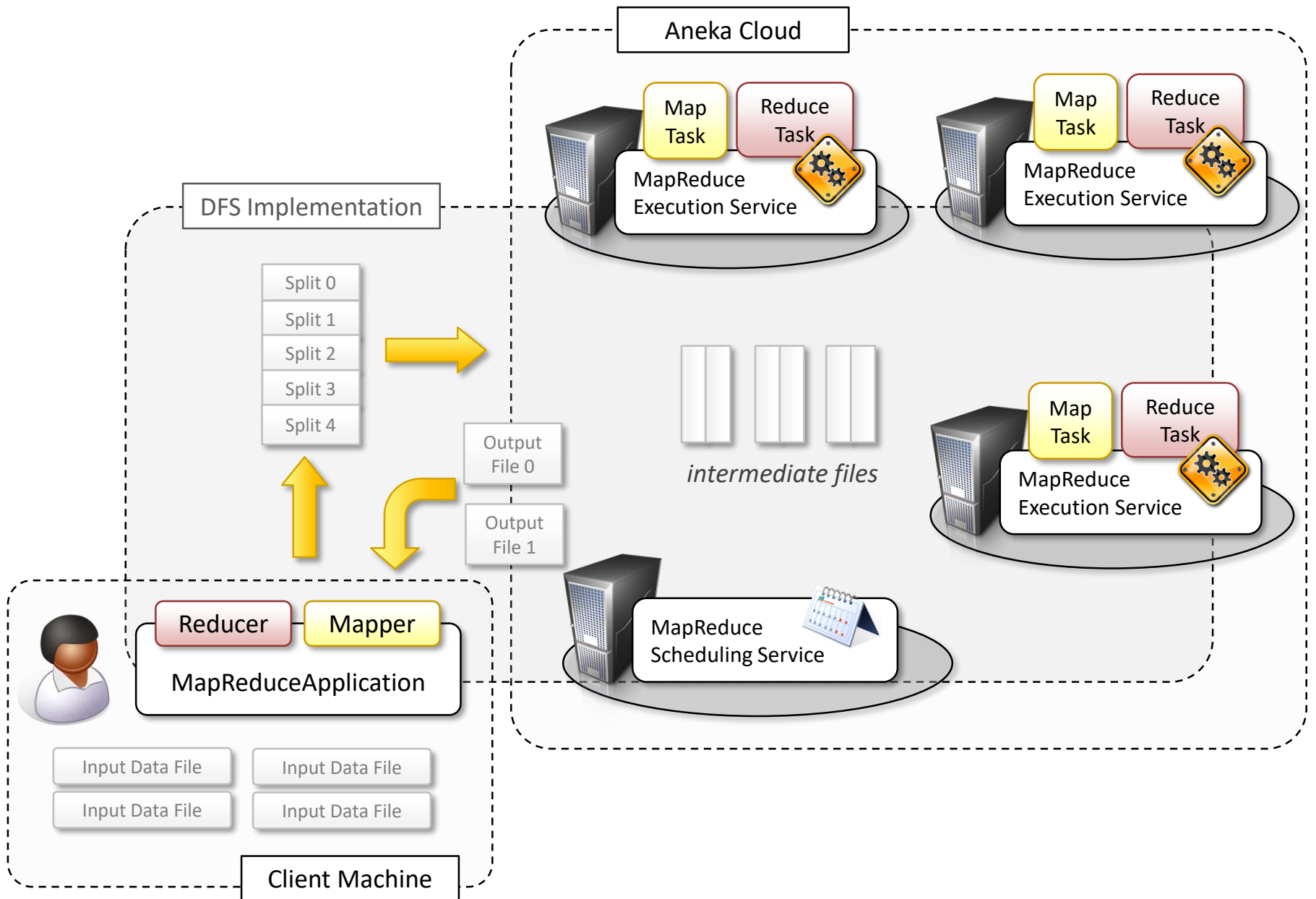


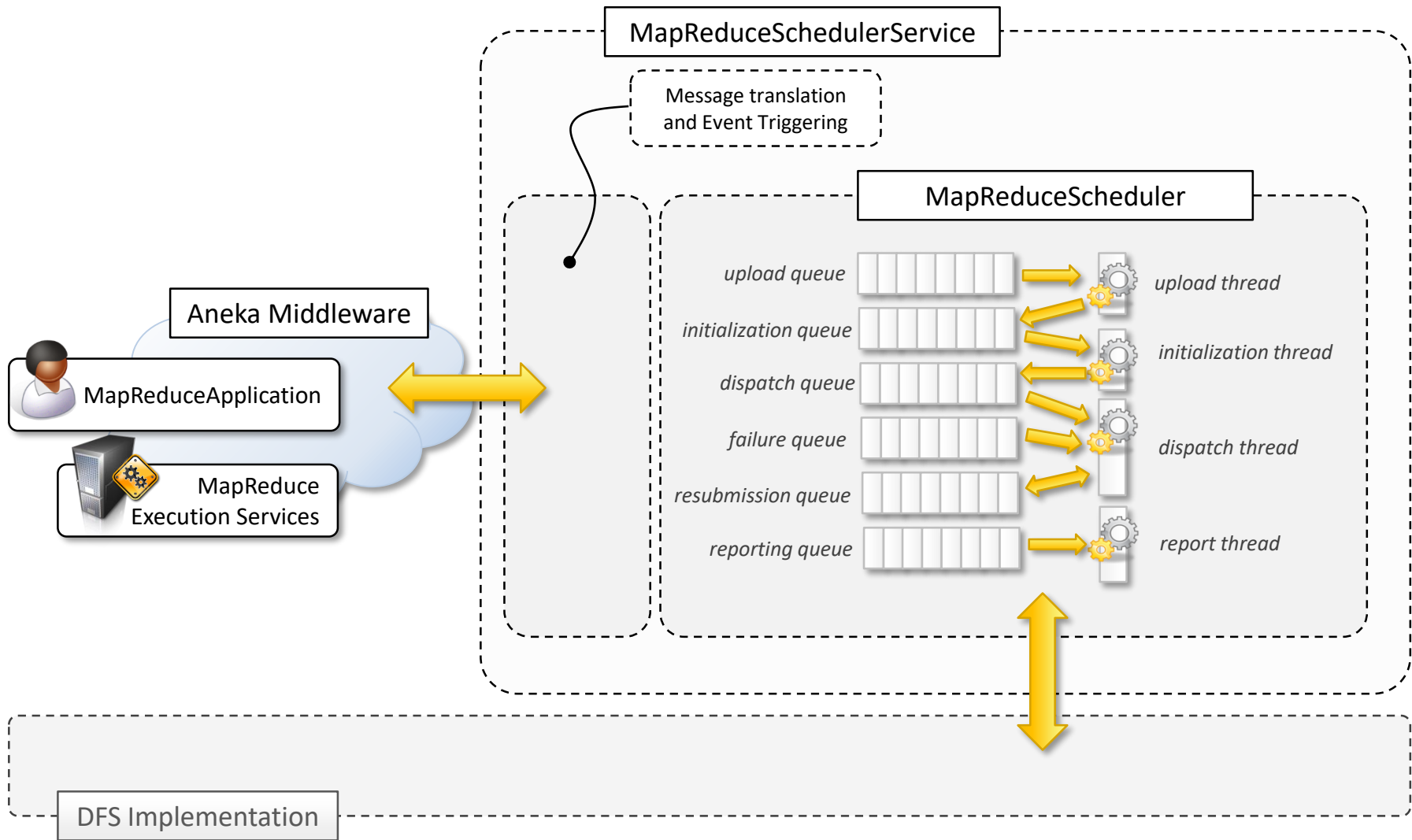


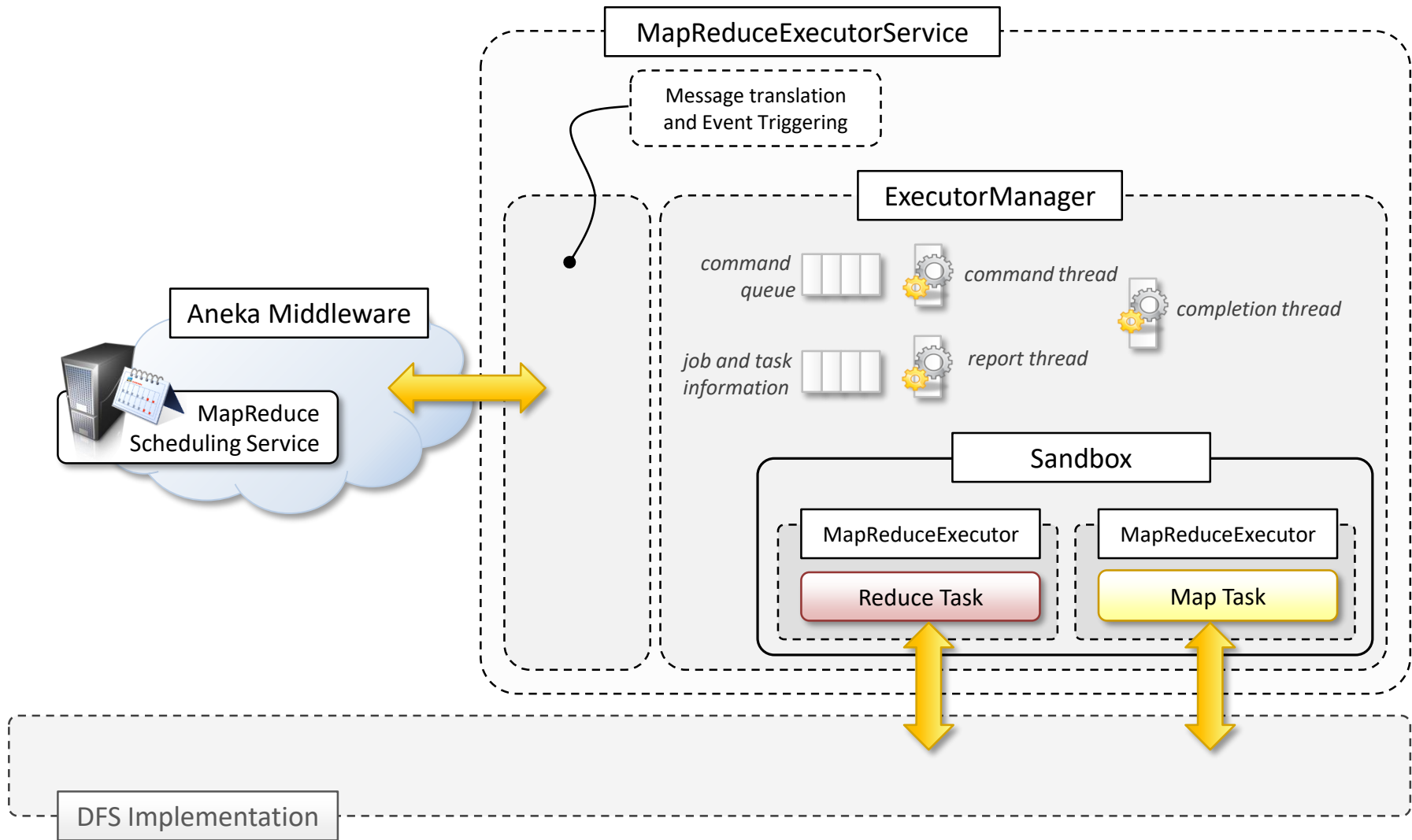


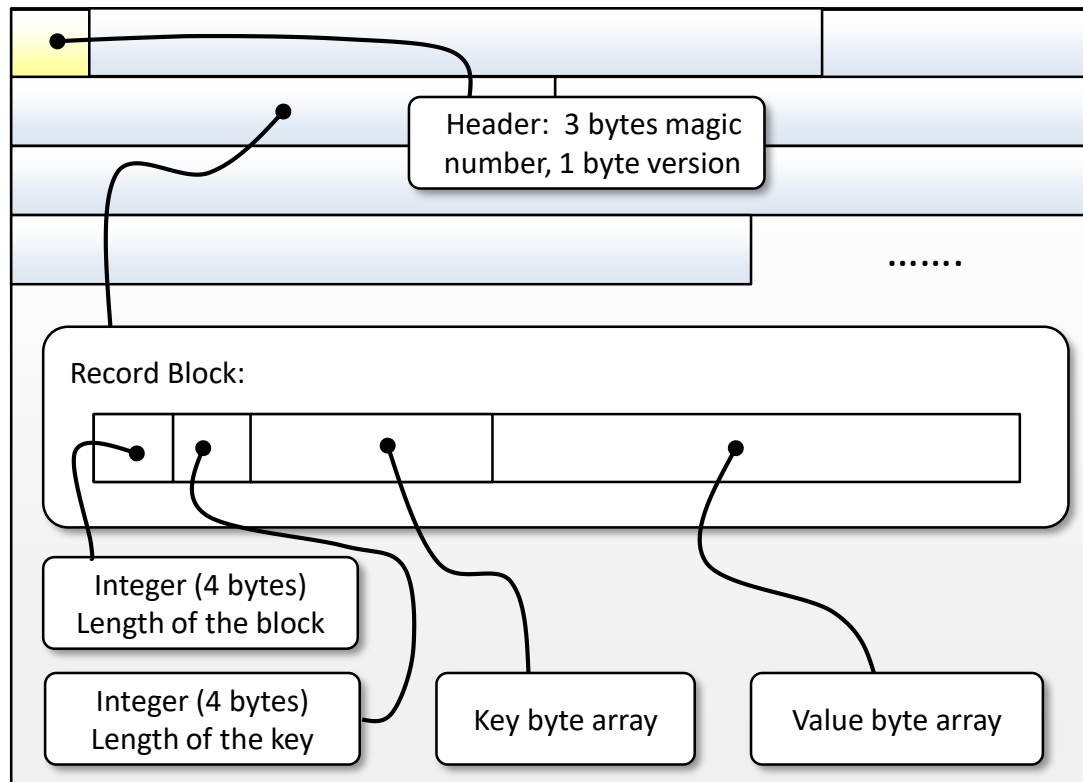


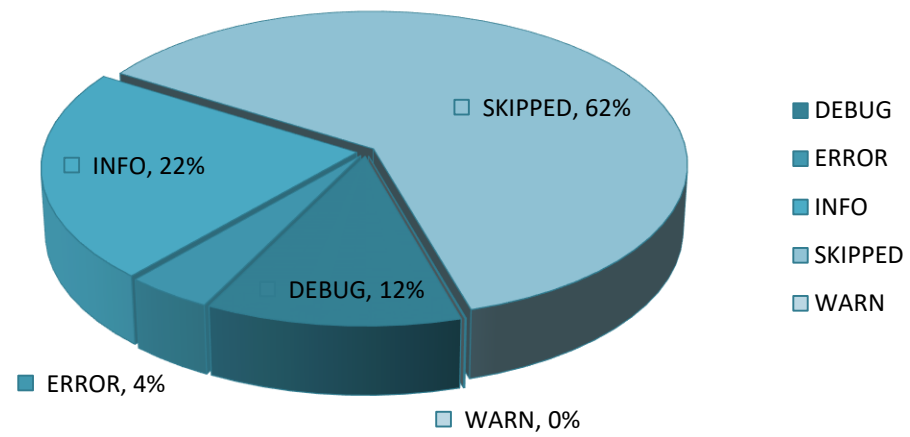


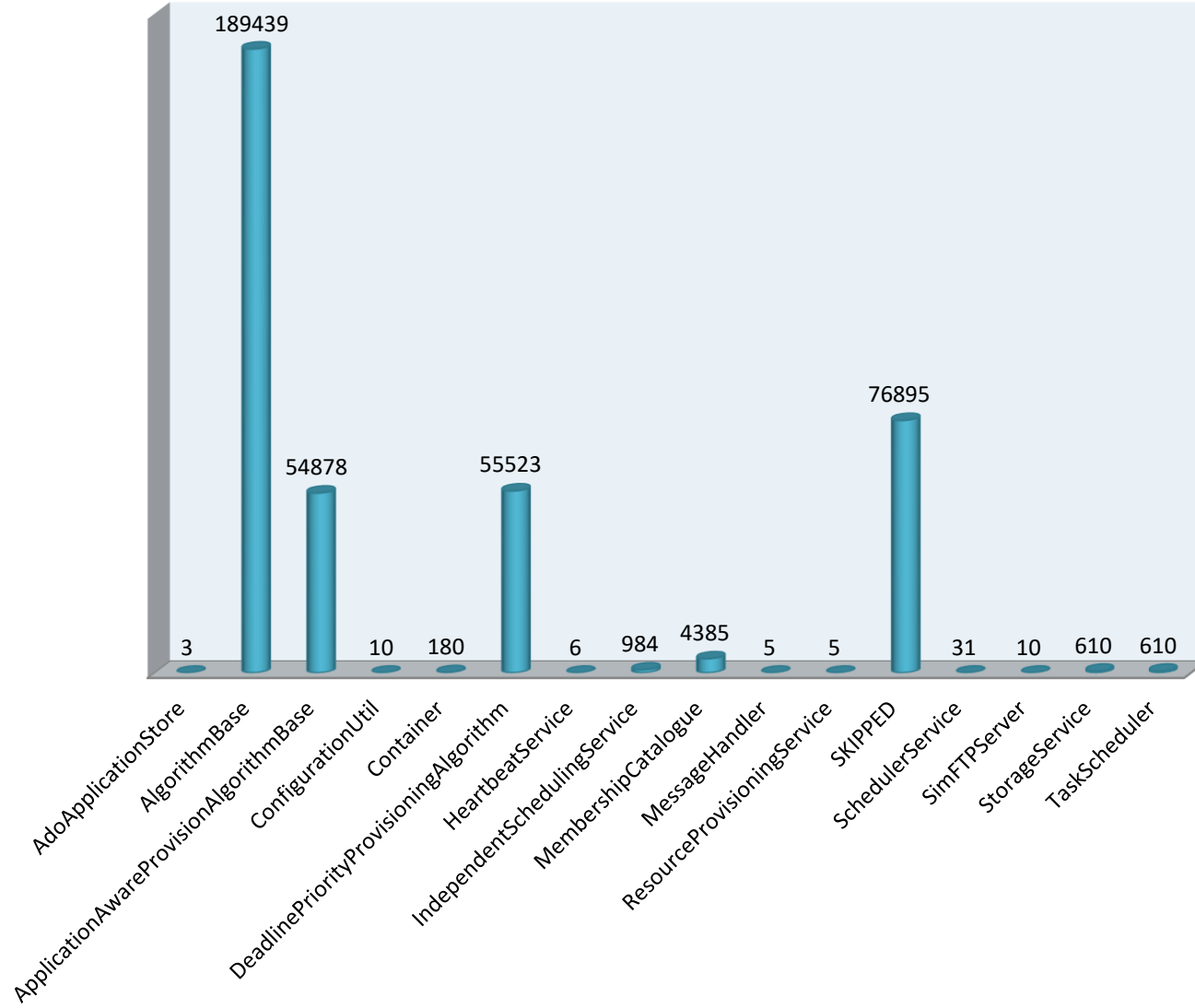


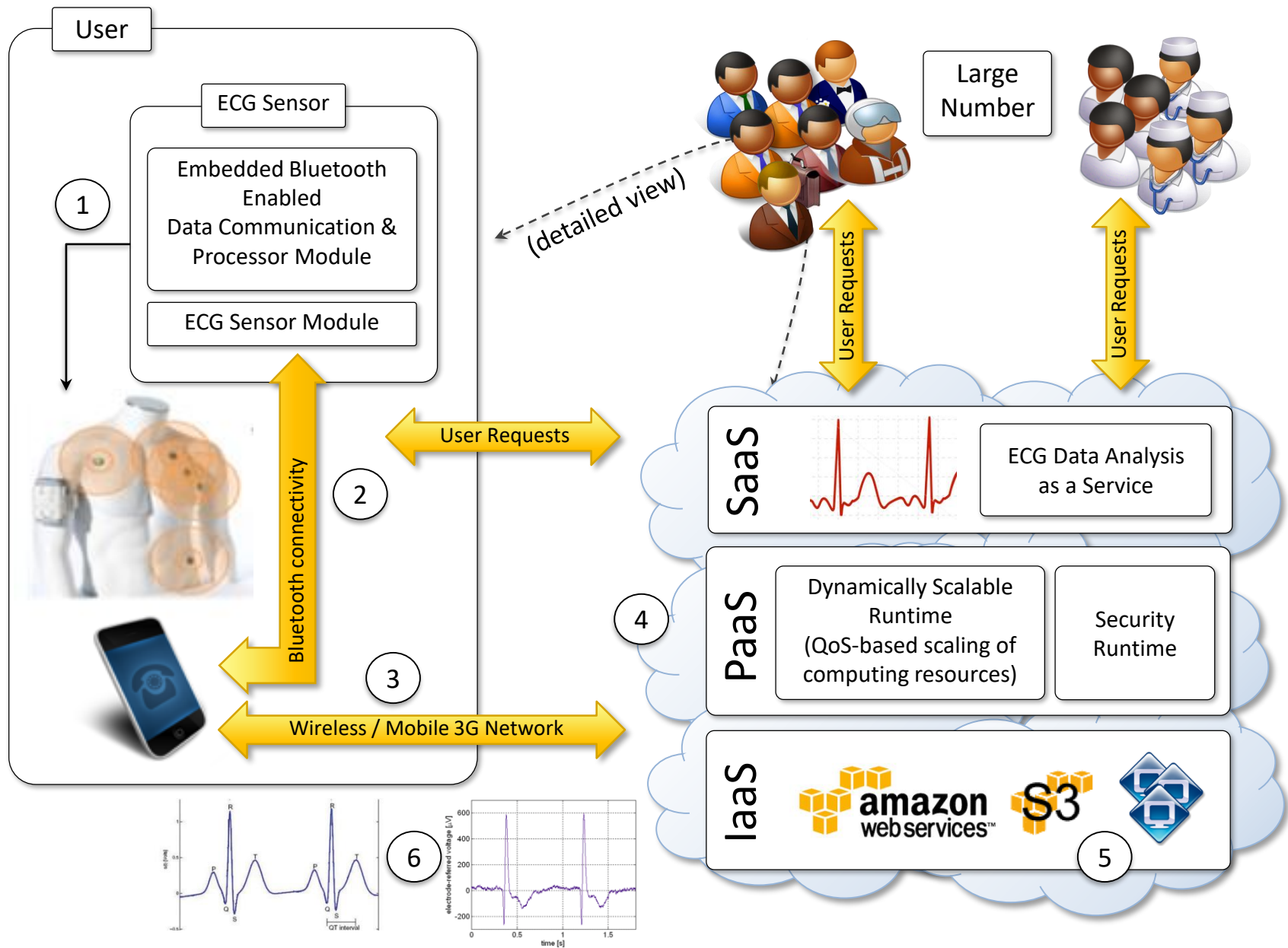


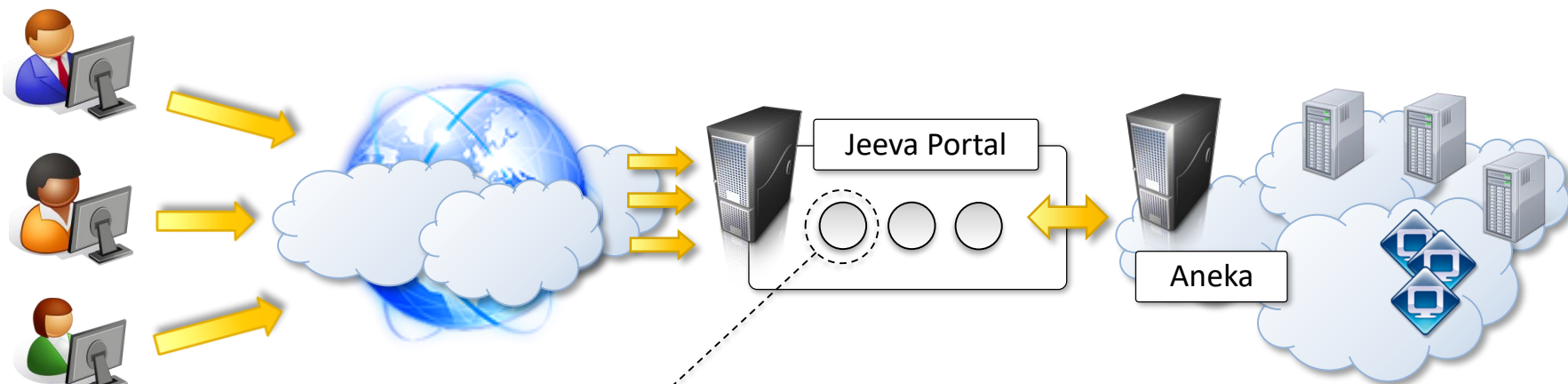




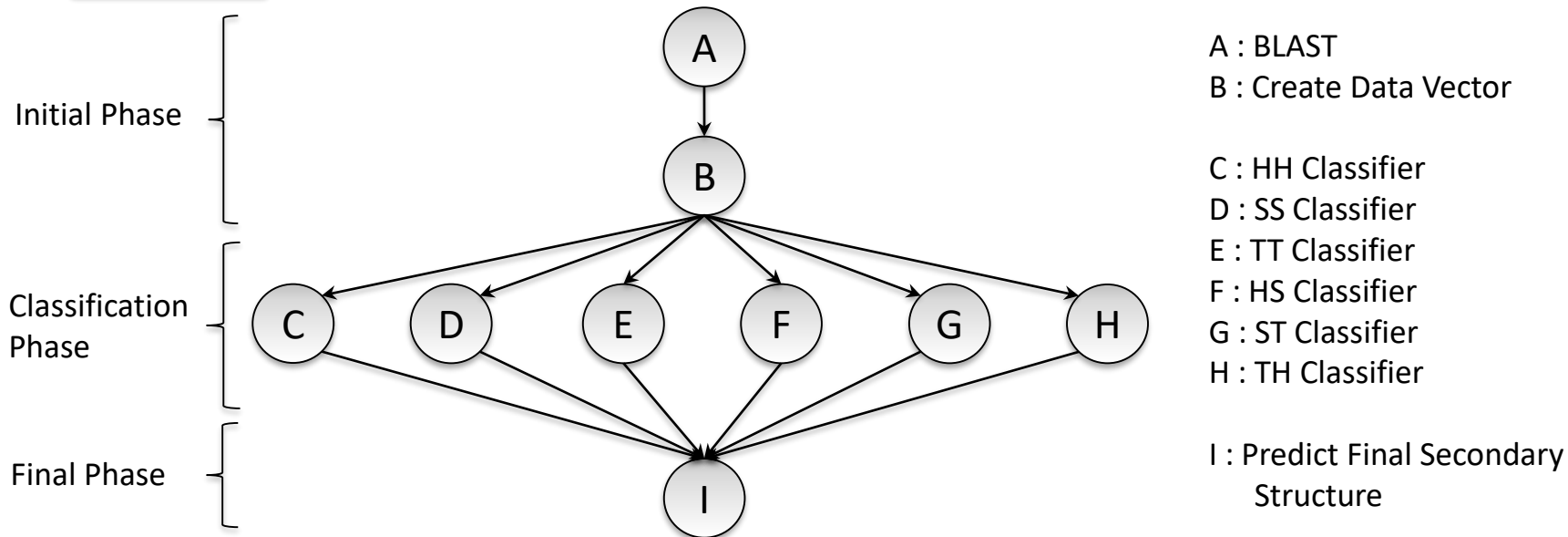








Task Graph



Chapter 9 – Cloud Platforms in Industry

Compute Services

Amazon Elastic
Compute Cloud (EC2)

Amazon Elastic
MapReduce

AWS Elastic Beanstalk

AWS Cloudformation

Autoscaling

Storage Services

Amazon Simple
Storage Service (S3)

Amazon Elastic Block
Store (EBS)

Amazon ElastiCache

Amazon SimpleDB

Amazon Relational
Database Service (RDS)

Amazon CloudFront

Amazon
Import/Export

Communication Services

Amazon Simple Queue
Service (SQS)

Amazon Simple
Notification Service
(SNS)

Amazon Simple Email
Service (SES)

Amazon Route 53

Amazon Virtual Private
Cloud (VPC)

Amazon Direct
Connect

Amazon Elastic Load
Balancing

Additional Services

Amazon GovCloud

Amazon CloudWatch

Amazon Flexible
Payment Service (FPS)

Amazon DevPay

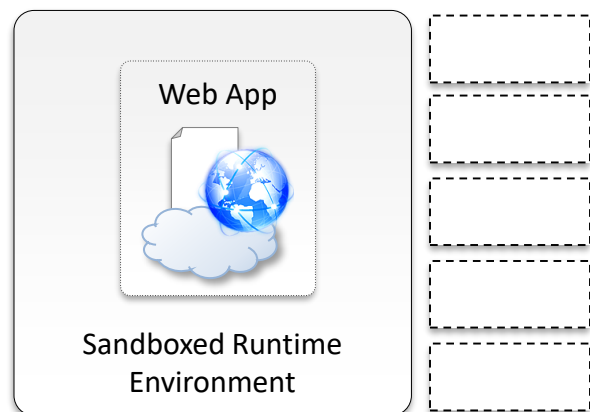
Amazon Fulfillment
Web Service (AWS)

Amazon Mechanical
Turk

Alexa Web Information
Service

Alexa Top Sites

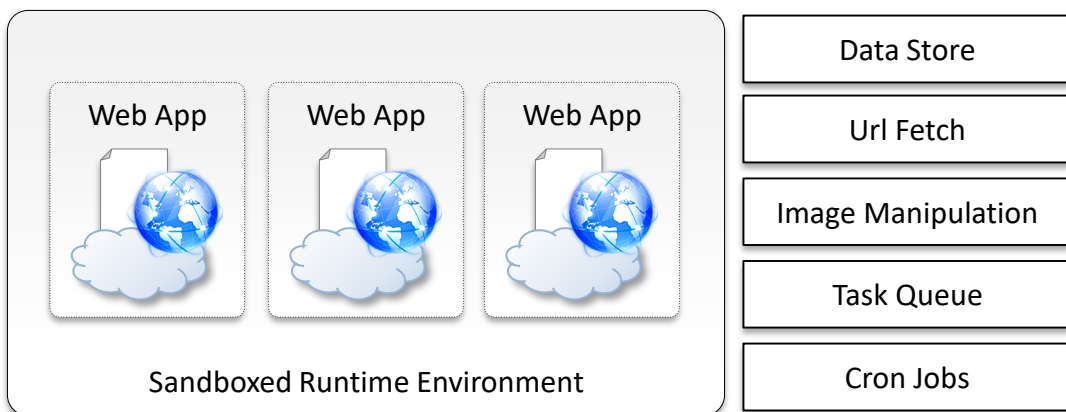
Amazon AWS Platform




Python SDK

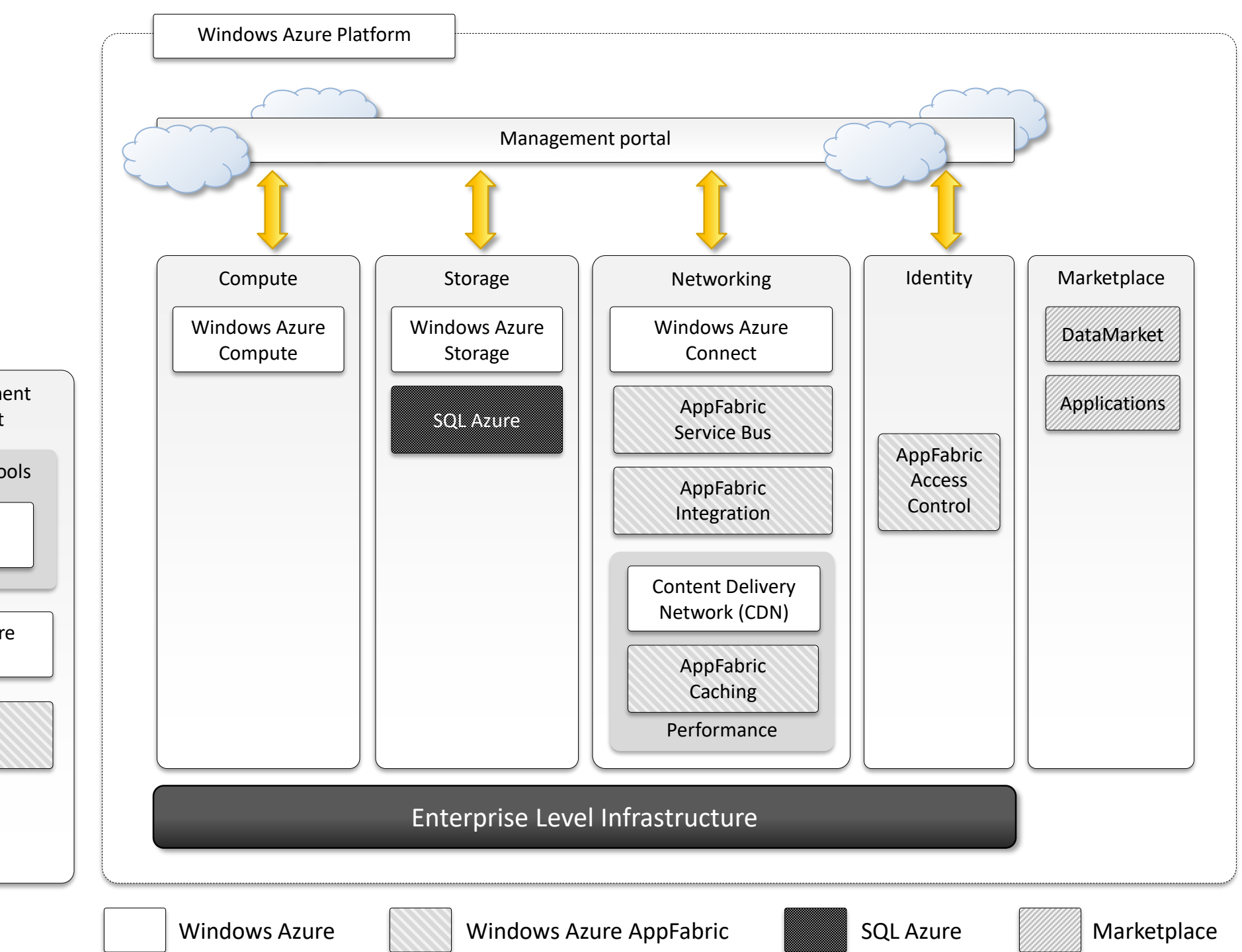
Local Machine 

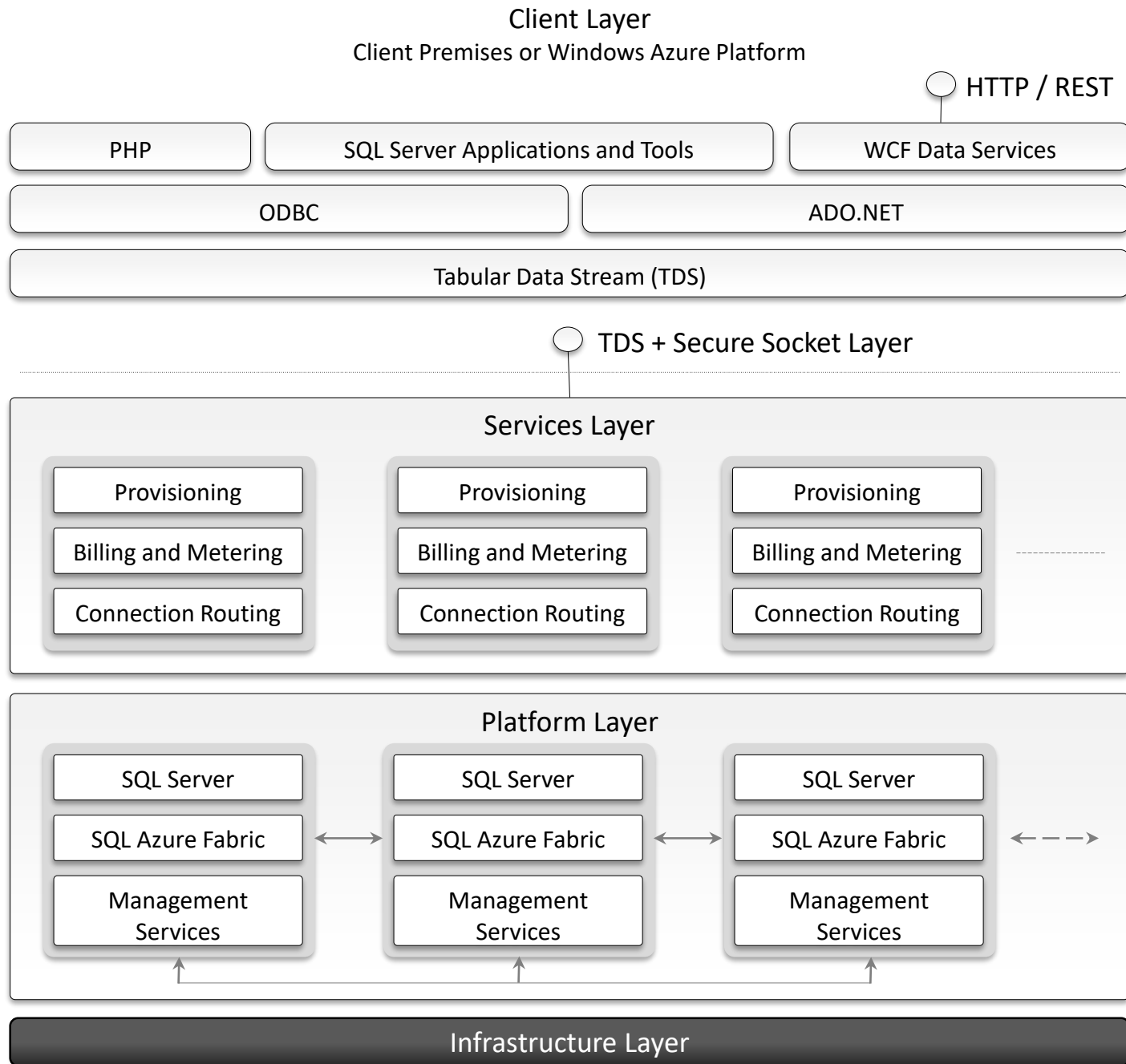
Development



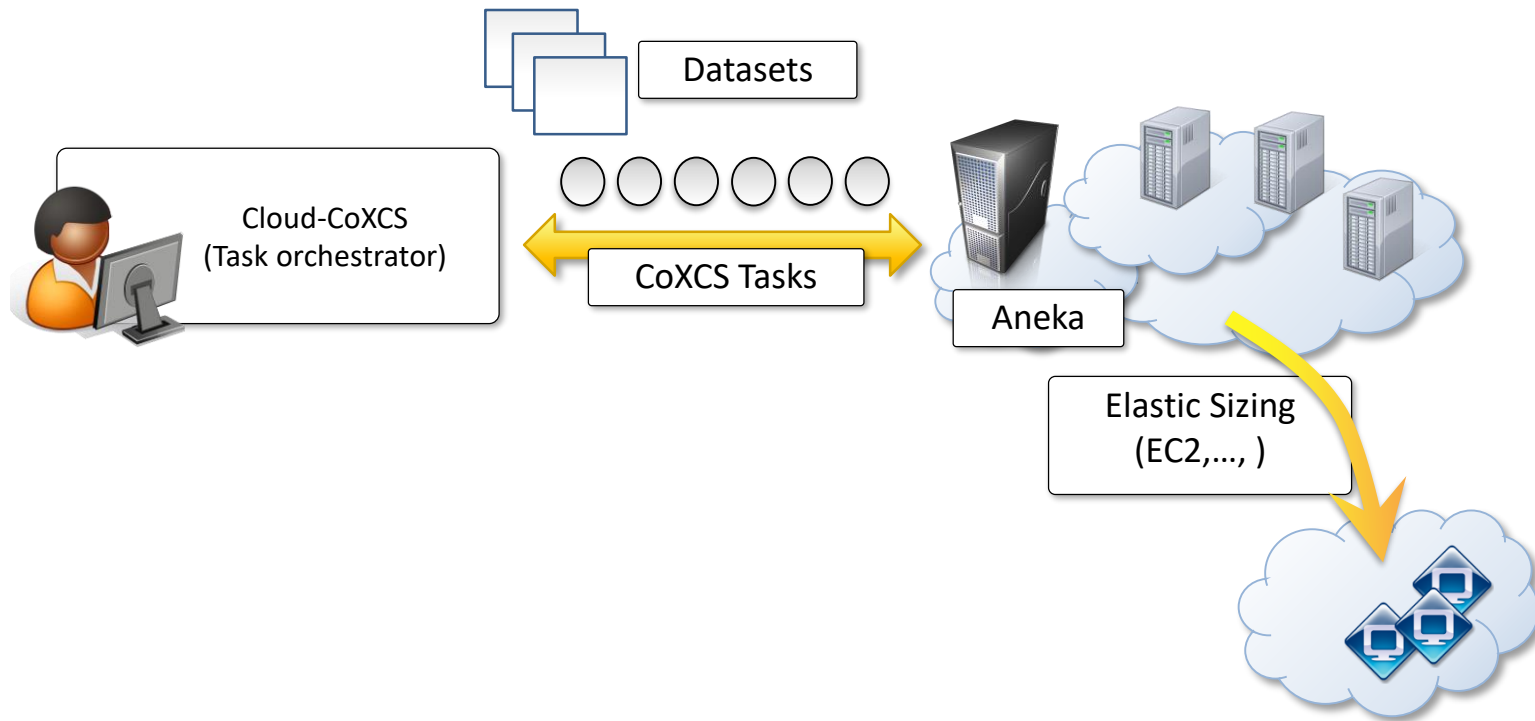
Google AppEngine Infrastructure 

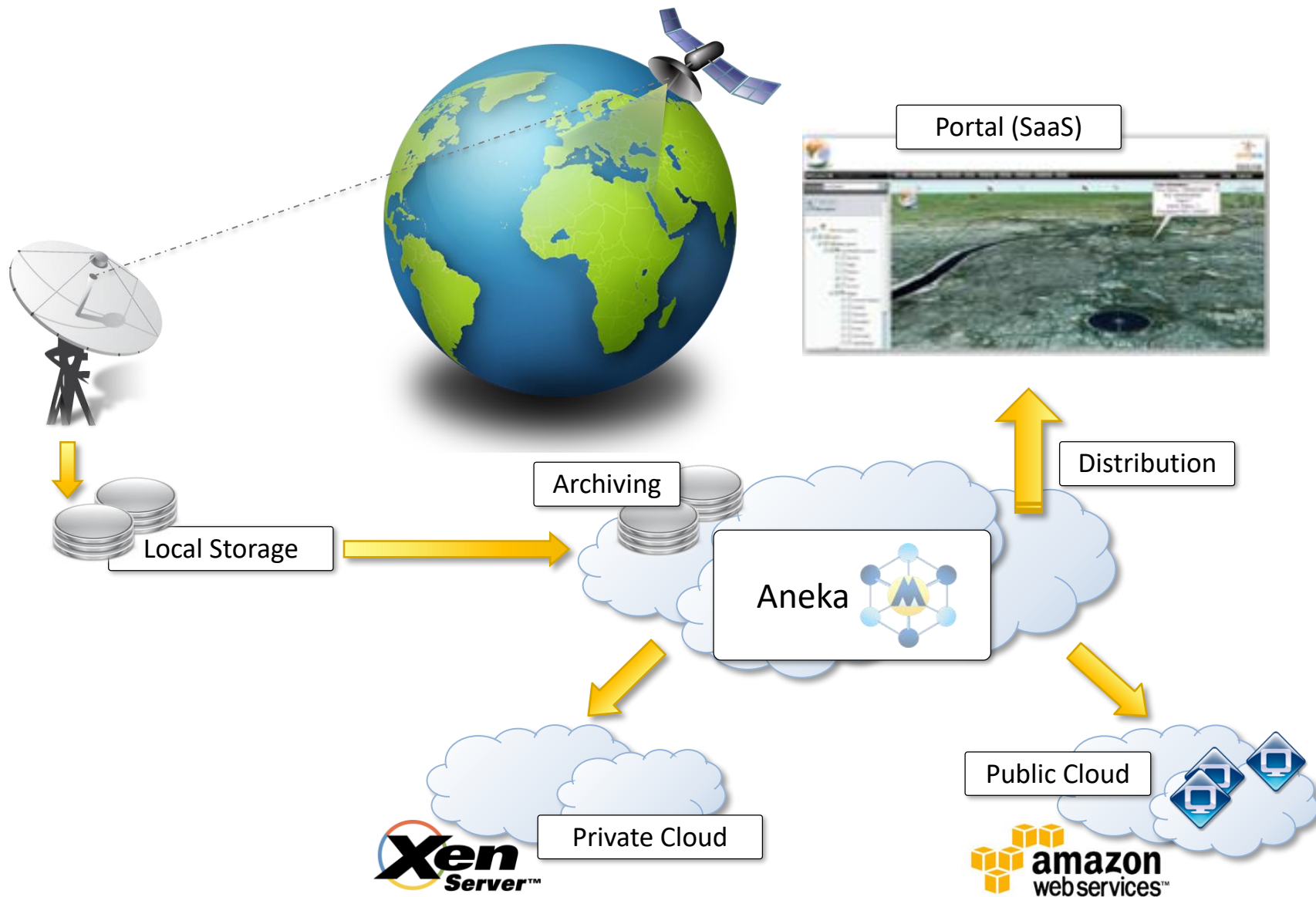
Runtime

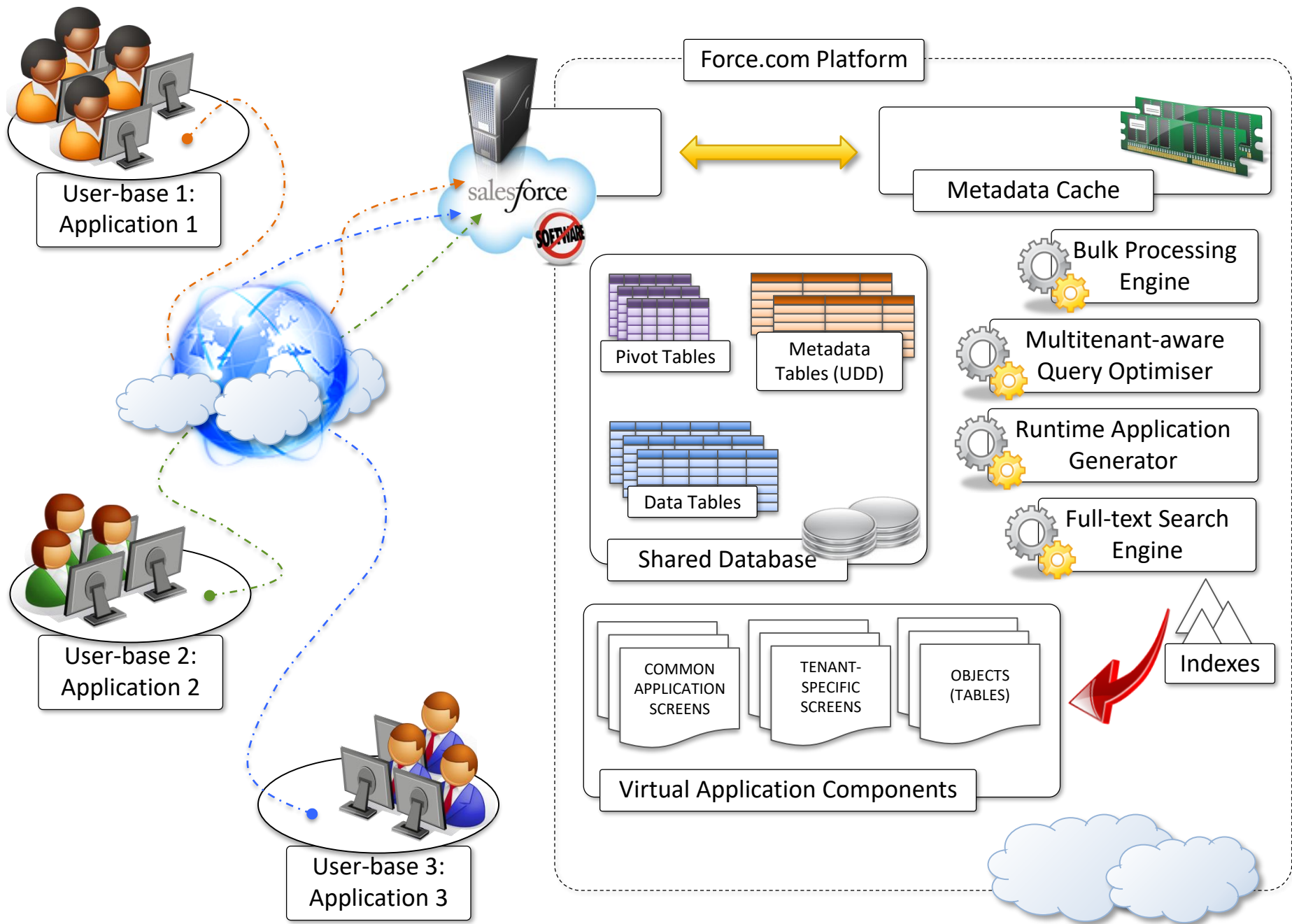


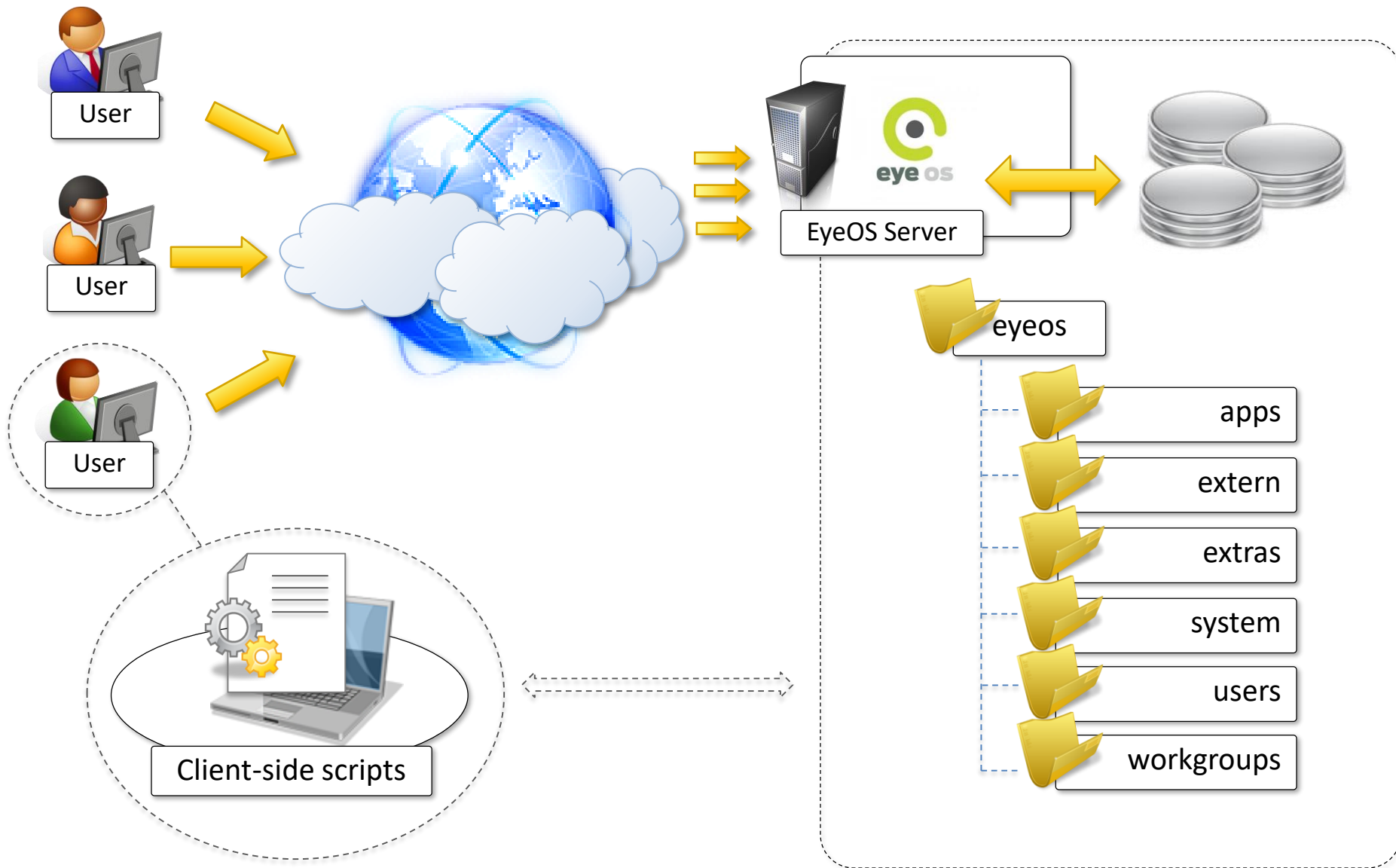


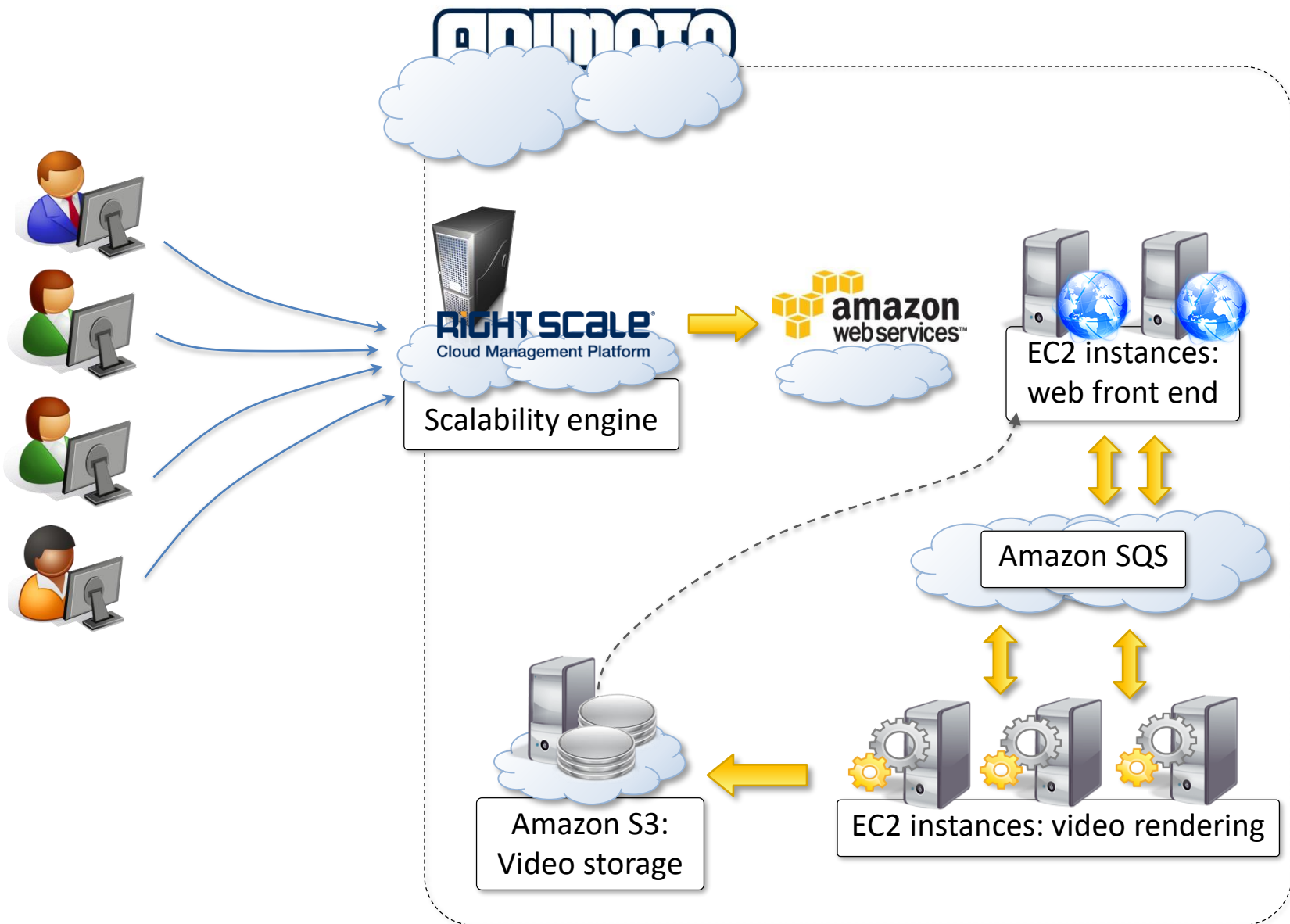
Chapter 10 – Cloud Applications

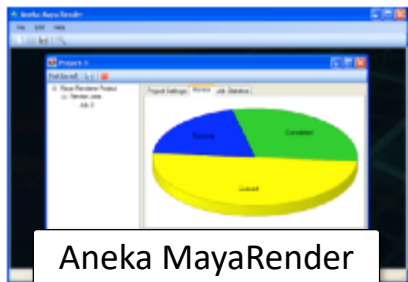










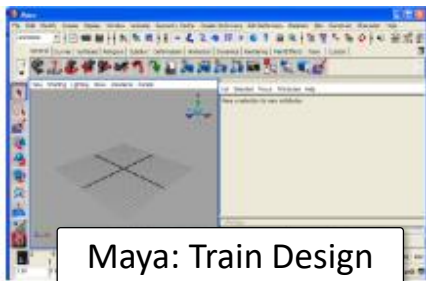


Aneka MayaRender

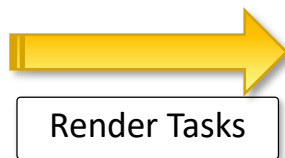


Render Files

Scenarios



Maya: Train Design

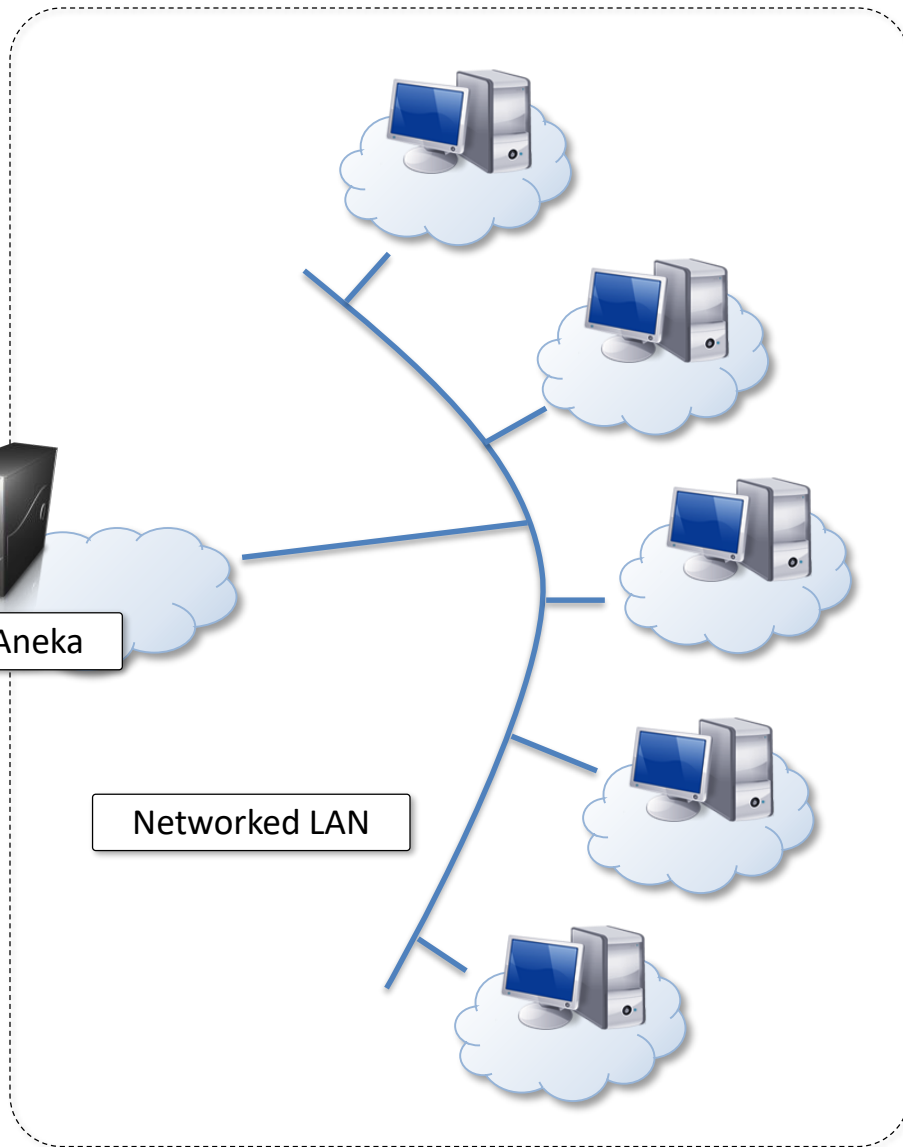


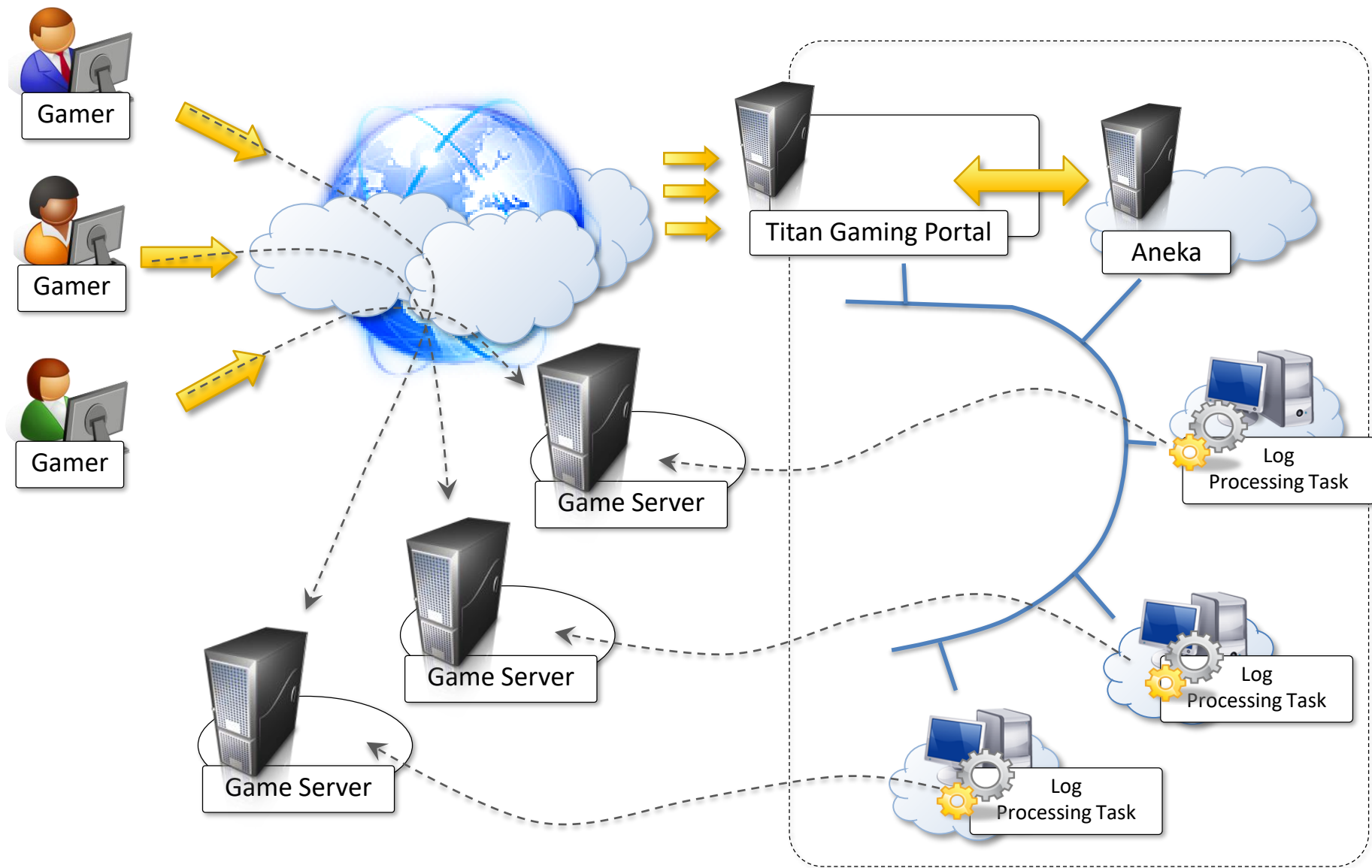
Render Tasks

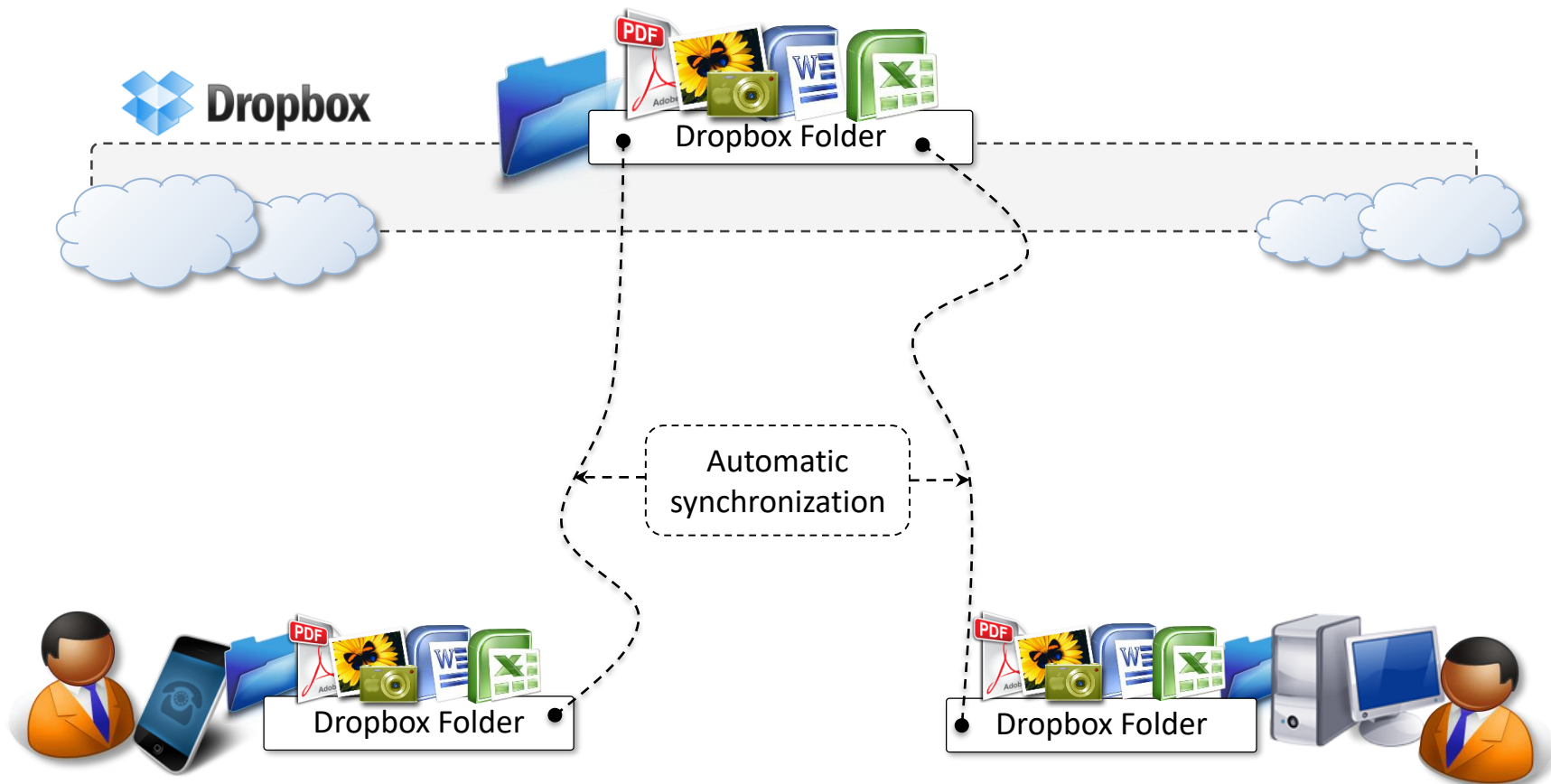


Aneka

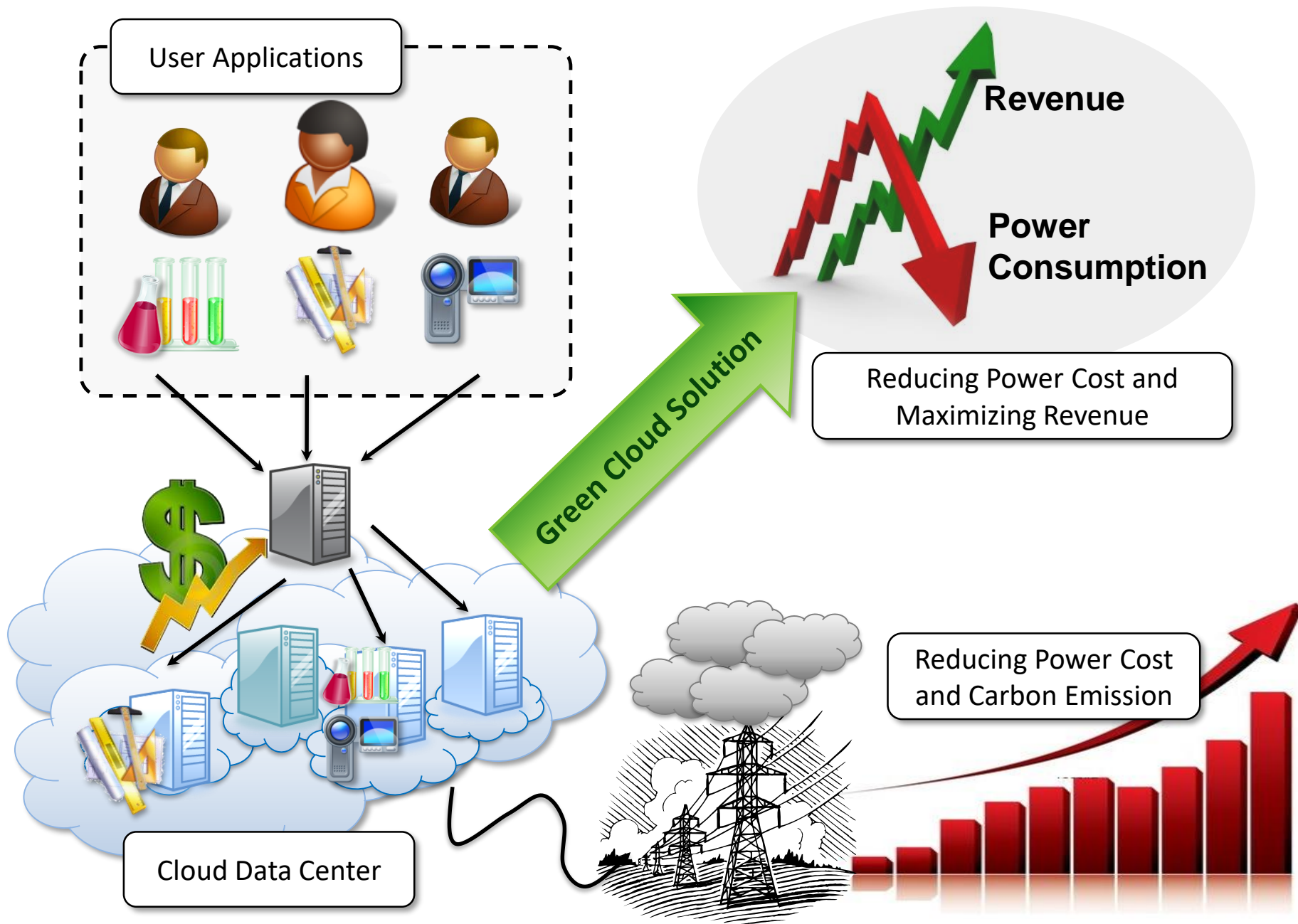
Networked LAN

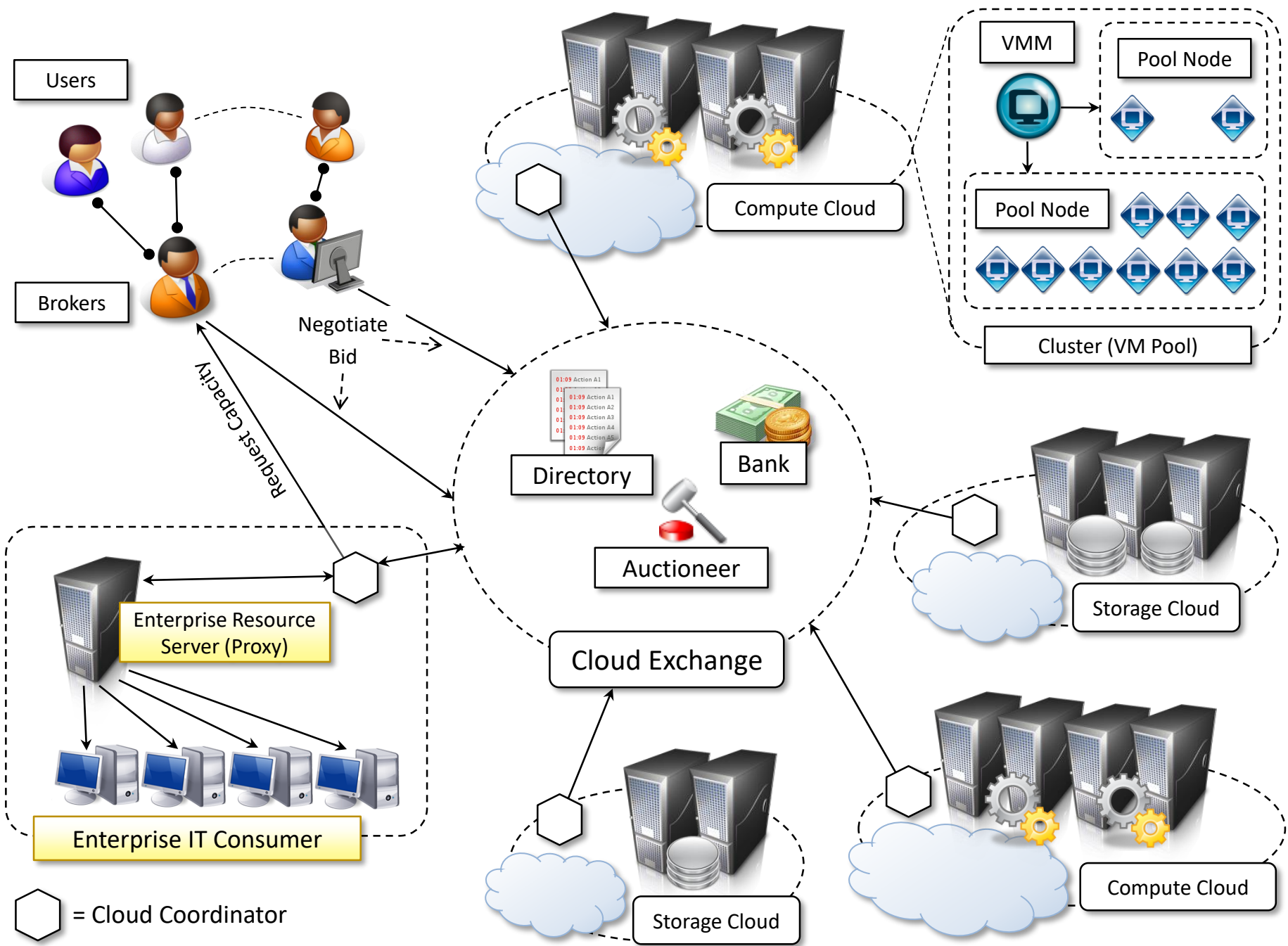


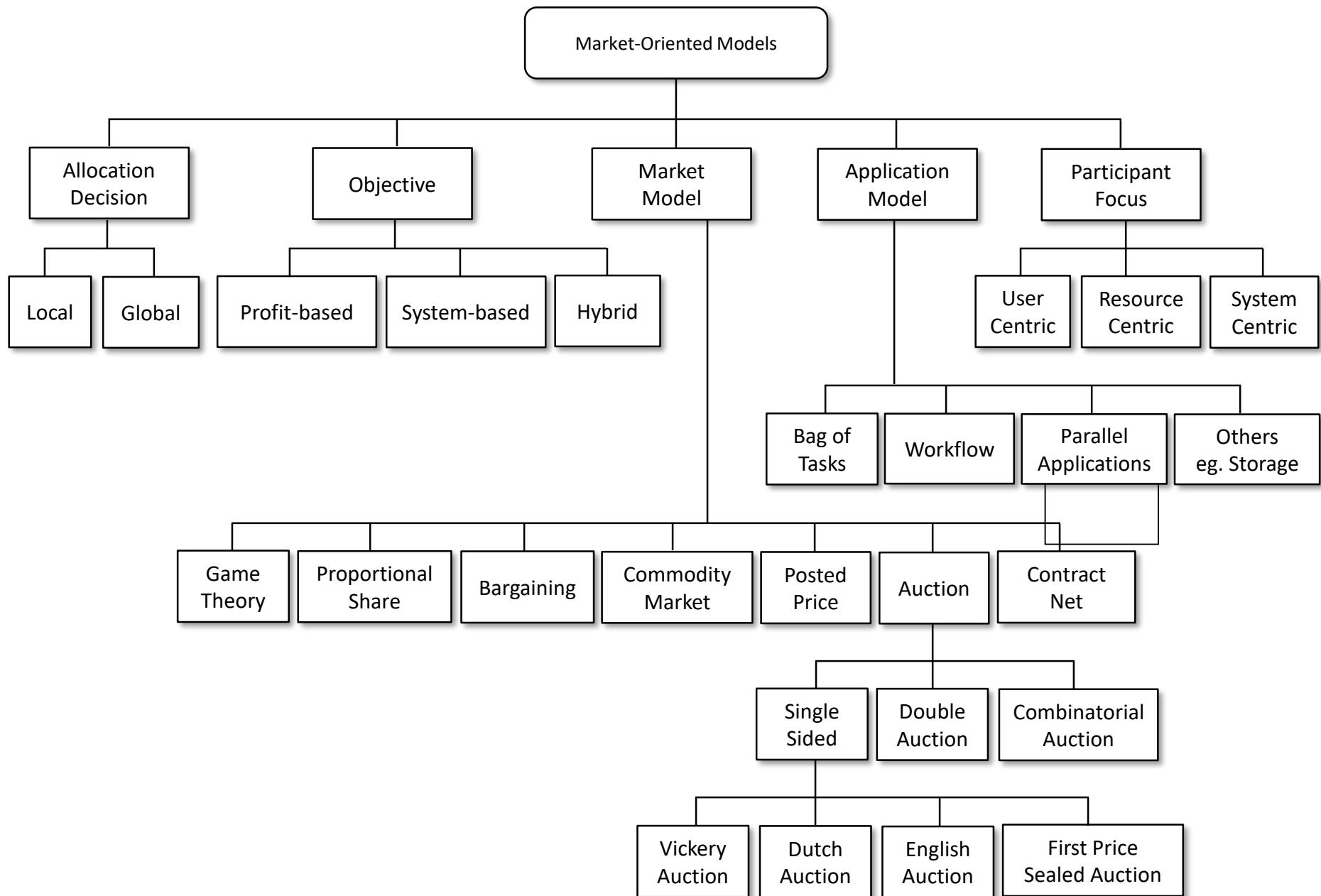


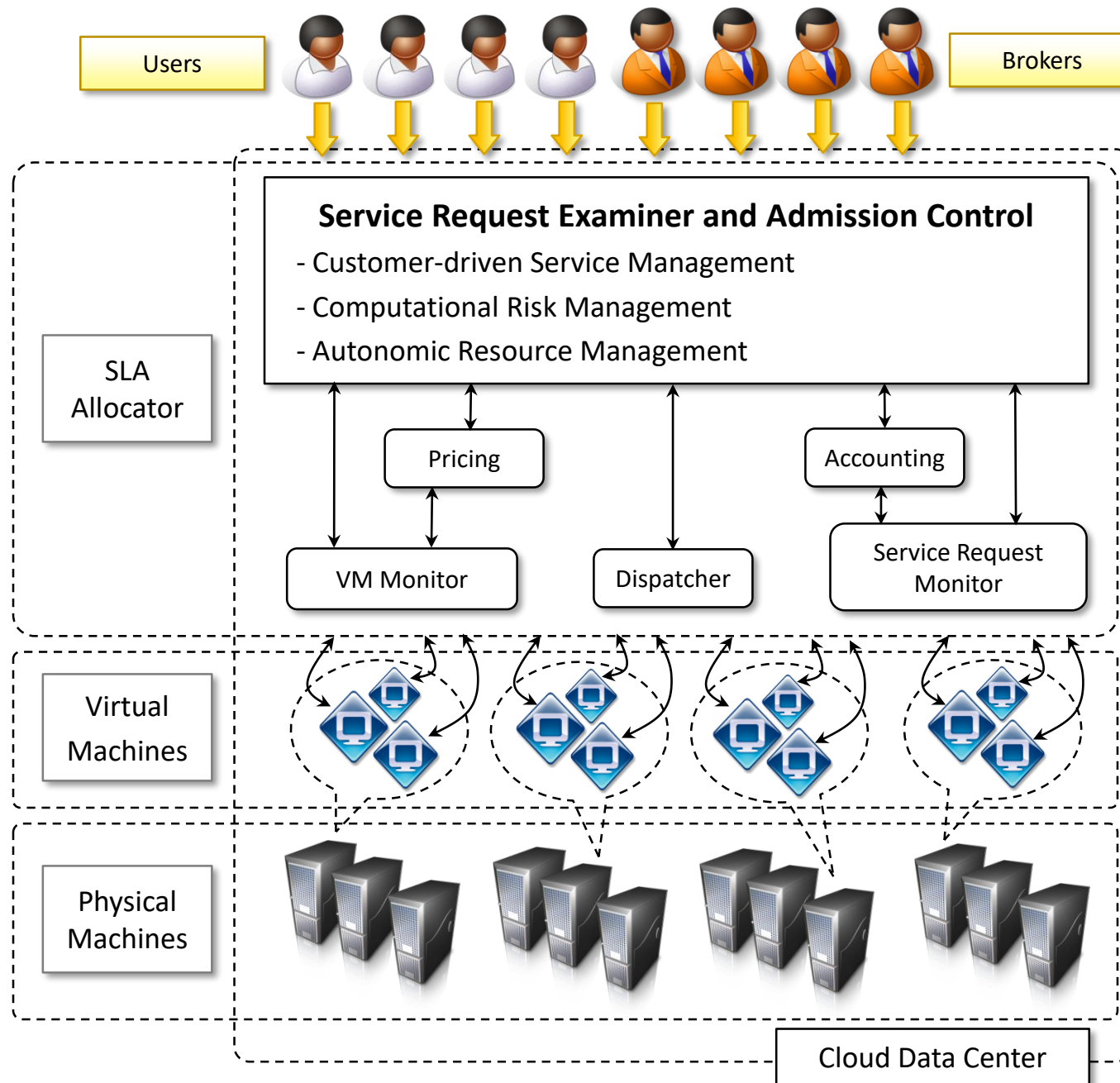


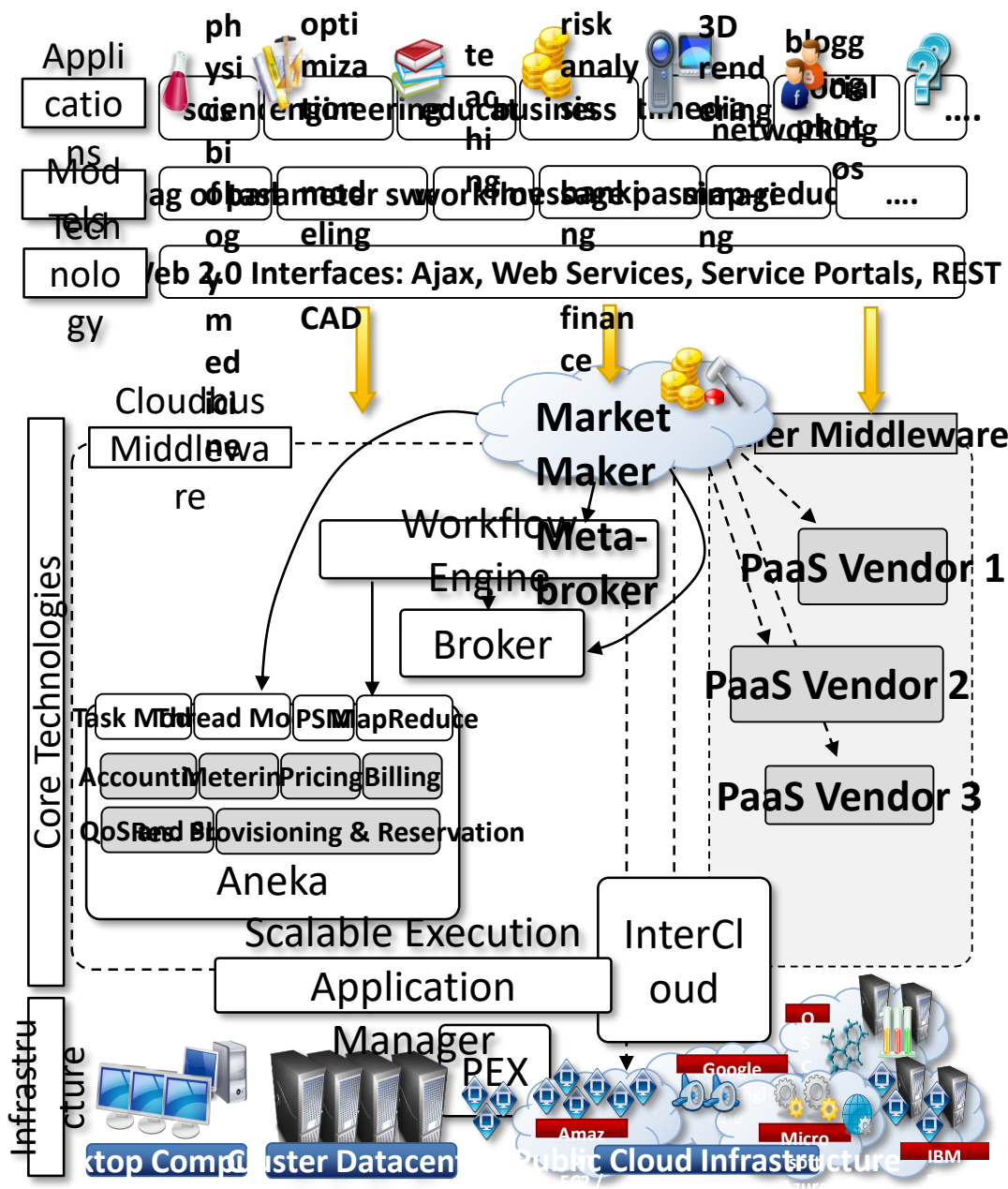
Chapter 11 – Advanced Topics in Cloud Computing











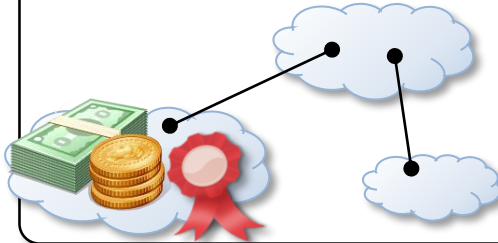
Cloud Federation Stack

Conceptual Level



Motivations
Advantages
Opportunities
Obligations

Logical and Operational Level

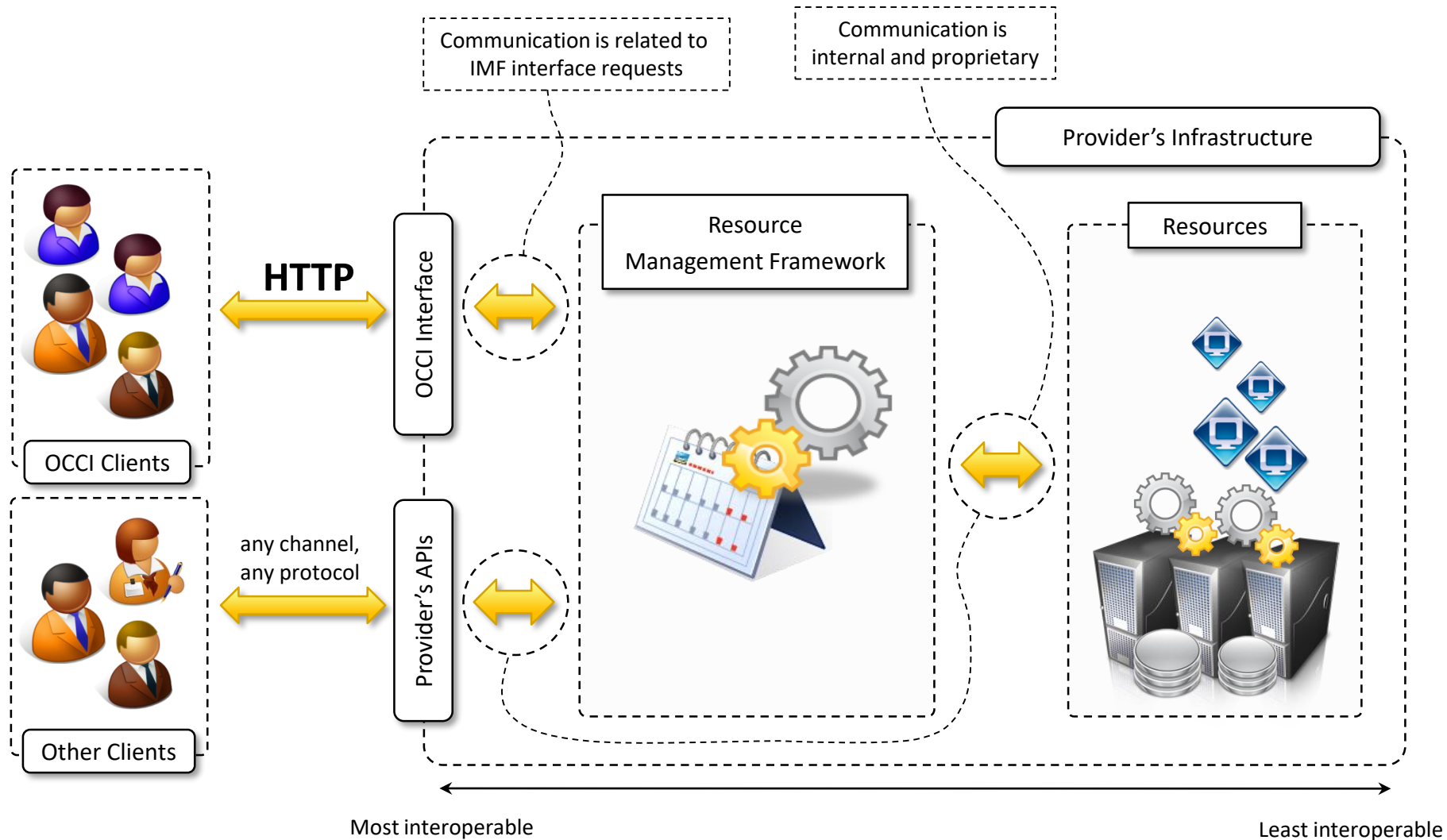


Federation Model
Cloud Service, Provider, Agreements
Market and Pricing Models
Service Level Agreements

Infrastructural Level



Protocol, Interfaces, and Standards
Programmatic Interoperation
Federation Platforms (RESERVOIR, InterCloud)



Clients can be in the Cloud or Enterprise and provide additional services (data, computing, etc...)



Block Storage Client



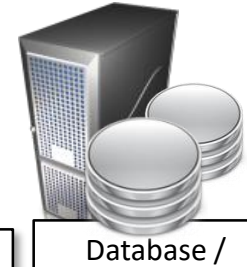
File System Client



Object Storage Client



XAM Client



Database / Table Client

Export Data to the Cloud

POSIX (NFS, CIFS, WebDAV)

CDMI

Multiple, Proprietary Interfaces

iSCSI, FC, FCoE, LUNs, Targets

Container

Container

Container

Data Storage Cloud

Draw Resources on Demand

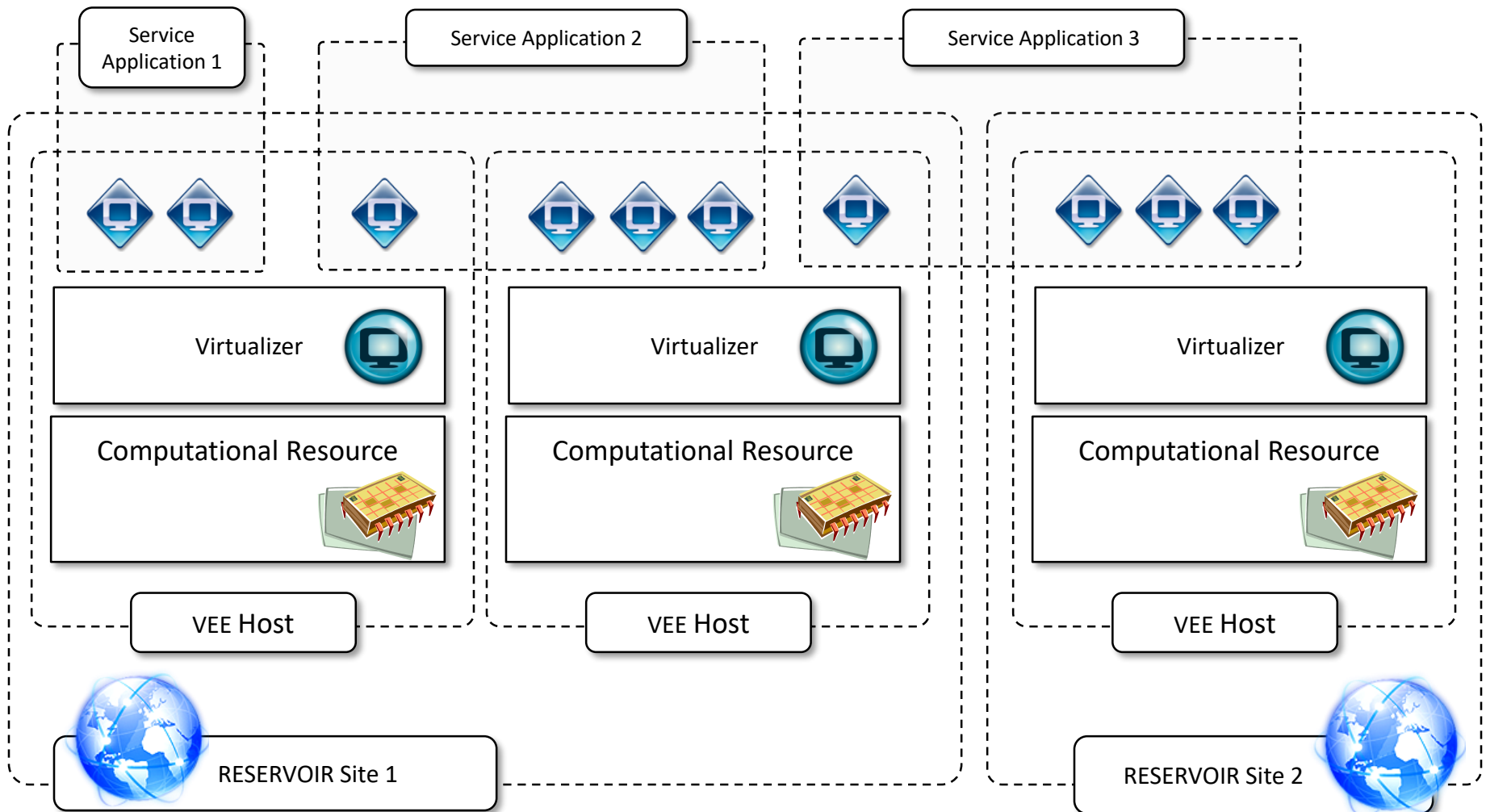
Storage Cloud Data Management Interface (CDMI)

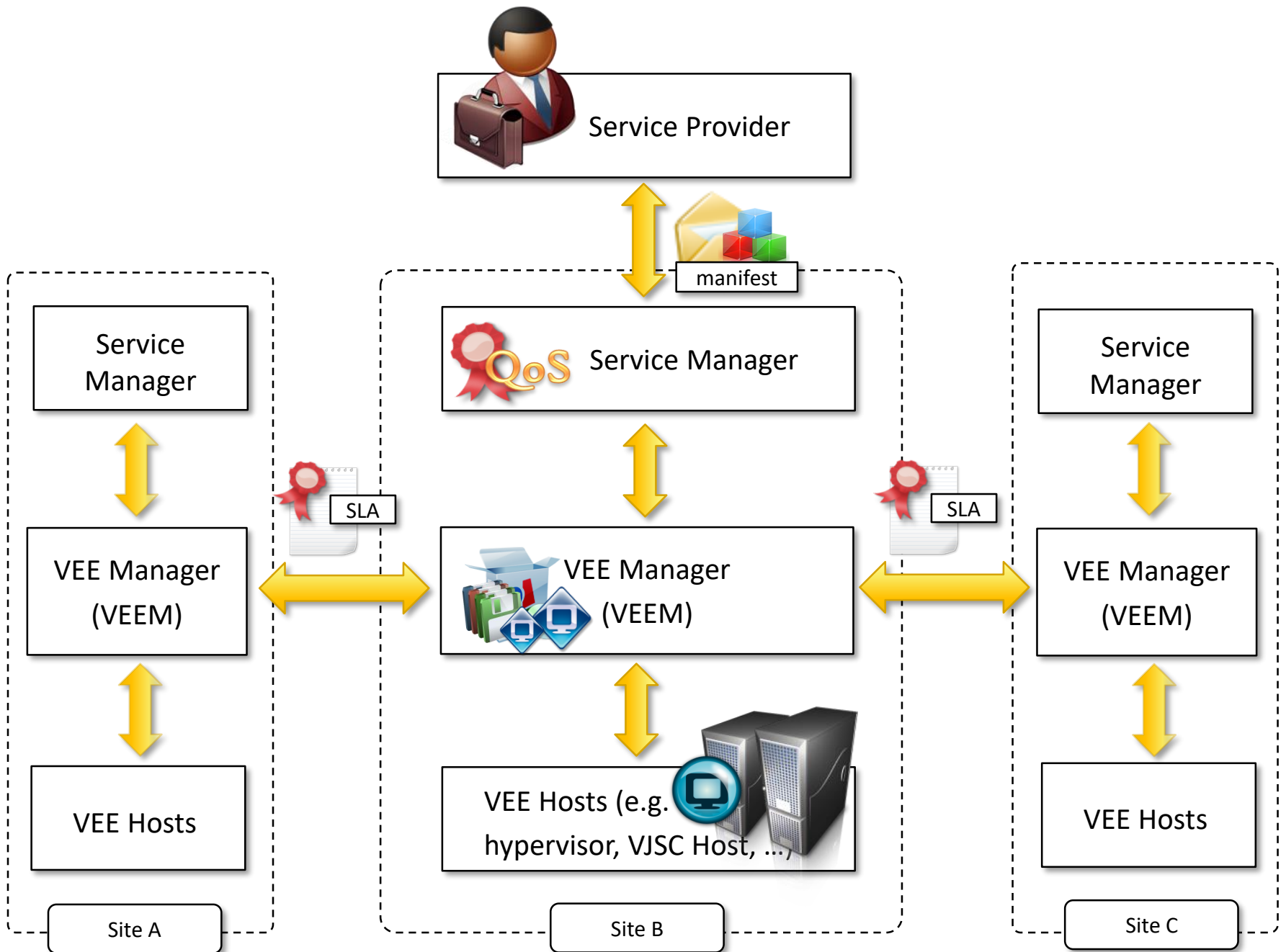
Data Services

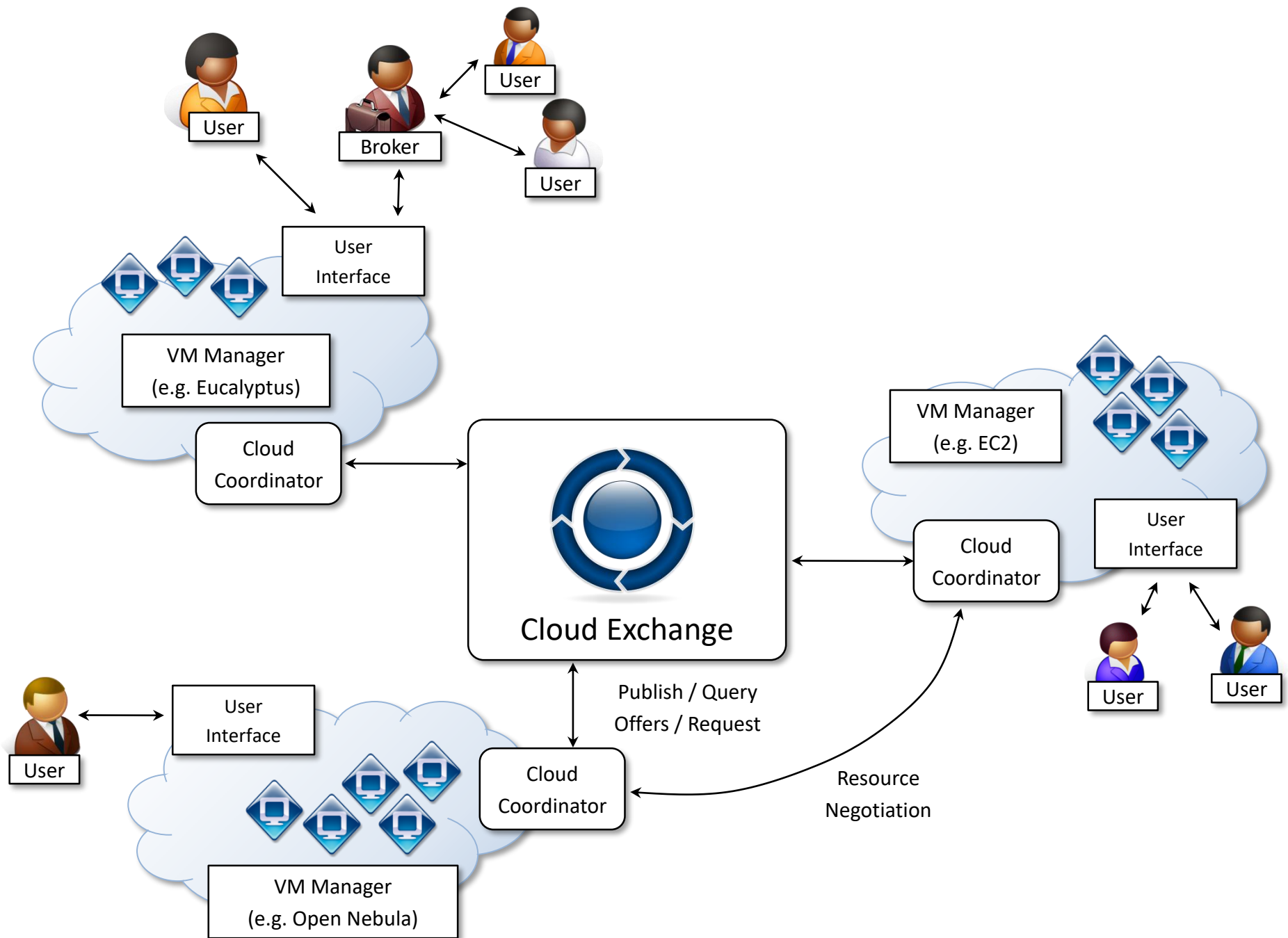
Management of the Cloud Storage can be standalone or part of the overall management of your Cloud Computing

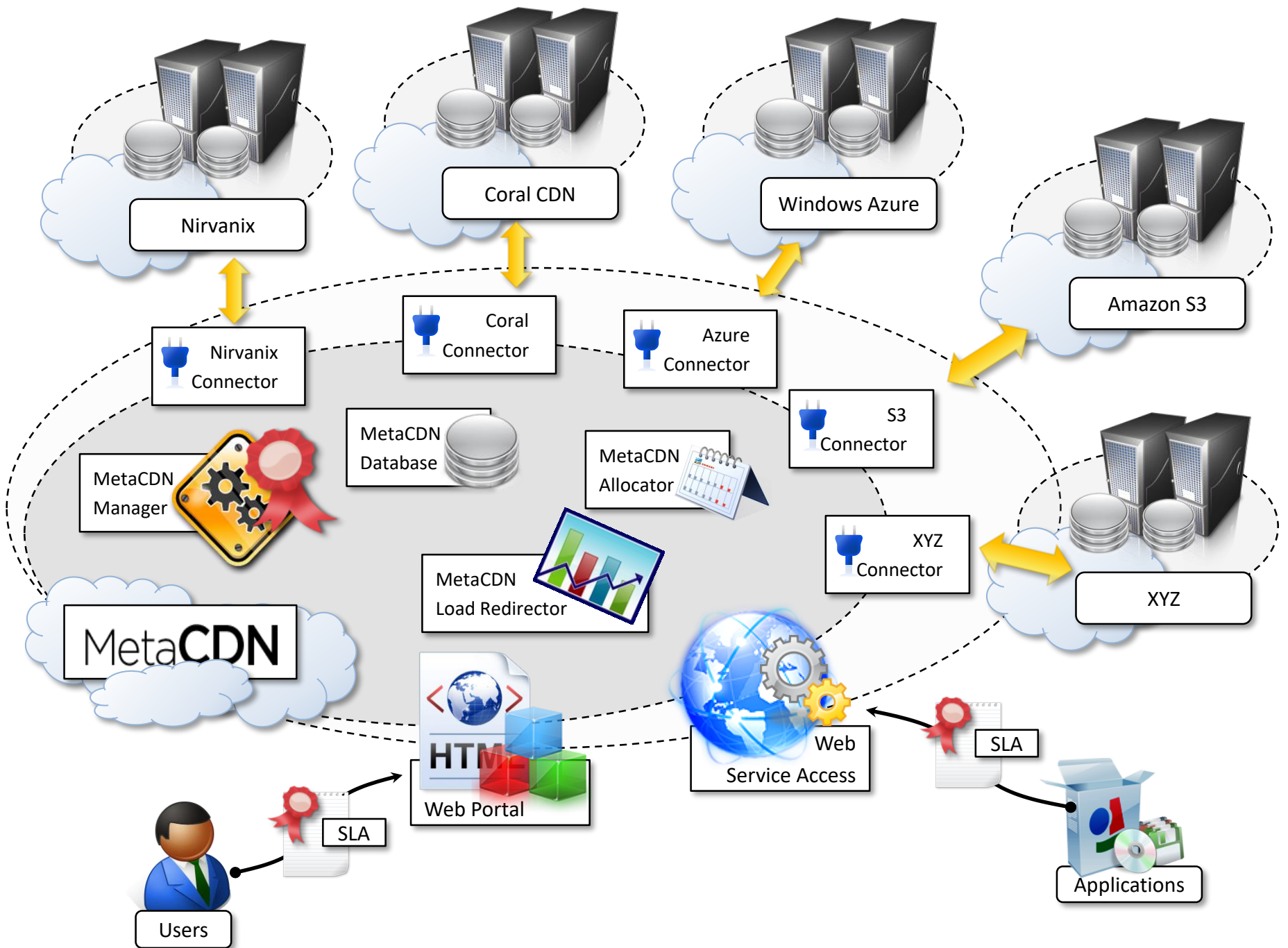
Acting in the Role of Managing Data / Storage

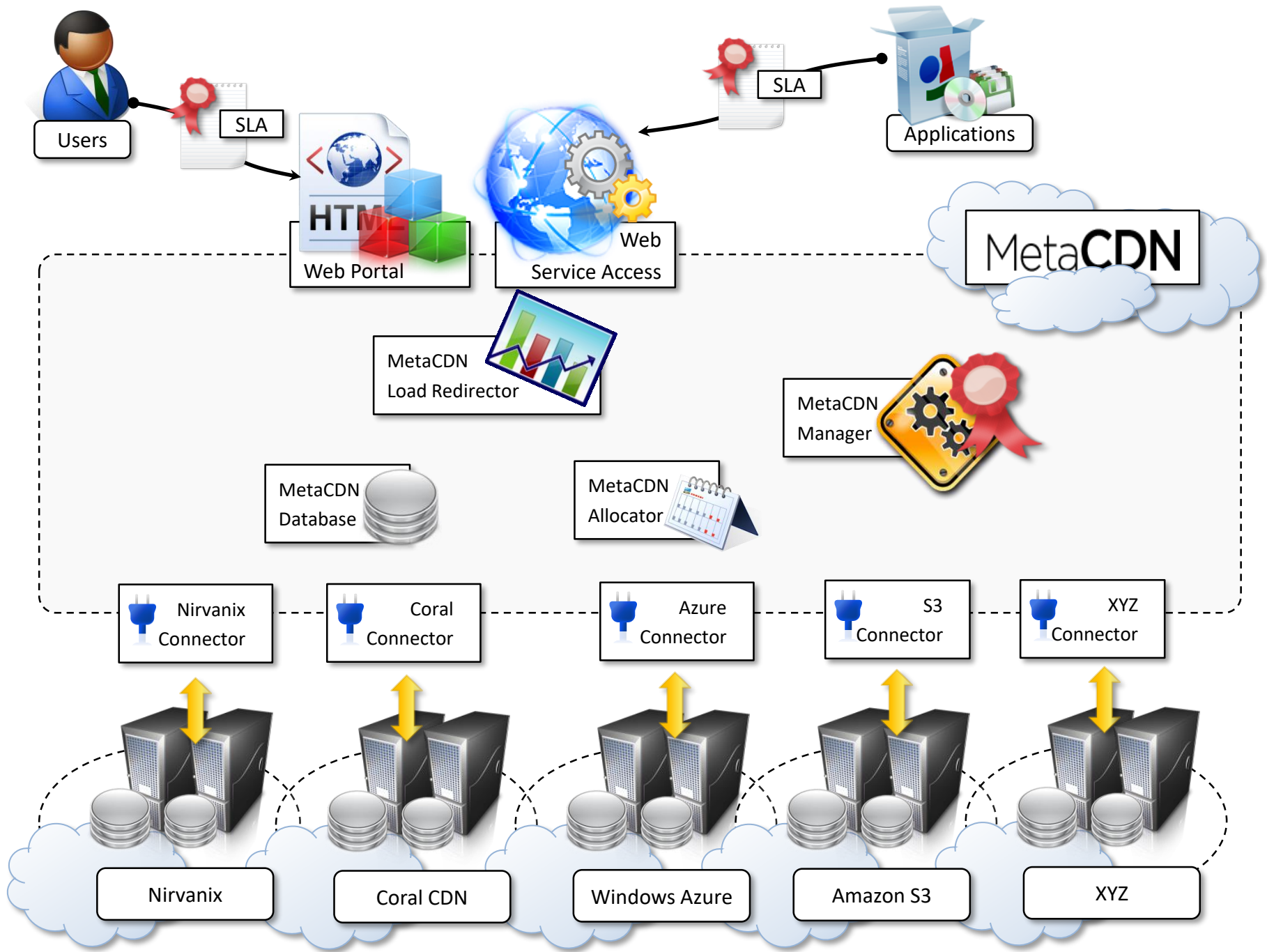


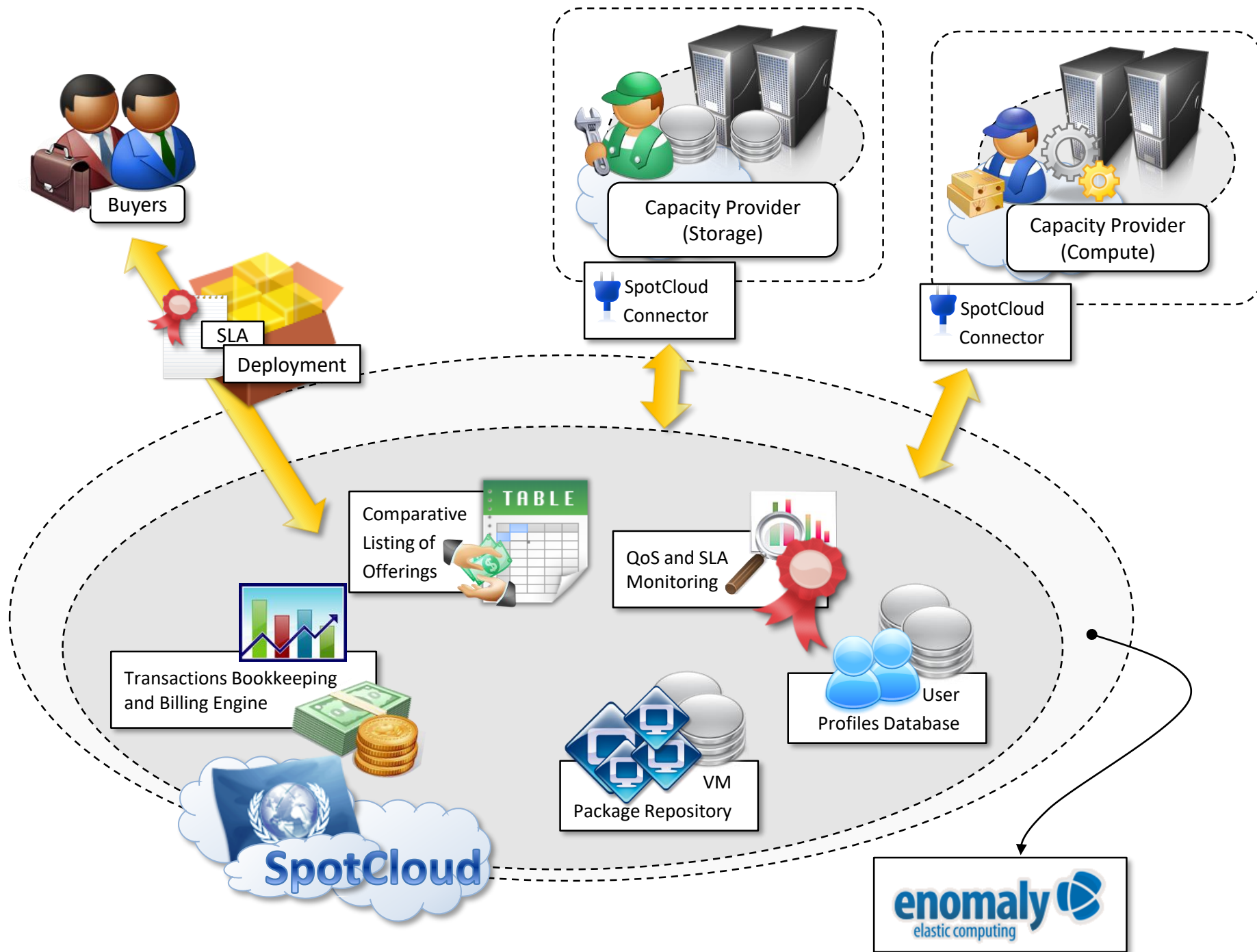












Other Stuff

