Situation Normal, Everything Must Change

Simon
Wardley

ubuntu®

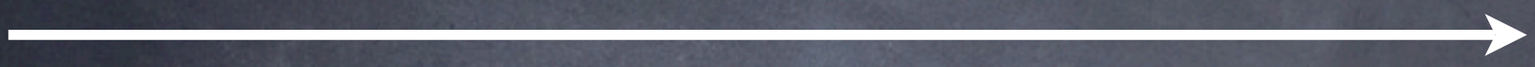
DANGER!

Will Robinson

DANGER!

Sccott Beale/Laughing Squid : http://www.flickr.com/photos/laughingsquid/

Pain



Pain
No. Slides

30 slides

448 slides

Severe risk of harm

OK

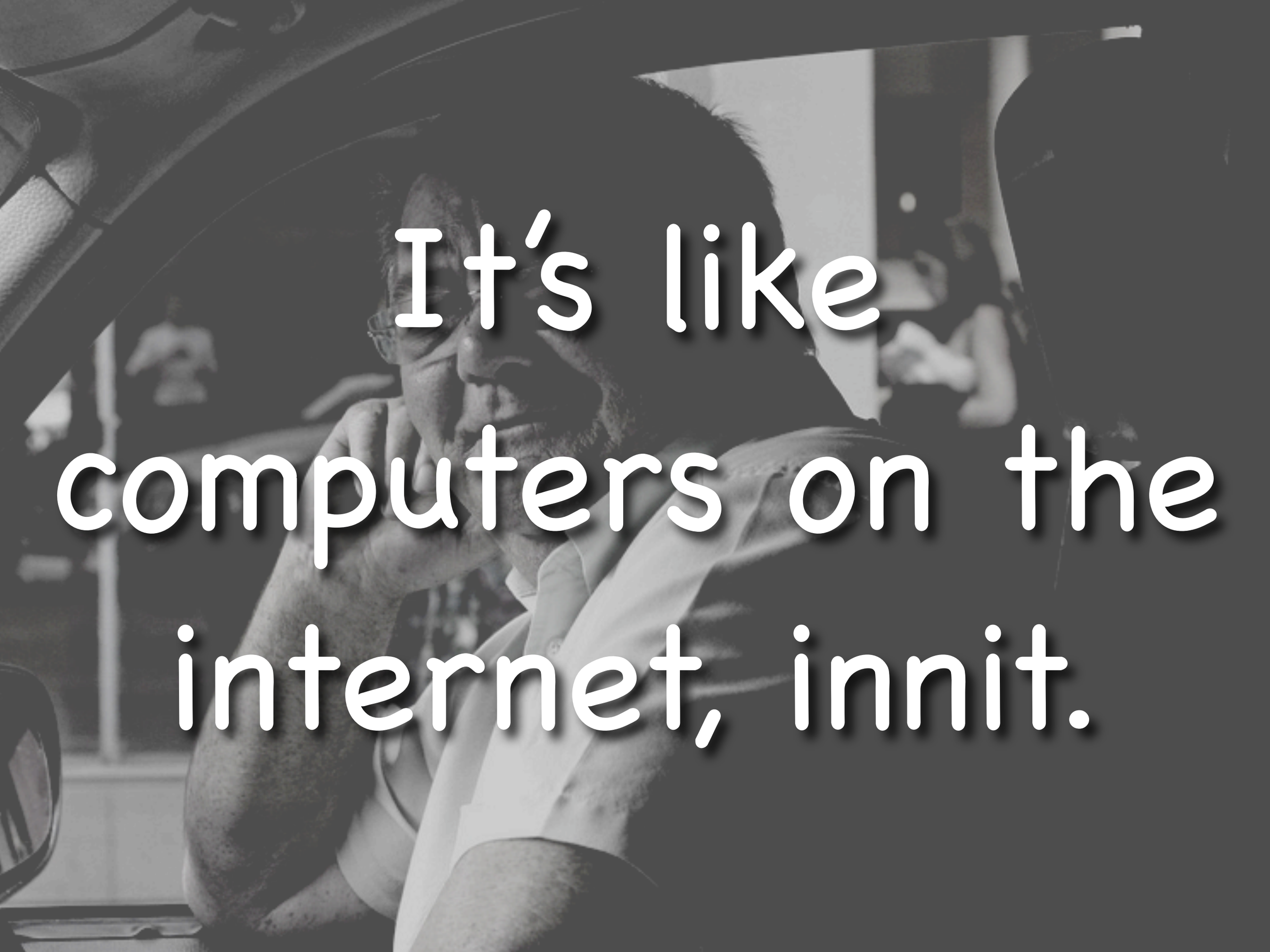
Pain

No. Slides

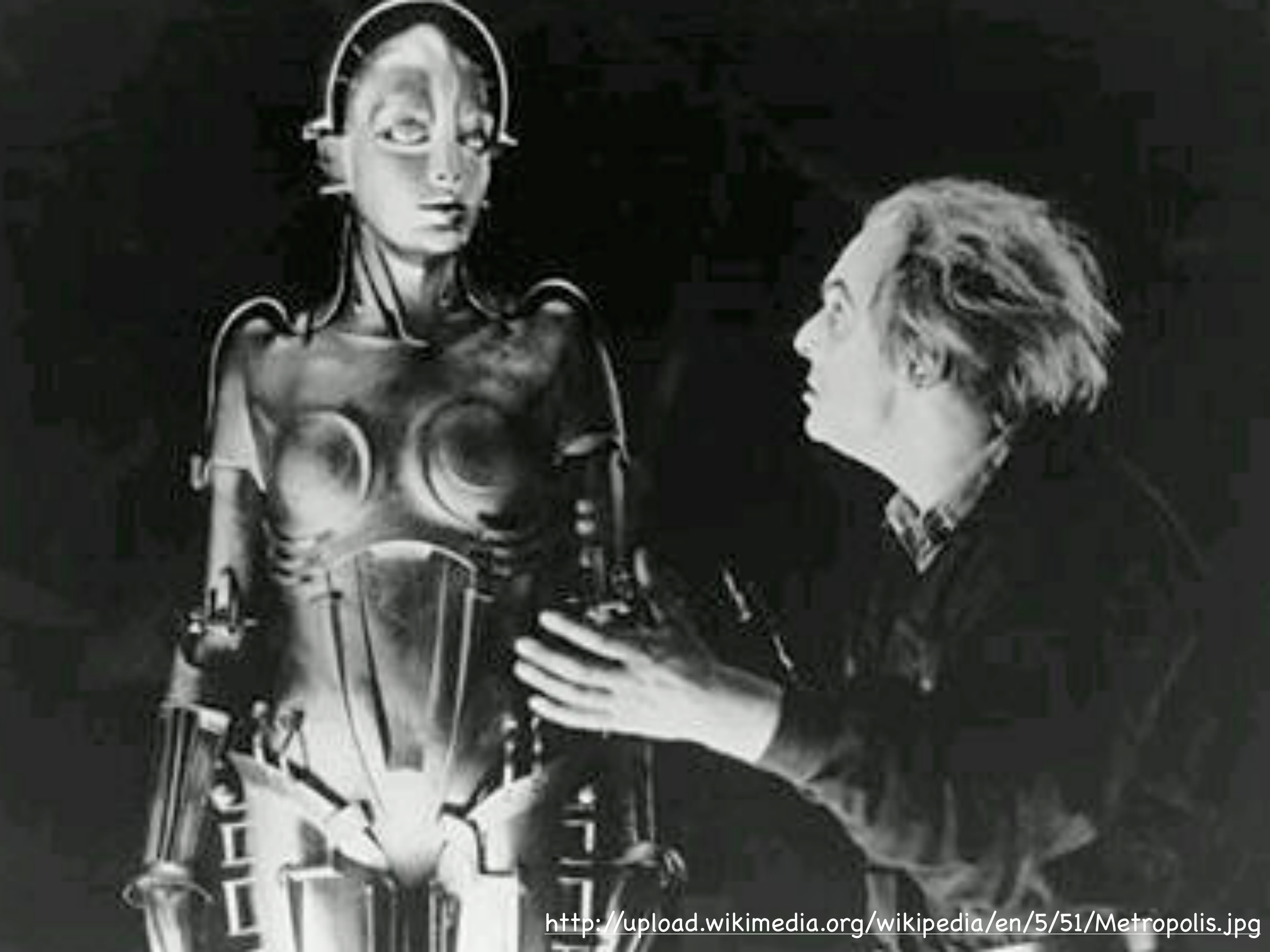
photos/videoplacebo/3481780379/

Cloud Computing?

http://www.flickr.com/photos/fimbrethil/


It's like
computers on the
internet, innit.

http://www.flickr.com/photos/radioflyer007/



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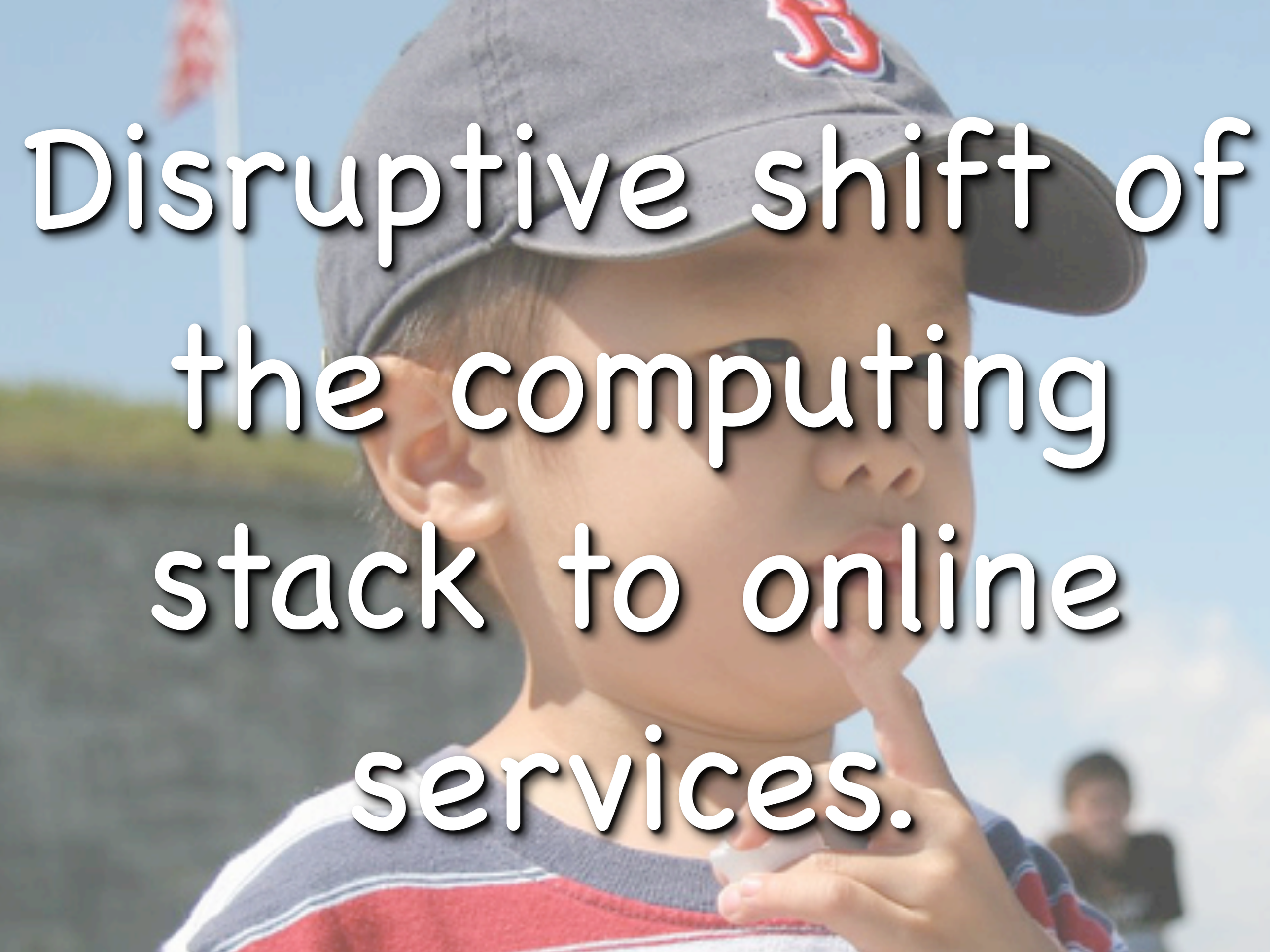
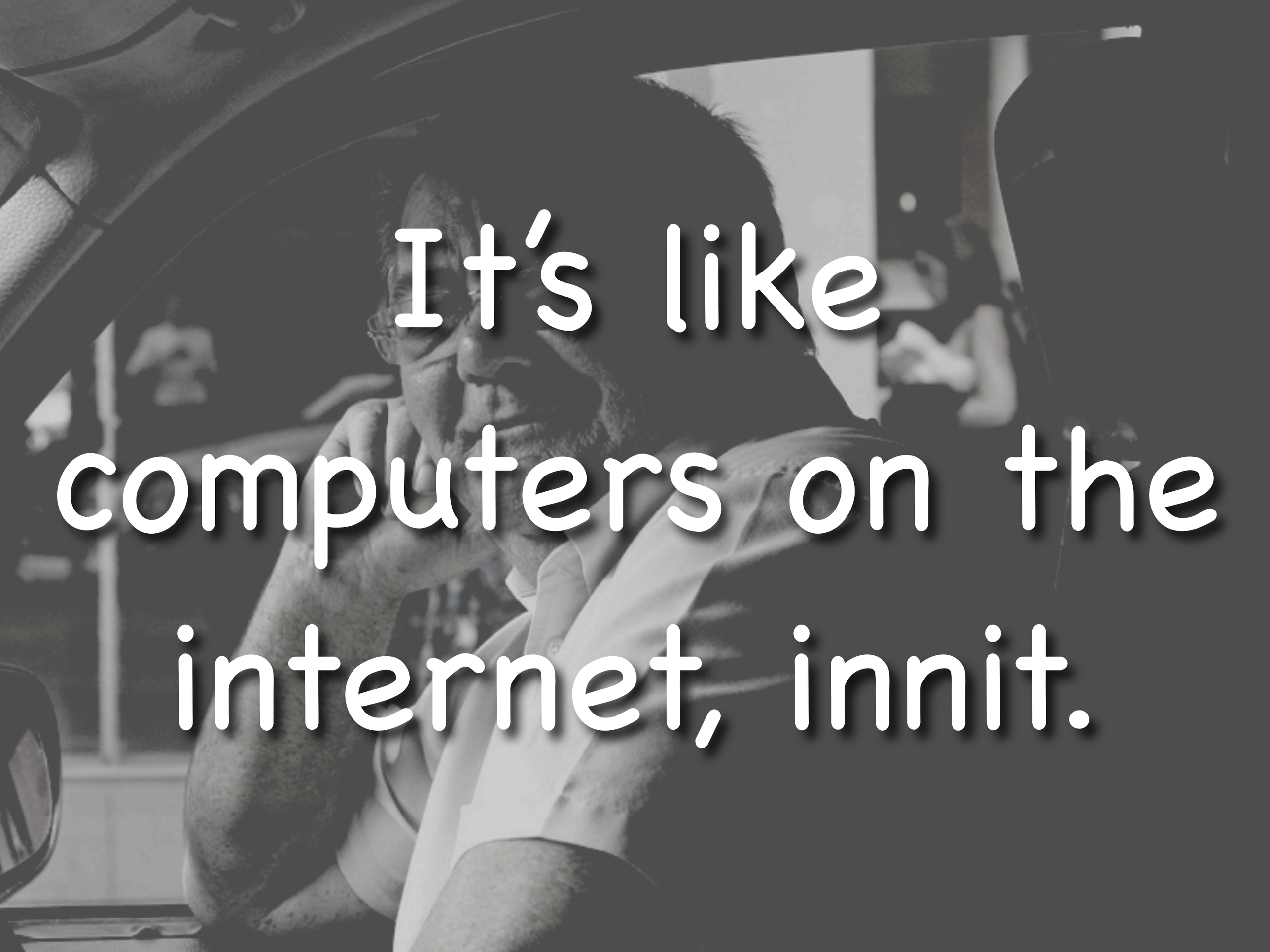
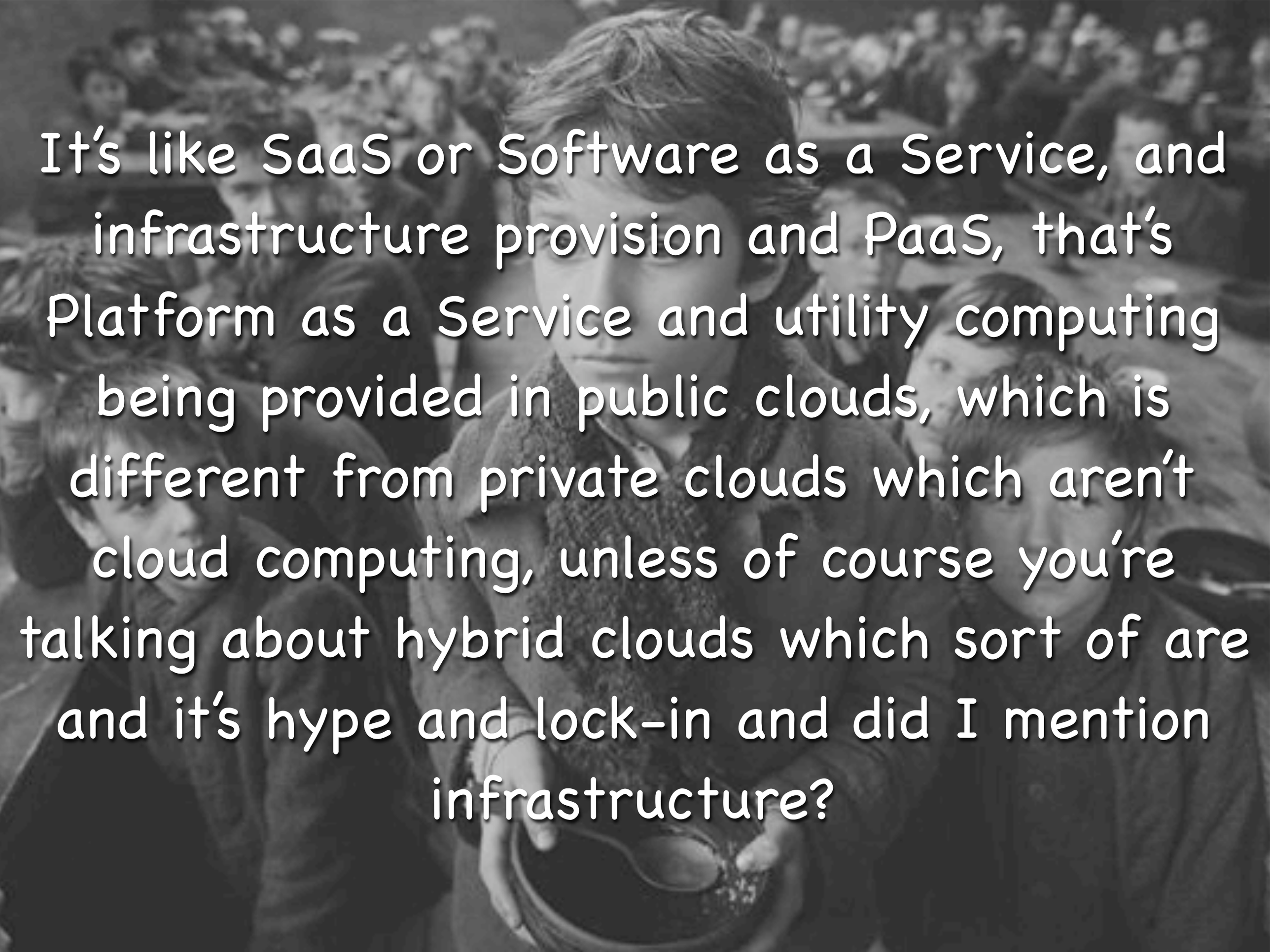

Disruptive shift of the computing stack to online services.


It's like
computers on the
internet, innit.

http://www.flickr.com/photos/rainbowproject/3928445074/

http://www.flickr.com/photos/rainbowproject/3928445074/

Image from Oliver Twist


It's like SaaS or Software as a Service, and infrastructure provision and PaaS, that's Platform as a Service and utility computing being provided in public clouds, which is different from private clouds which aren't cloud computing, unless of course you're talking about hybrid clouds which sort of are and it's hype and lock-in and did I mention infrastructure?

67 definitions

448 slides

Severe risk of harm

OK

Pain

No. Slides

1. On-demand self-service Internet infrastructure where you pay-as-you-go and use only what you need, all managed by a browser, application or API. Cloud computing is broken up into multiple segments including: Cloud Infrastructure, Cloud Platforms and Cloud Applications.
(see "Cloud Pyramid")

No definition

Cloud = Our Product

NIST

(National Institute of Science & Technology)

Version 15

National Institute of Standards and Technology, Information Technology Laboratory

Note 1: Cloud computing is still an evolving paradigm. Its definitions, use cases, underlying technologies, issues, risks, and benefits will be refined in a spirited debate by the public and private sectors. These definitions, attributes, and characteristics will evolve and change over time.

Note 2: The cloud computing industry represents a large ecosystem of many models, vendors, and market niches. This definition attempts to encompass all of the various cloud approaches.
Definition of Cloud Computing:

Cloud computing is a model for enabling 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 promotes availability and is composed of five essential characteristics, three service models, and four deployment models.

Essential Characteristics:
On-demand self-service. A consumer can unilaterally provision computing capabilities, such as server time and network storage, as needed automatically without requiring human interaction with each service's provider.
Broad network access. Capabilities are available over the network and accessed through standard mechanisms that promote use by heterogeneous thin or thick client platforms (e.g., mobile phones, laptops, and PDAs).
Resource pooling. The provider's computing resources are pooled to serve multiple consumers using a multi-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand. There is a sense of location independence in that the customer generally has no control or knowledge over the exact location of the provided resources but may be able to specify location at a higher level of abstraction (e.g., country, state, or datacenter). Examples of resources include storage, processing, memory, network bandwidth, and virtual machines.
Rapid elasticity. Capabilities can be rapidly and elastically provisioned, in some cases automatically, to quickly scale out and rapidly released to quickly scale in. To the consumer, the capabilities available for provisioning often appear to be unlimited and can be purchased in any quantity at any time.
Measured Service. Cloud systems automatically control and optimize resource use by leveraging a metering capability at some level of abstraction appropriate to the type of service (e.g., storage, processing, bandwidth, and active user accounts). Resource usage can be monitored, controlled, and reported providing transparency for both the provider and consumer of the utilized service.

Service Models:
Cloud Software as a Service (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 a thin client interface such as a web browser (e.g., web-based email). 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.
Cloud Platform as a Service (PaaS). The capability provided to the consumer is to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages 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 application hosting environment configurations.
Cloud Infrastructure as a Service (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, deployed applications, and possibly limited control of select networking components (e.g., host firewalls).

Deployment Models:
Private cloud. The cloud infrastructure is operated solely for an organization. It may be managed by the organization or a third party and may exist on premise or off premise.
Community cloud. The cloud infrastructure is shared by several organizations and supports a specific community that has shared concerns (e.g., mission, security requirements, policy, and compliance considerations). It may be managed by the organizations or a third party and may exist on premise or off premise.
Public cloud. The cloud infrastructure is made available to the general public or a large industry group and is owned by an organization selling cloud services.
Hybrid cloud. The cloud infrastructure is a composition of two or more clouds (private, community, or public) that remain unique entities but are bound together by standardized or proprietary technology that enables data and application portability (e.g., cloud bursting for load-balancing between clouds).

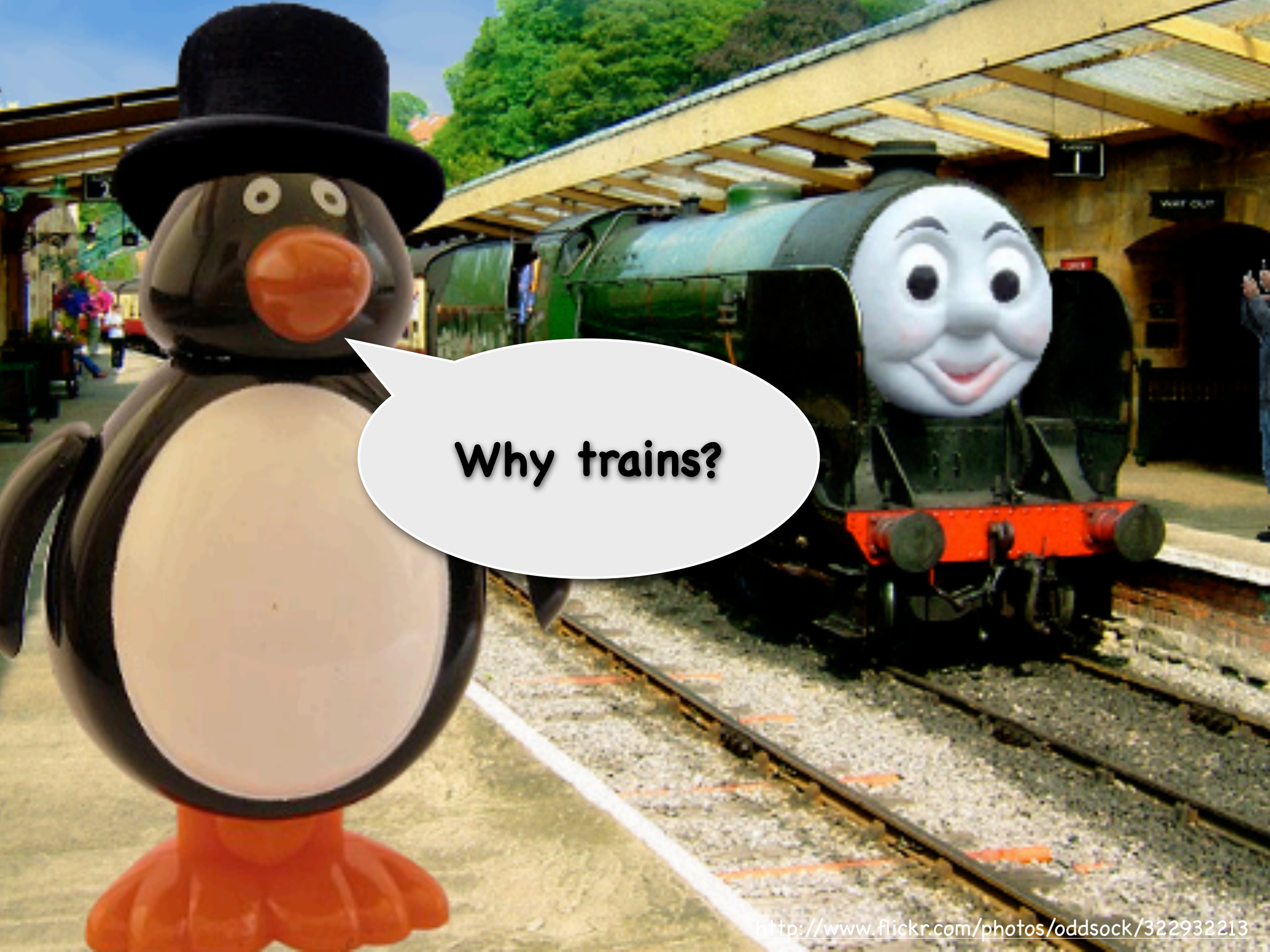
Note: Cloud software takes full advantage of the cloud paradigm by being service oriented with a focus on statelessness, low coupling, modularity, and semantic interoperability.

Note 1:
Cloud computing is still an evolving paradigm.

http://www.flickr.com/photos/rainbowproject/3928445074/

3 service models
4 deployment models
5 essential characteristics

http://www.flickr.com/photos/oddsock/322932213



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"The real thing to do today is to capture, what are the dimensions of the **thing** that literally, I will tell you, we're betting our company on, and I think pretty much everybody in the technology industry is betting their companies on"

Microsoft CEO, Steve Ballmer

We don't know what "cloud" is yet

but bet your company on it

everybody else is ...

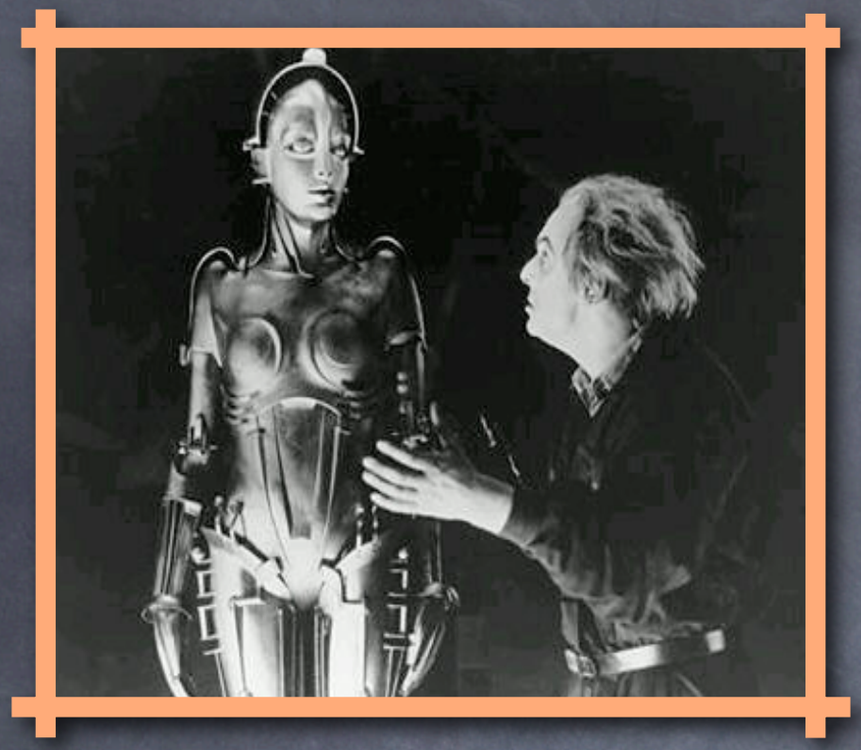
http://www.flickr.com/photos/rainbowproject/3928445074/

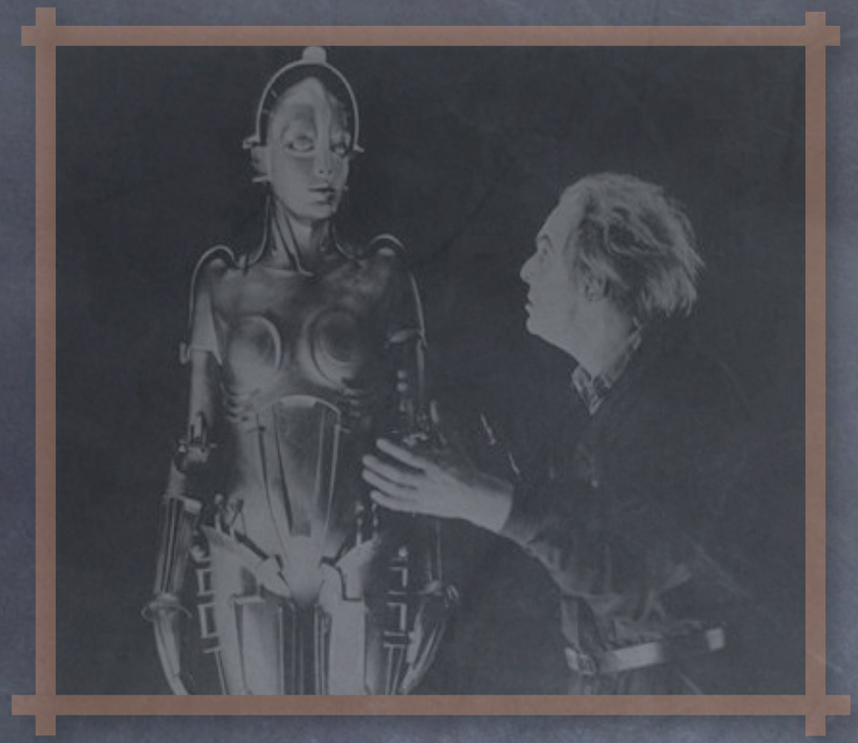
"open up exciting new prospects for the employment of computers in ways and on a scale that would have seemed pure fantasy only five year ago"

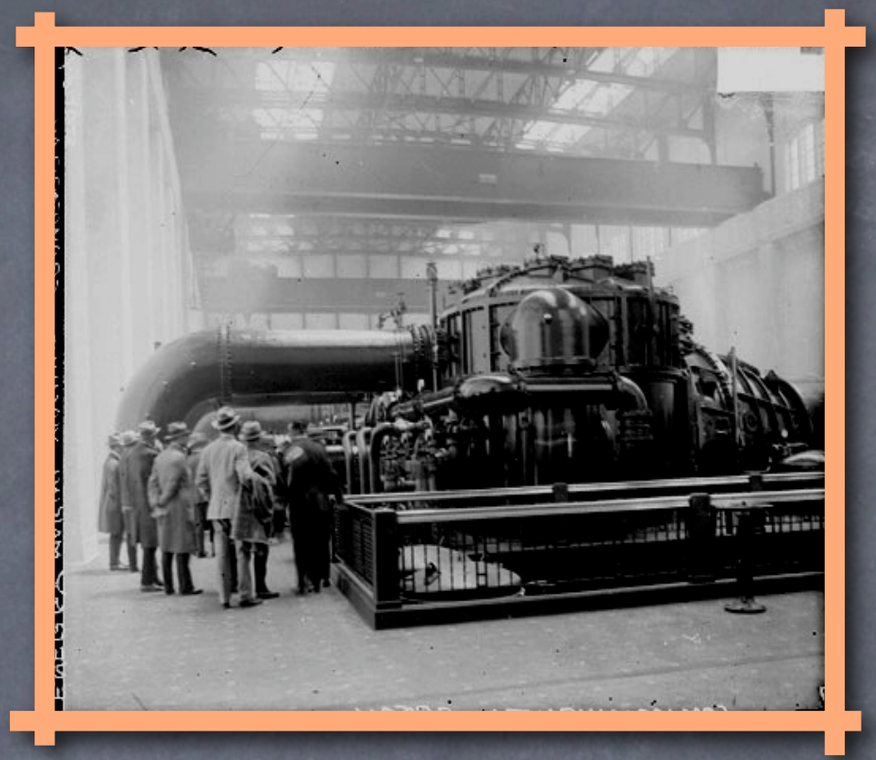
"The challenge of the Computer Utility"

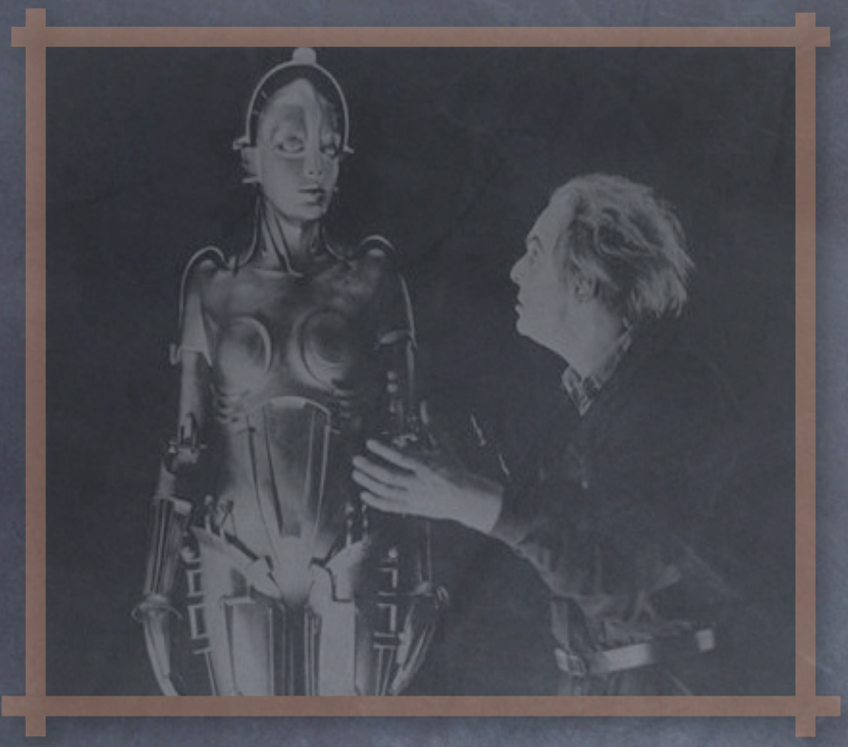
Douglas Parkhill

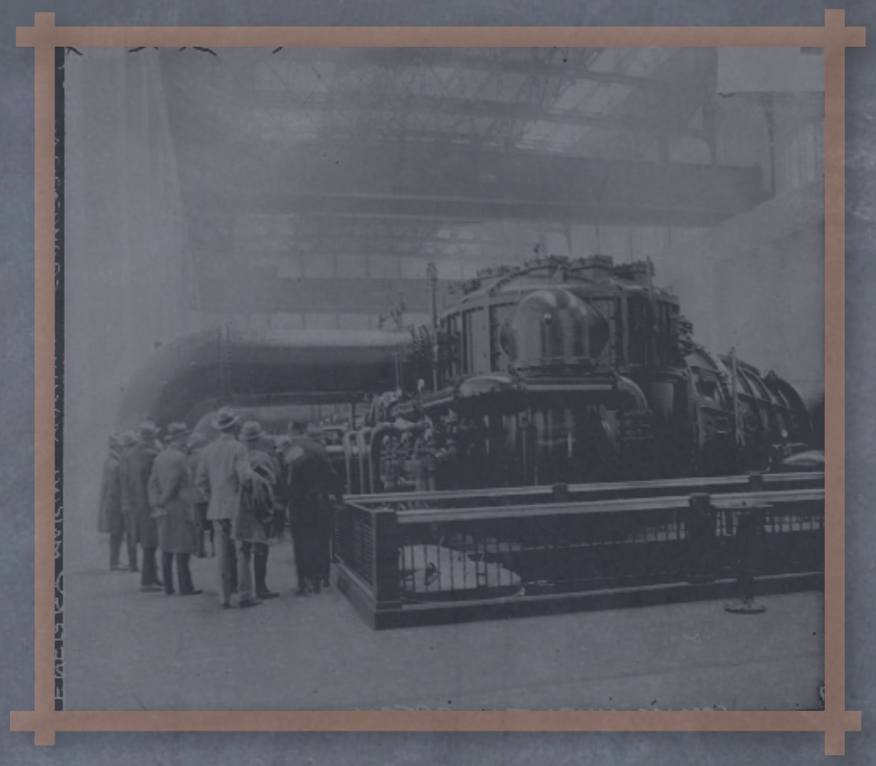
1966



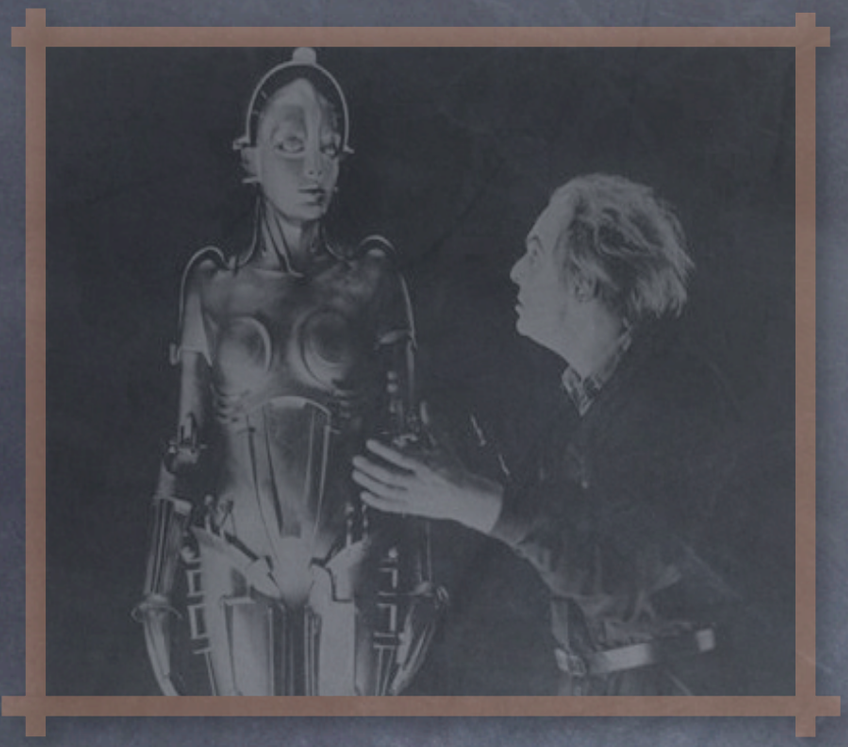


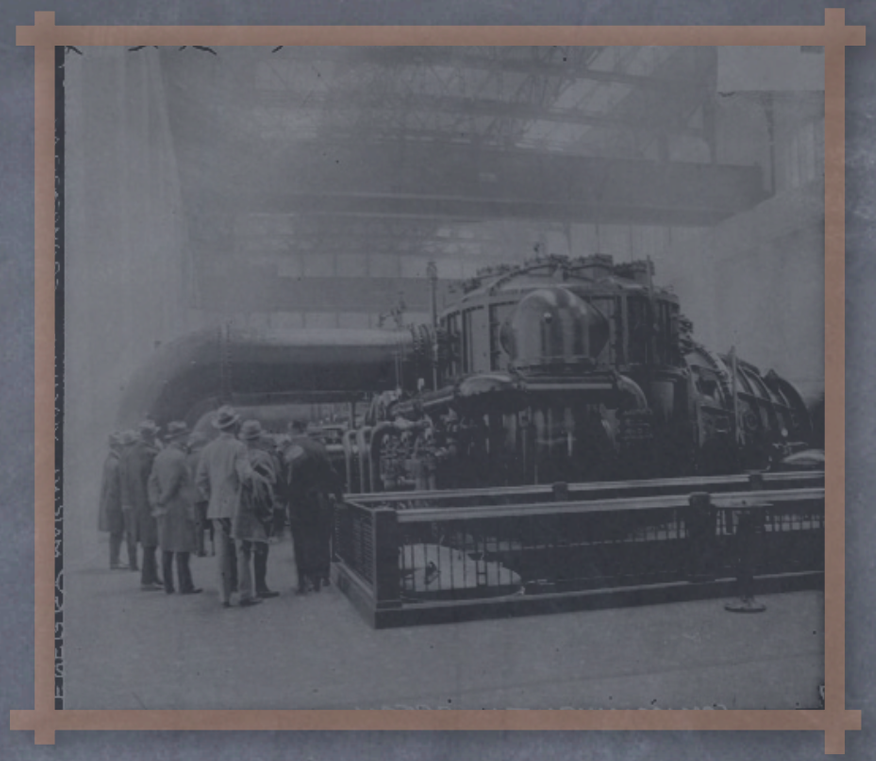






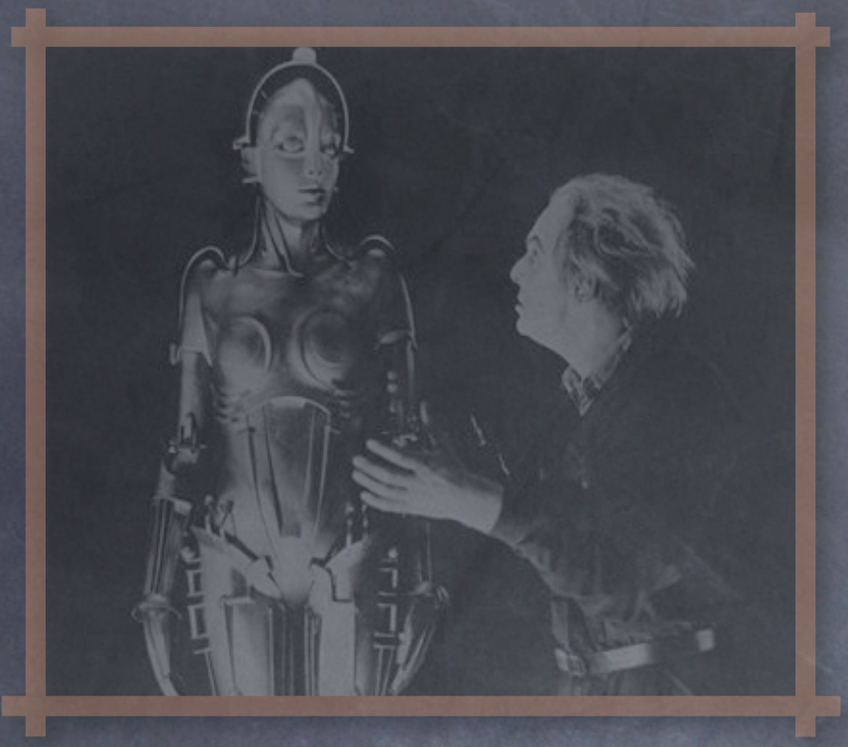
Public, Private & Government

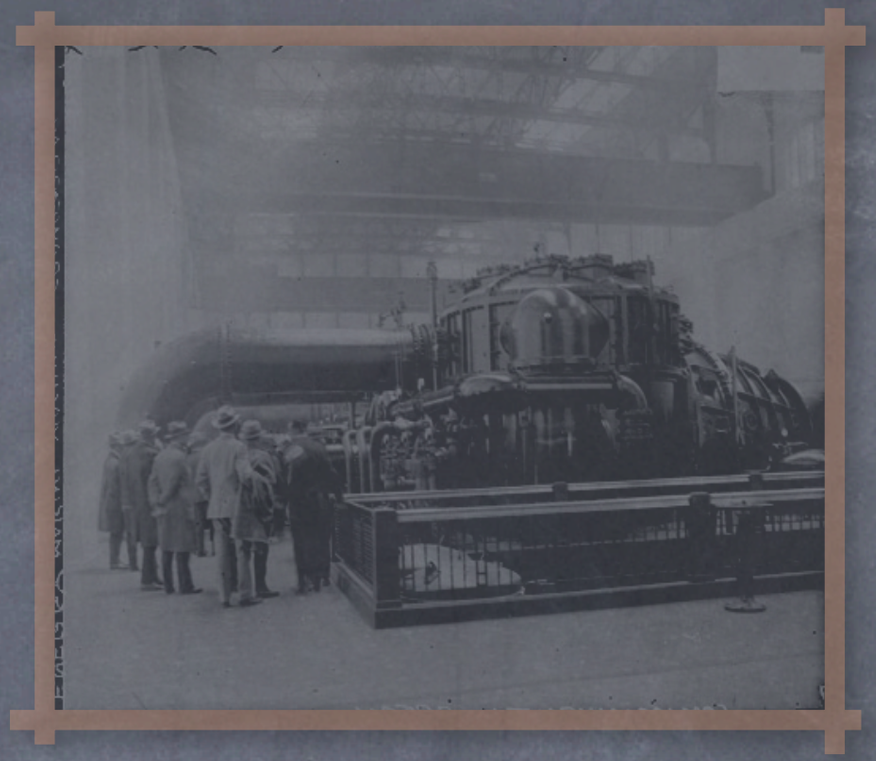




Public, Private &
Government

Elastic & Infinite Supply

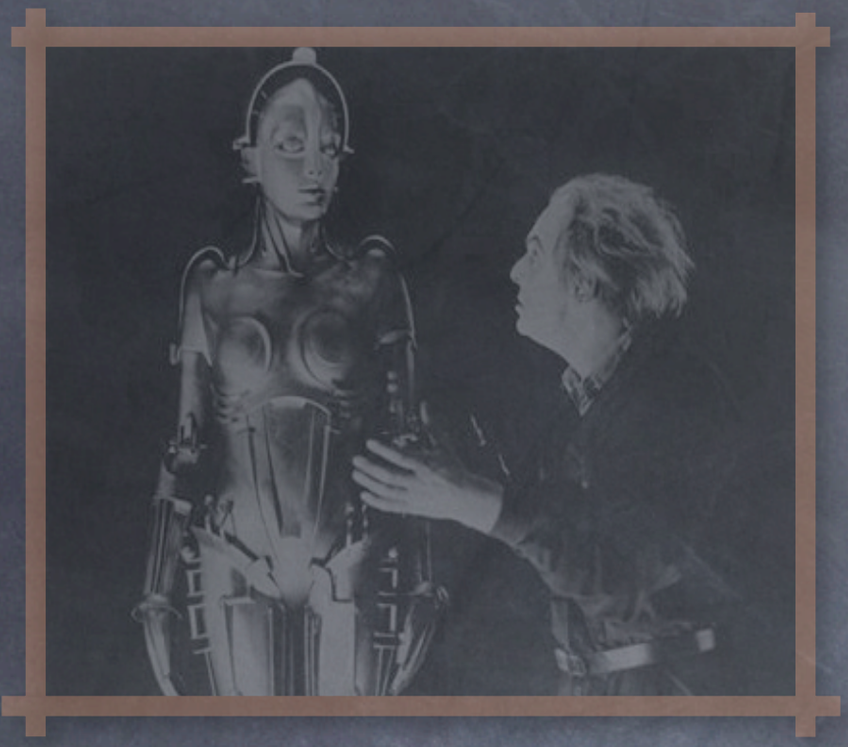


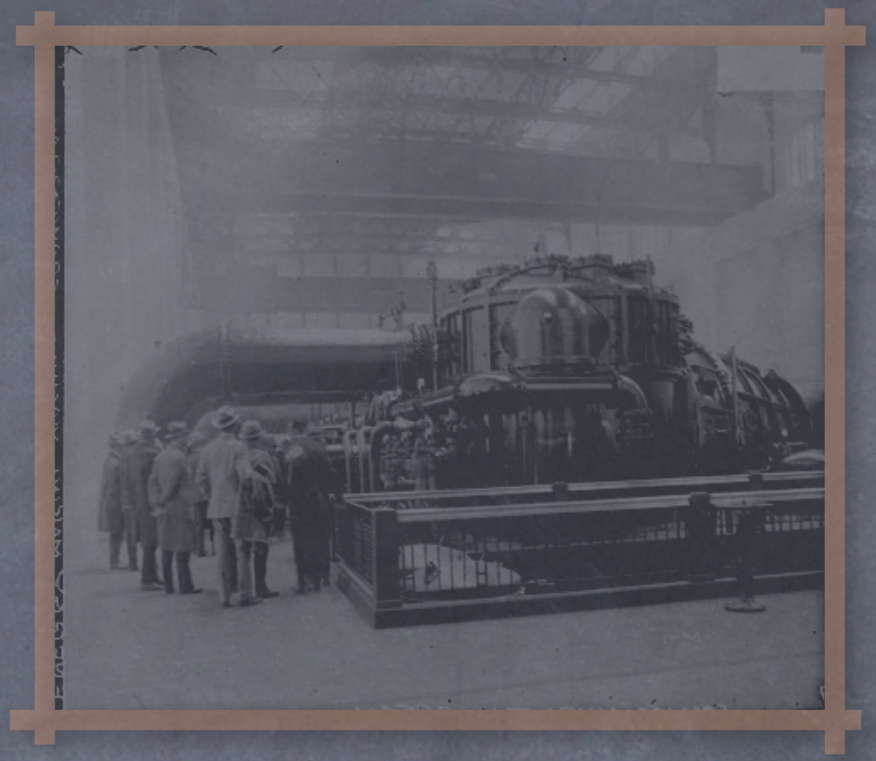


Public, Private &
Government

Elastic & Infinite Supply

Charged on a utility basis





Public, Private &
Government

Elastic & Infinite Supply

Charged on a utility basis

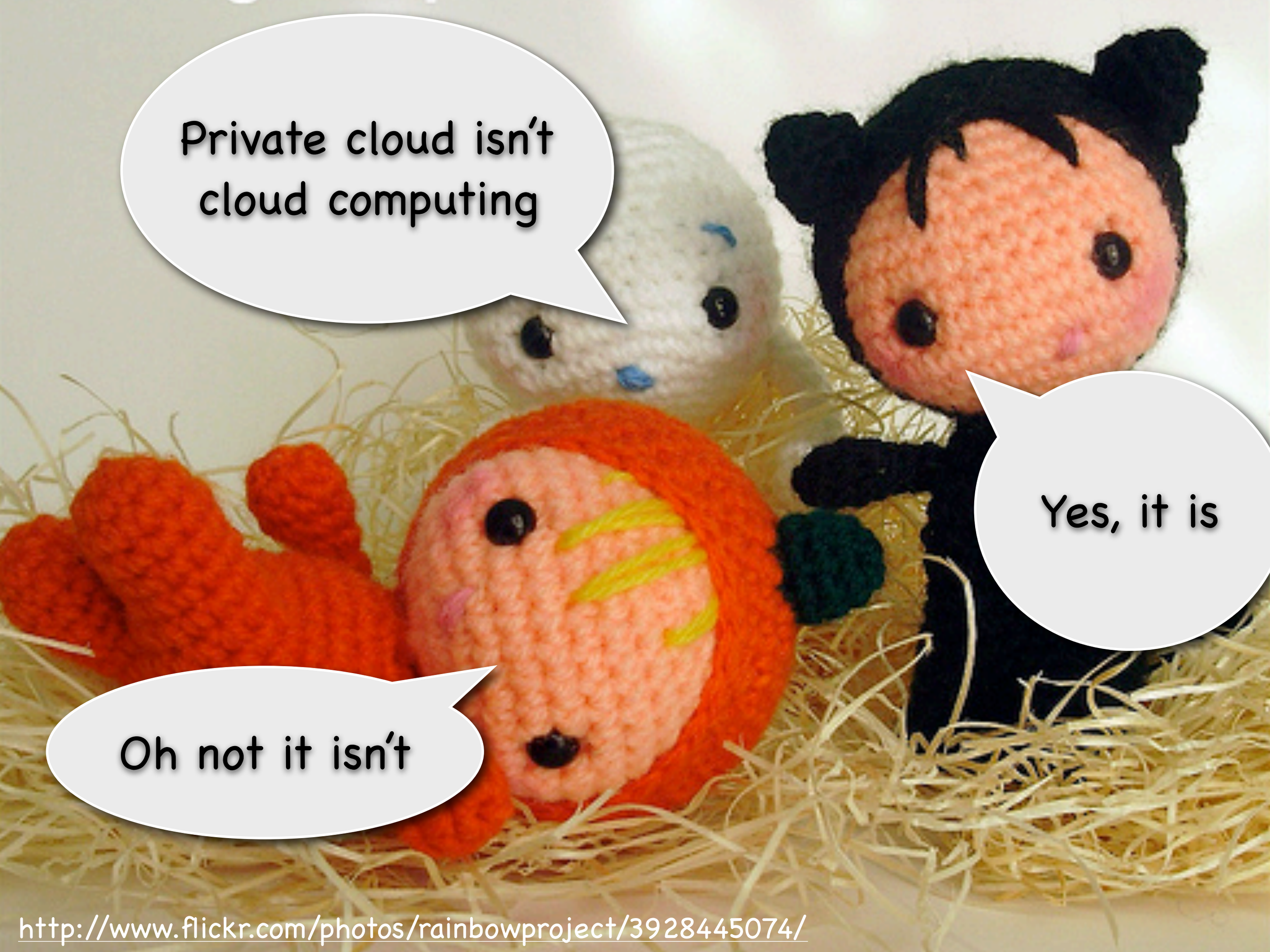
Online

+44 years

~~Computer Utility~~

Cloud

67 definitions



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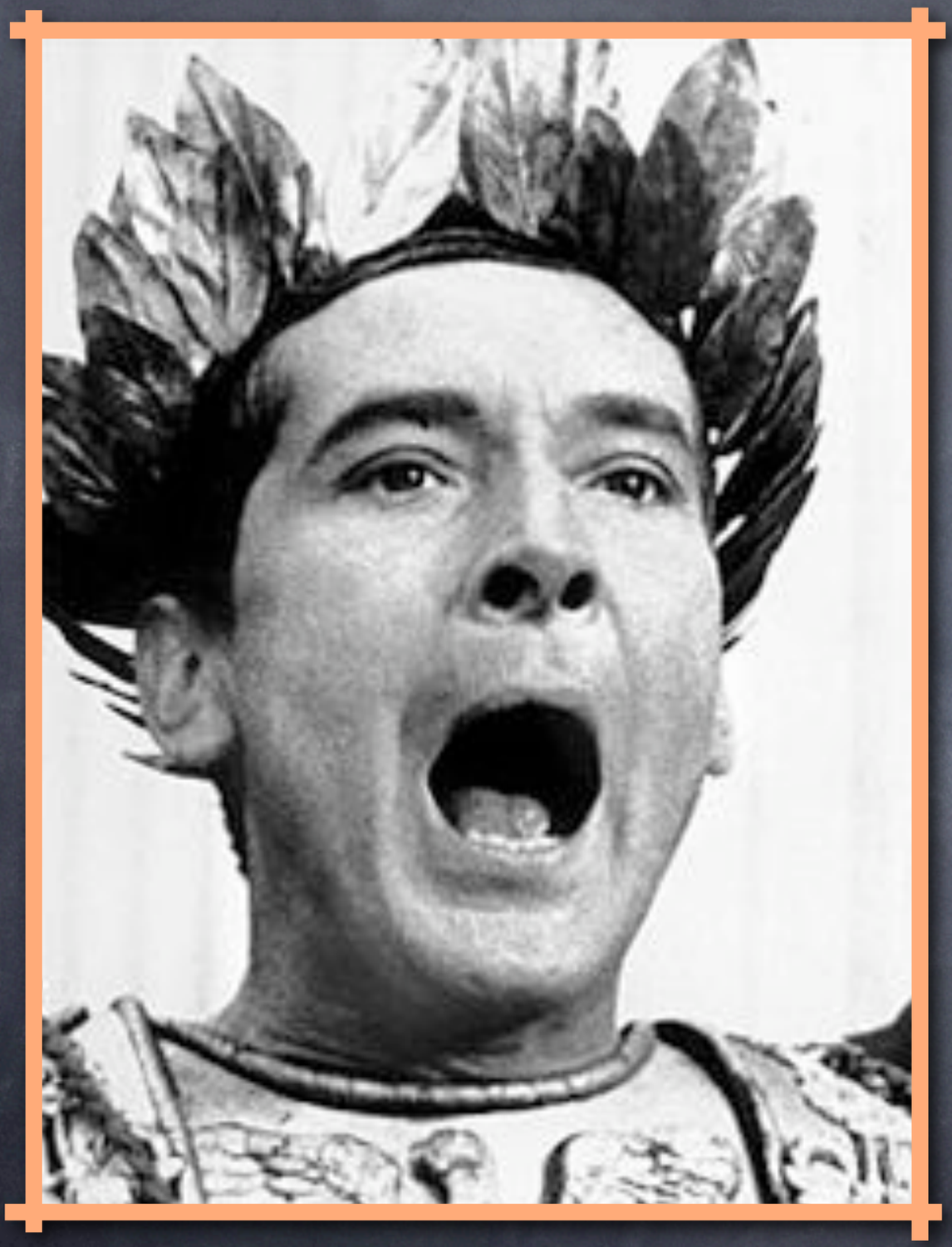
process engineering
secure
Web 2.0
adaptable
show ROI
Outsource
flexible
innovate
Six Sigma
Open source
align to the
SOA
Agile
SAAS
business
Enterprise 2.0
Cloud
cost efficient
REST
Offshore
good governance
Organic
ITIL
focus on core
KPIs
Demand management



Infamy,

Infamy ...

Economics

Economics

What is cloud?

Economics

What is cloud?

Why now?

Economics

What is cloud?

Why now?

Benefits & Risks

Economics

What is cloud?

Why now?

Benefits & Risks

Private or Public?

Economics

What is cloud?

Why now?

Benefits & Risks

Private or Public?

Myths

Economics

What is cloud?

Why now?

Benefits & Risks

Private or Public?

Myths

Ubuntu

Economics

What is cloud?

Why now?

Benefits & Risks

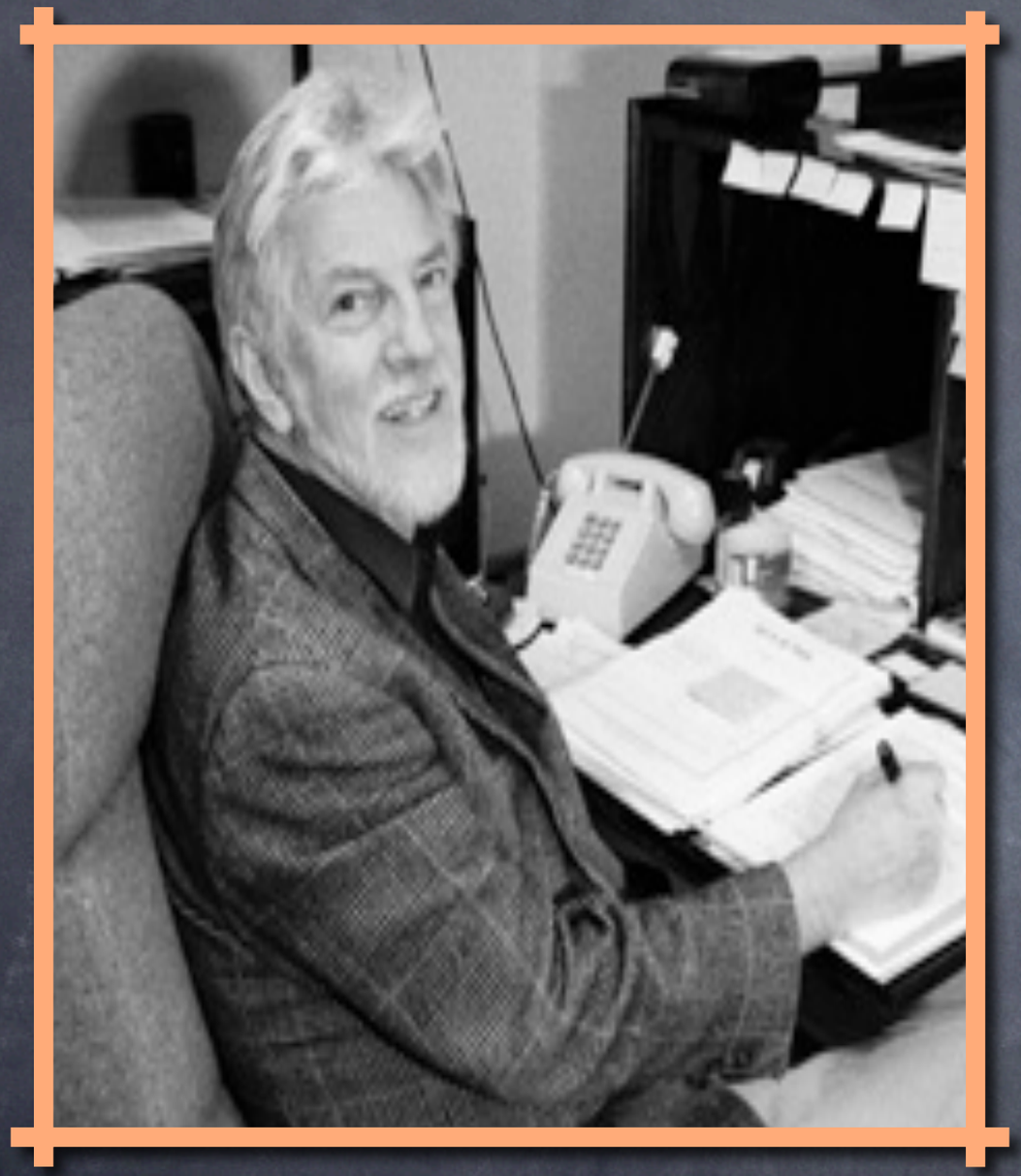
Private or Public?

Myths

Ubuntu

Where to start?

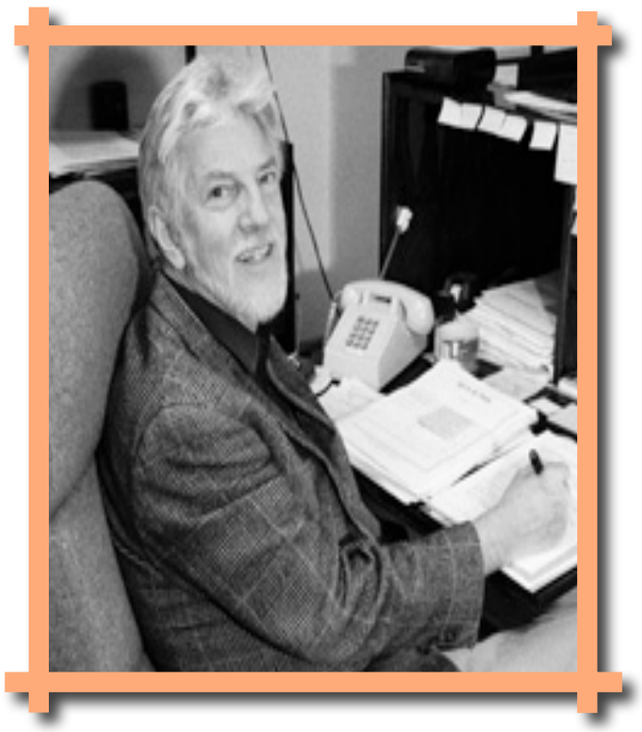
Economics

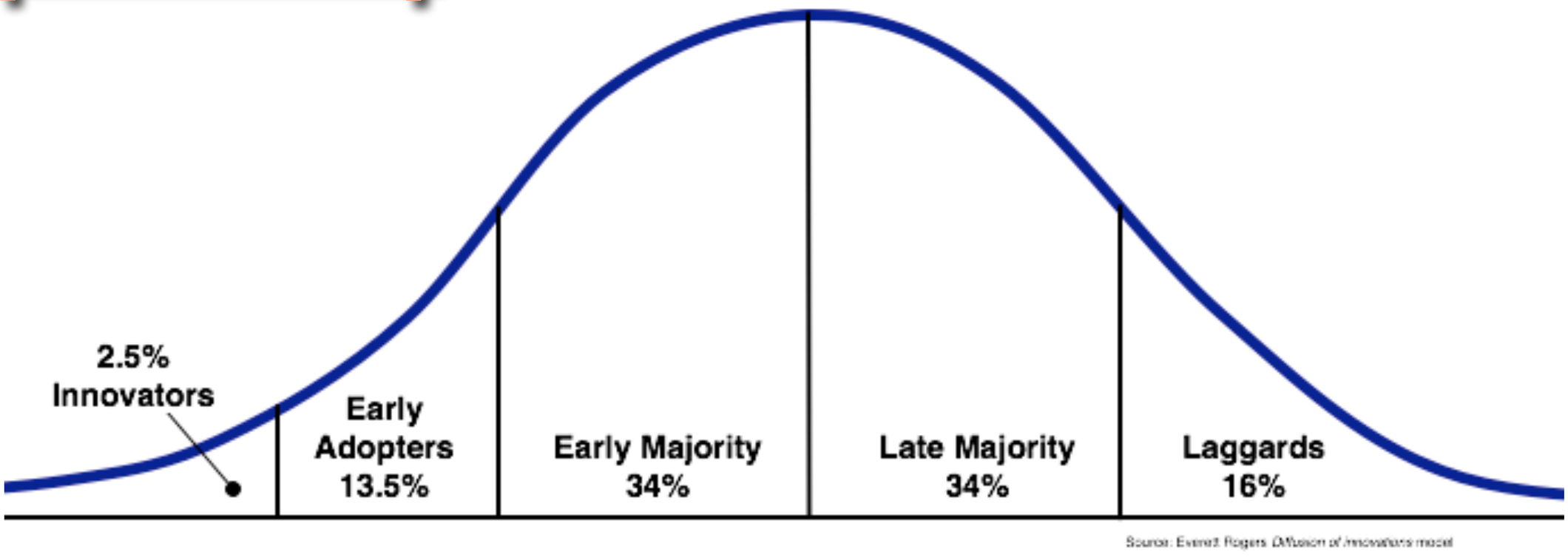


Diffusion of innovation

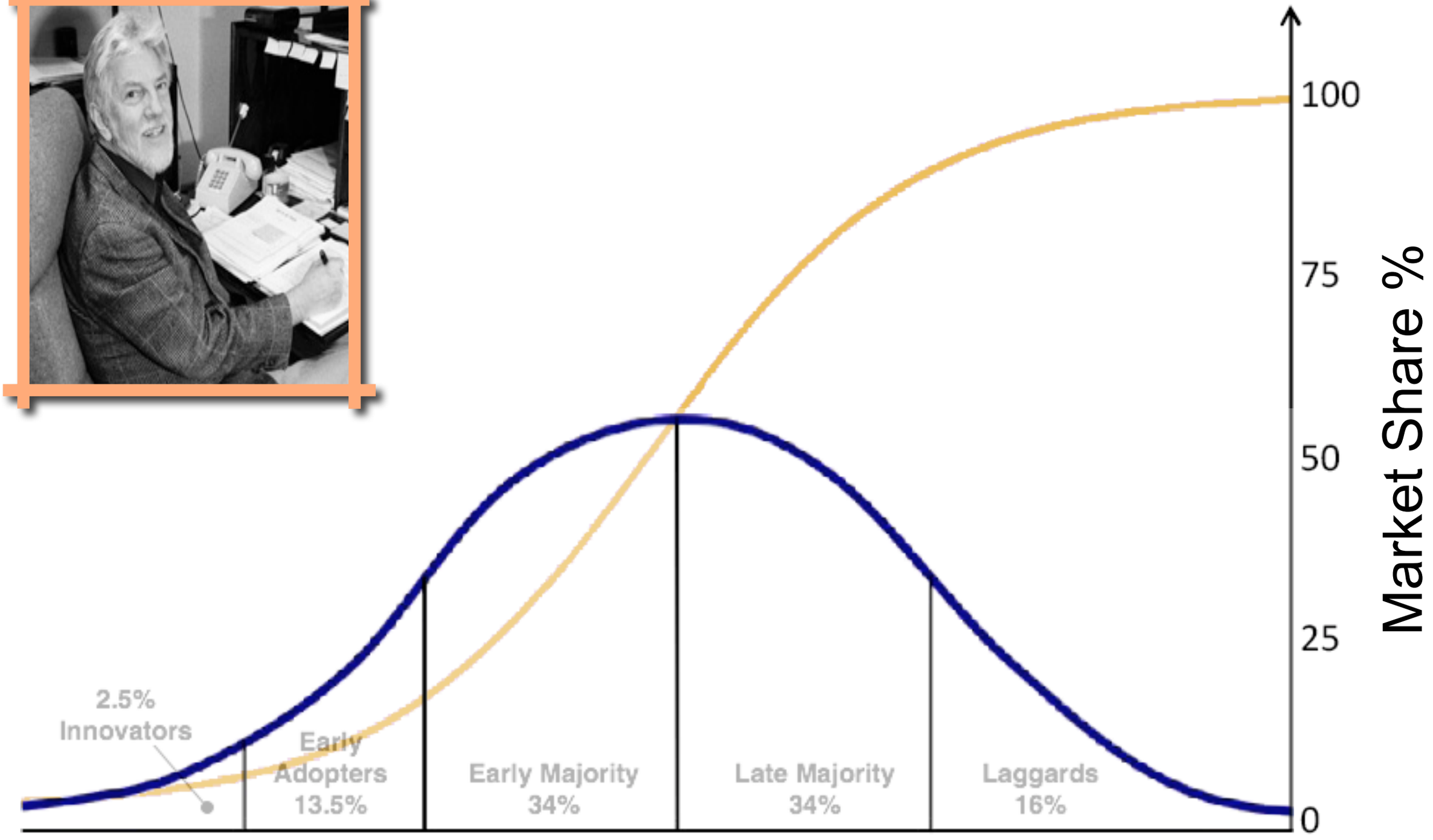
Everett Rogers

(1931 - 2004)



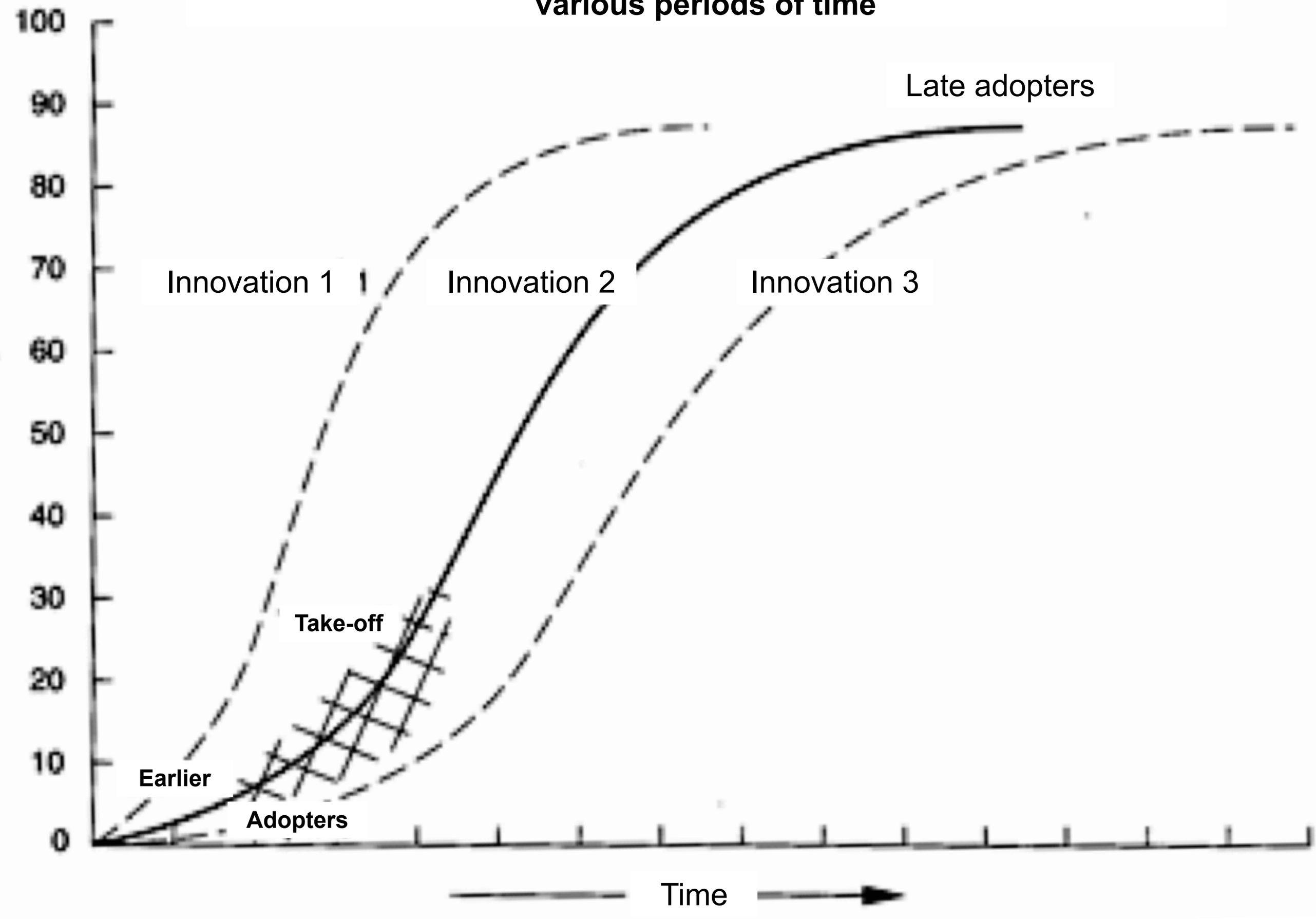


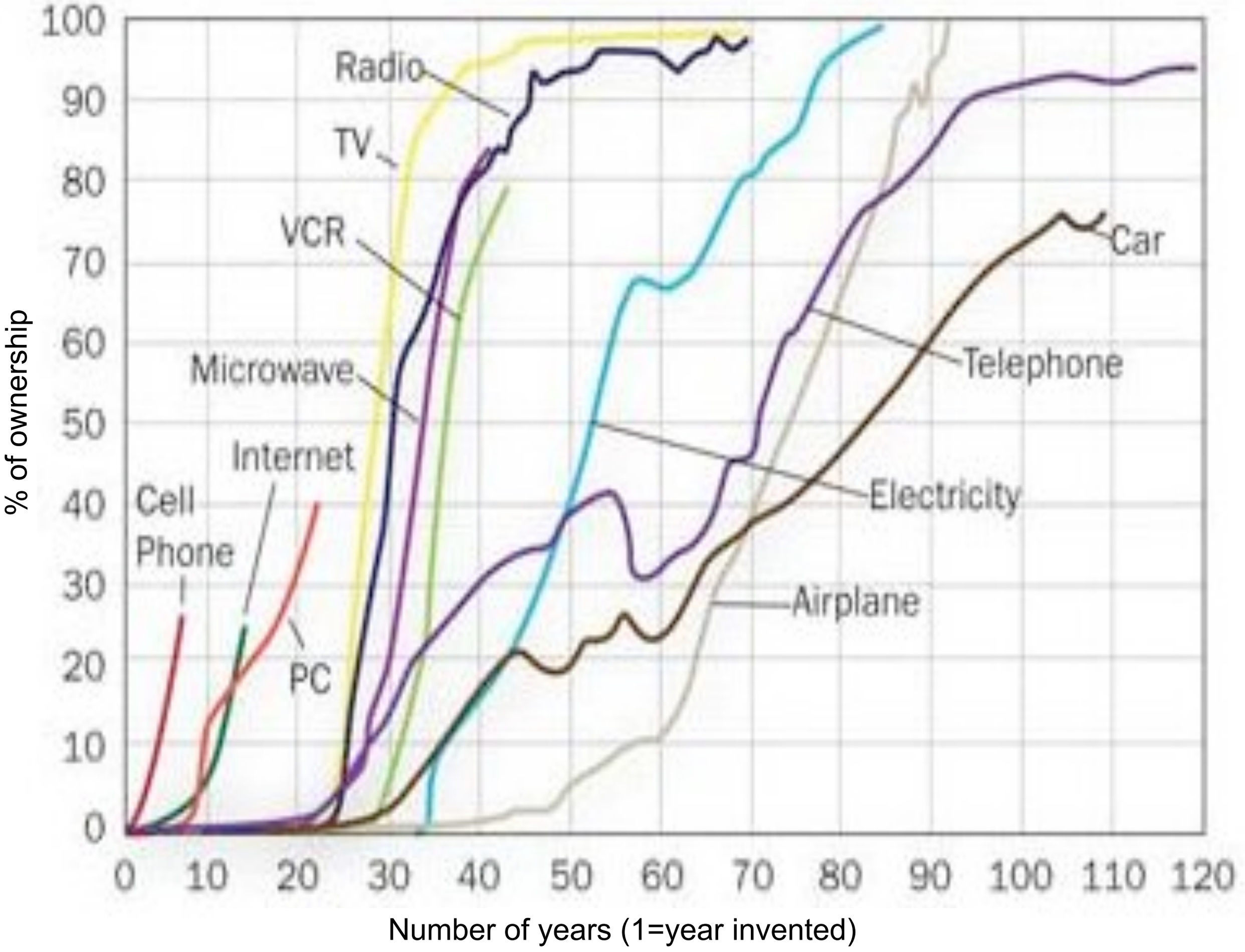
Technology Adoption



Technology Adoption

Shapes of curves of diffusions for innovations that spread over various periods of time



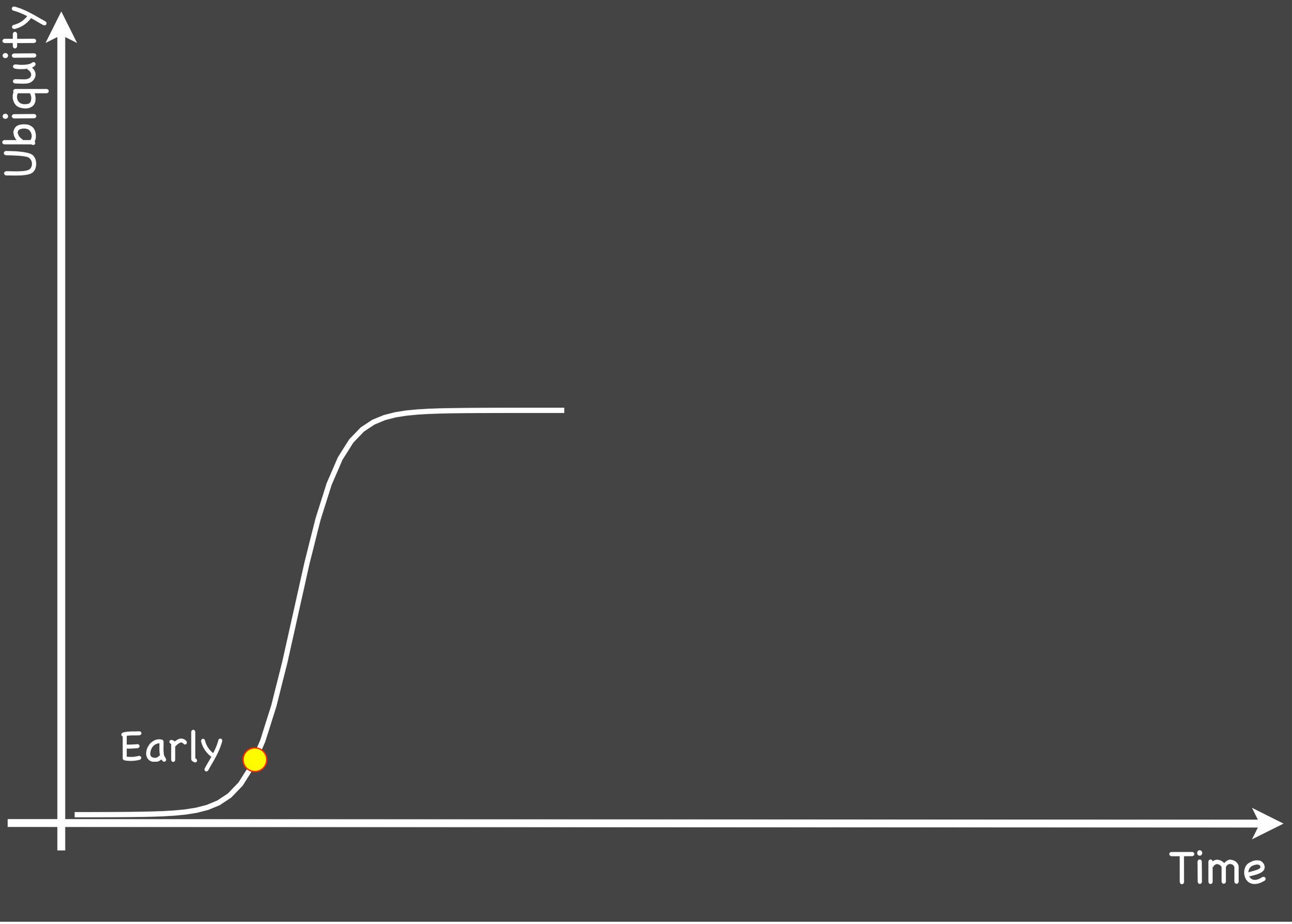

% of ownership
100
90
80
70
60
50
40
30
20
10
0
0
10
20
30
40
50
60
70
80
90
100
110
120
Number of years (1=year invented)
Radio
TV
VCR
Microwave
Internet
Cell Phone
PC
Car
Telephone
Electricity
Airplane

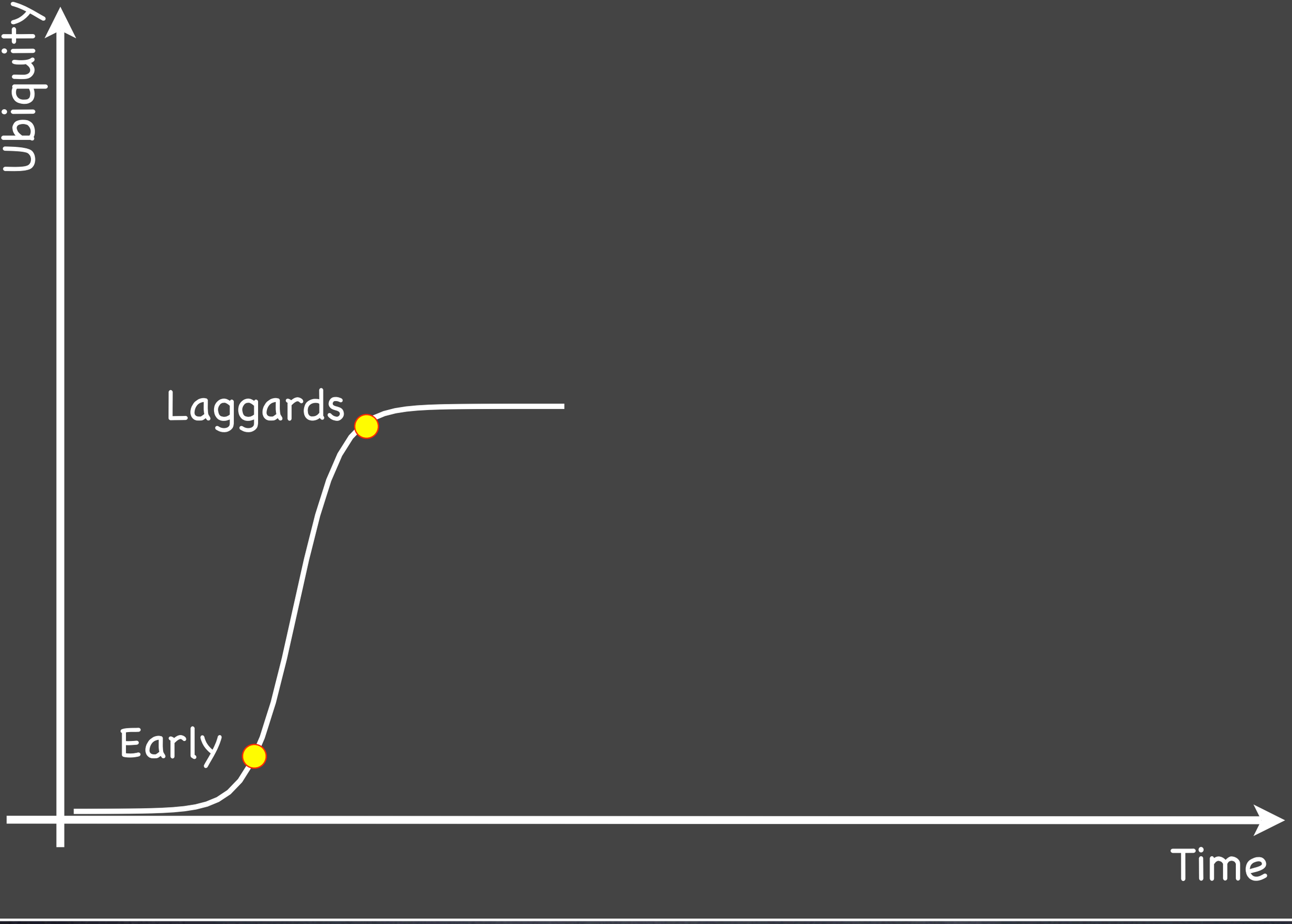
% of Ownership

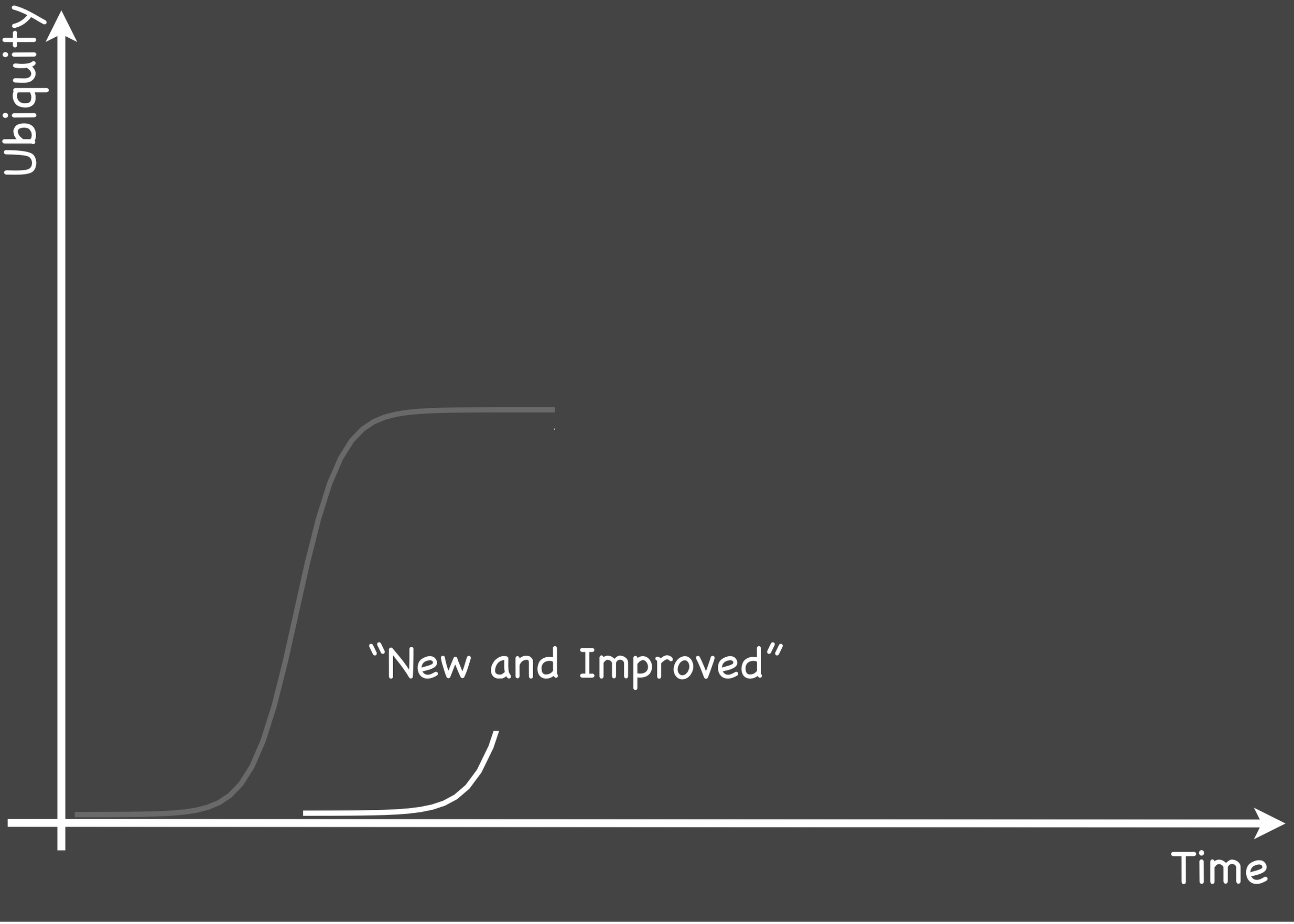
Ubiquity

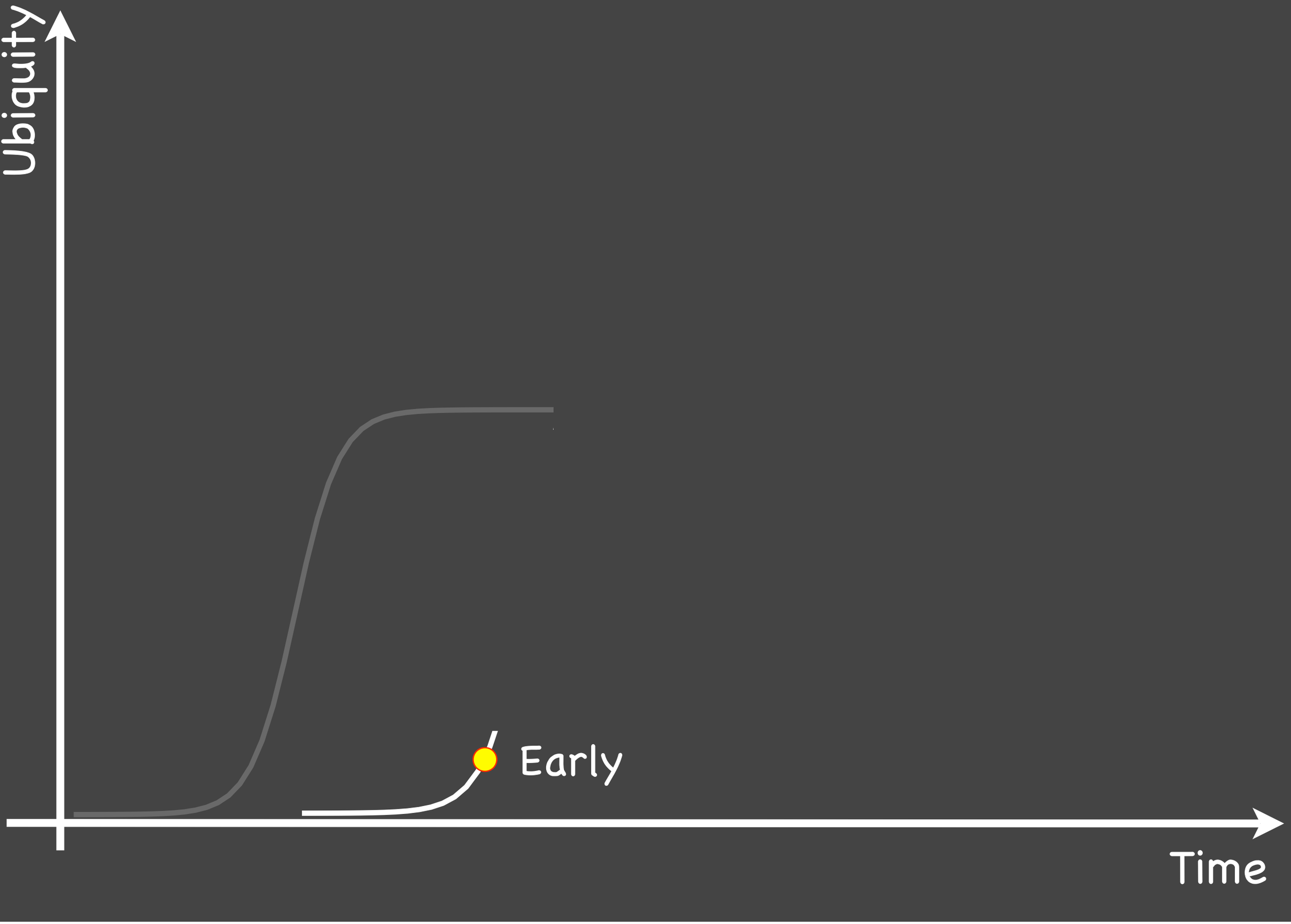
Ubiquity

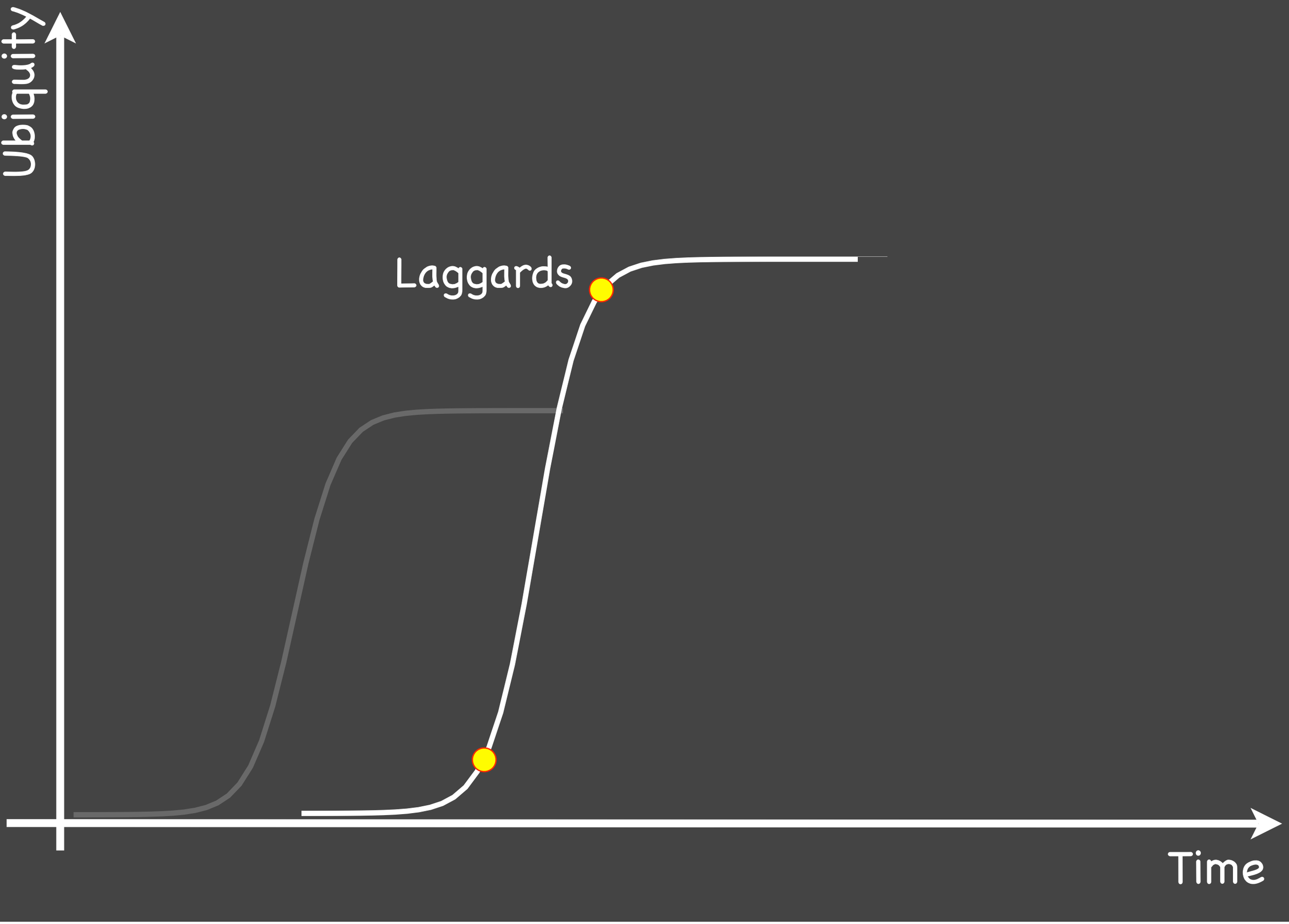
Time

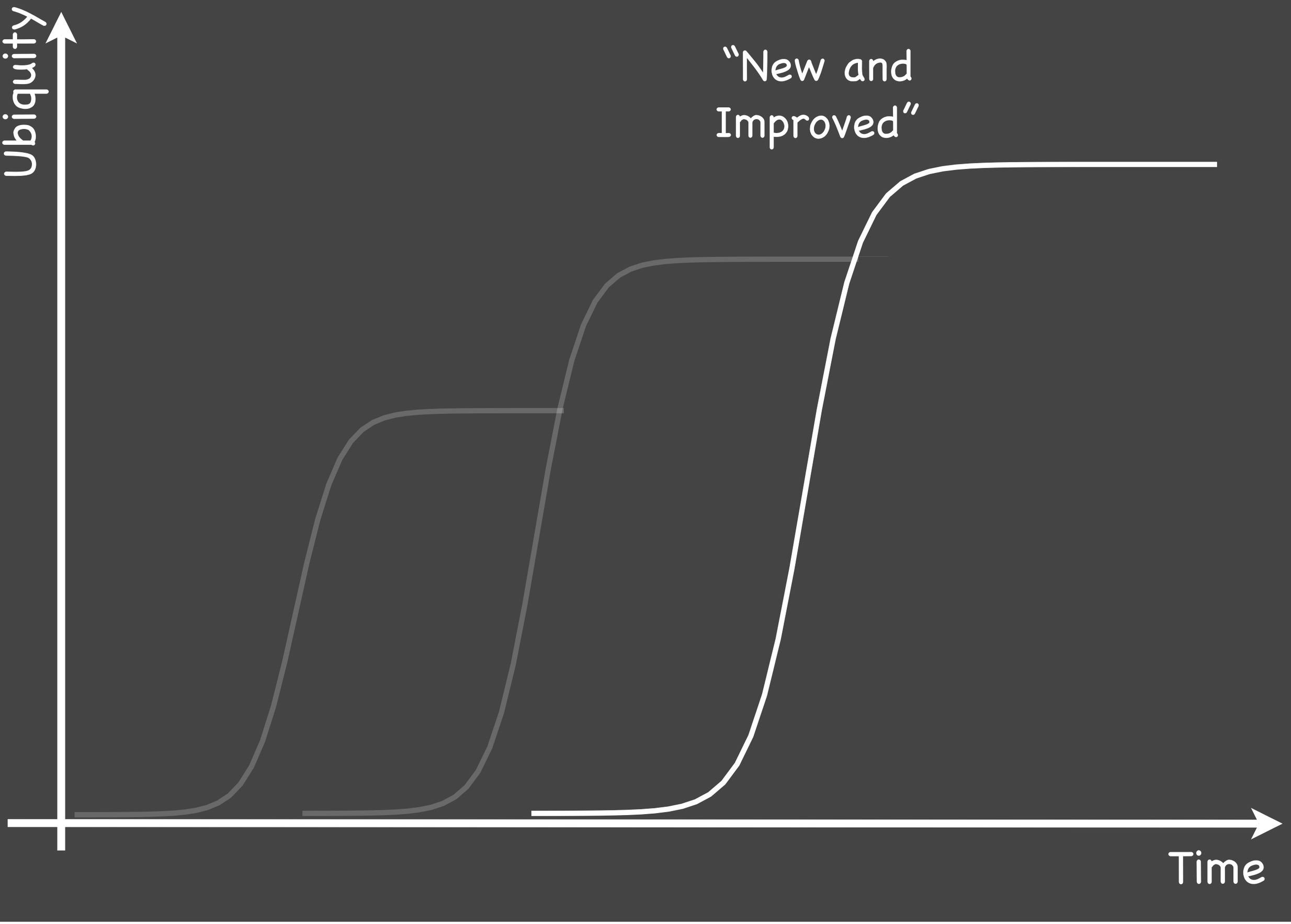

Ubiquity
Early
Time

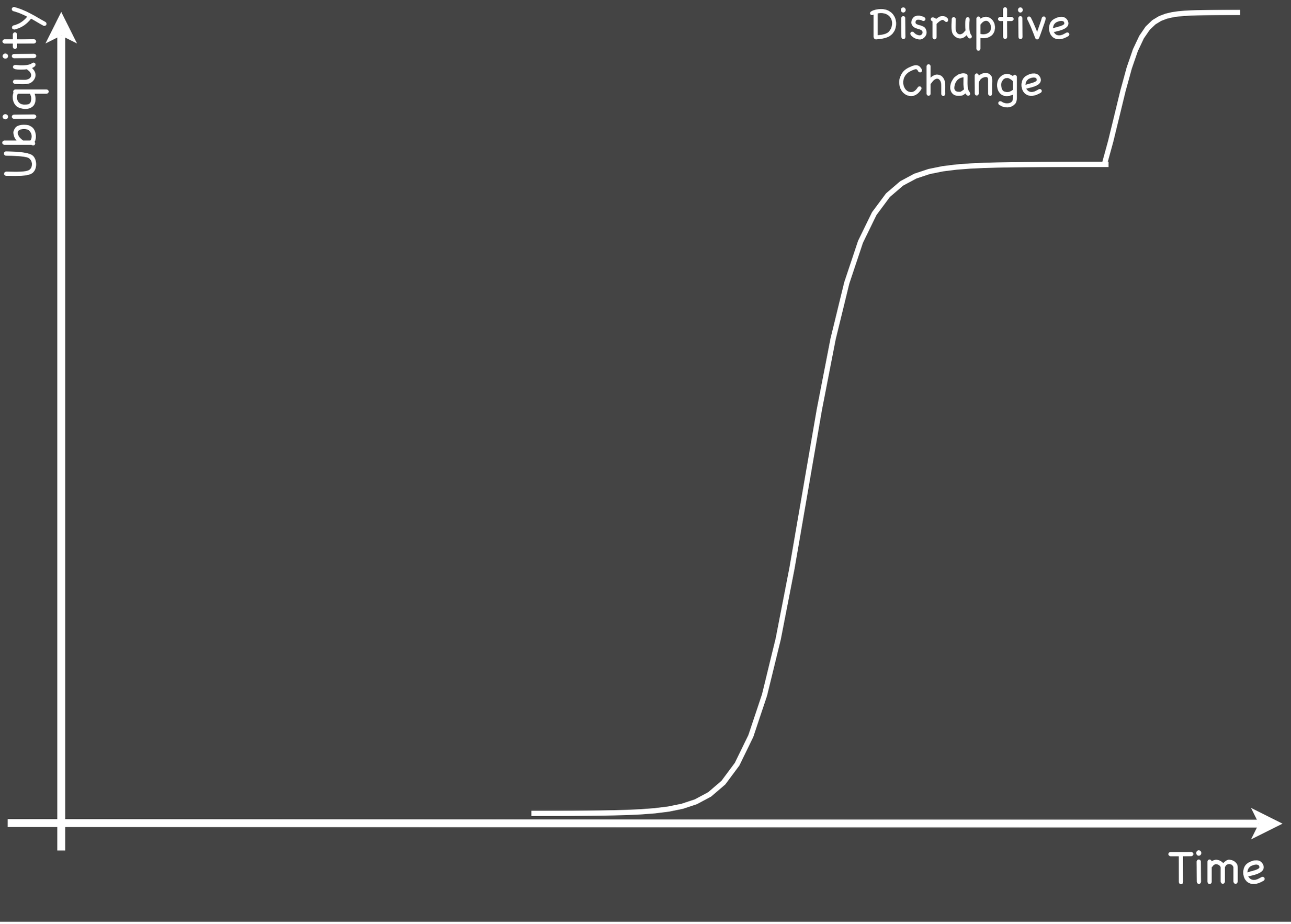

Ubiquity
Laggards
Early
Time


Ubiquity
"New and Improved"
Time


Ubiquity
Early
Time


Ubiquity
Laggards
Time


Ubiquity
"New and Improved"
Time

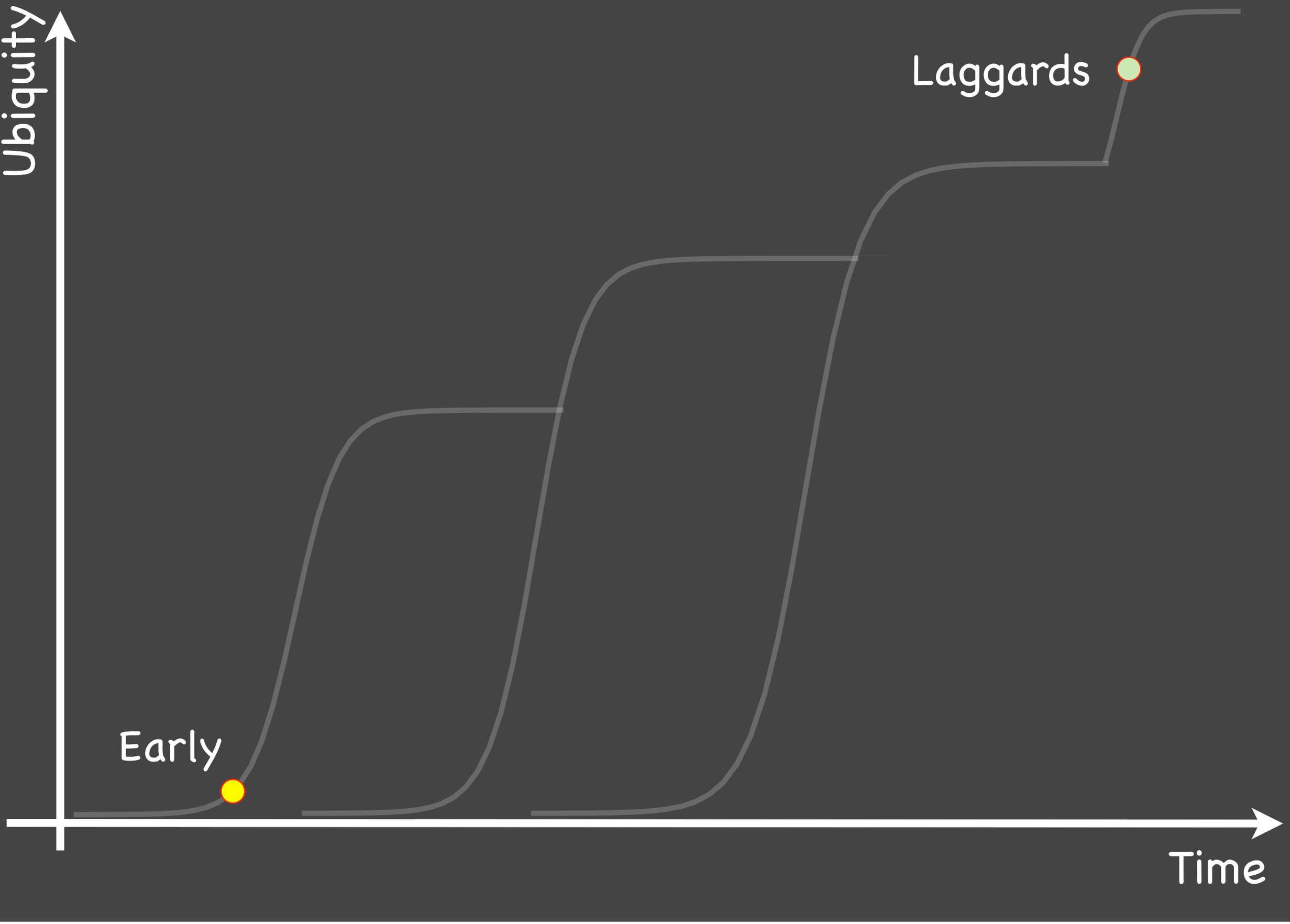

Ubiquity
Disruptive
Change
Time

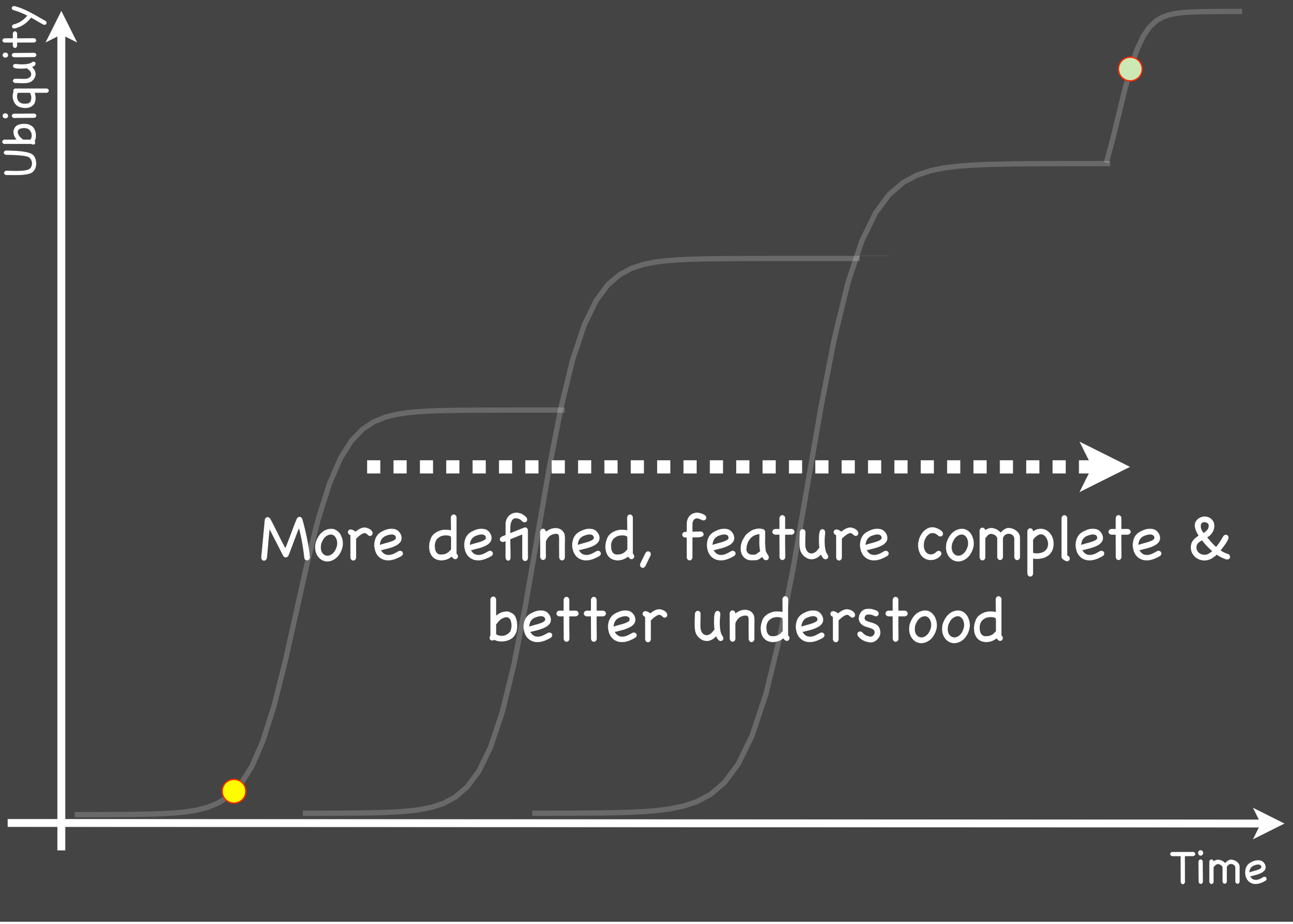
Ubiquity

Clayton Christensen

Disruptive Change

Time


Ubiquity
Laggards
Early
Time


Ubiquity
More defined, feature complete &
better understood
Time

Sccott Beale/Laughing Squid : http://www.flickr.com/photos/laughingsquid/

Ubiquity

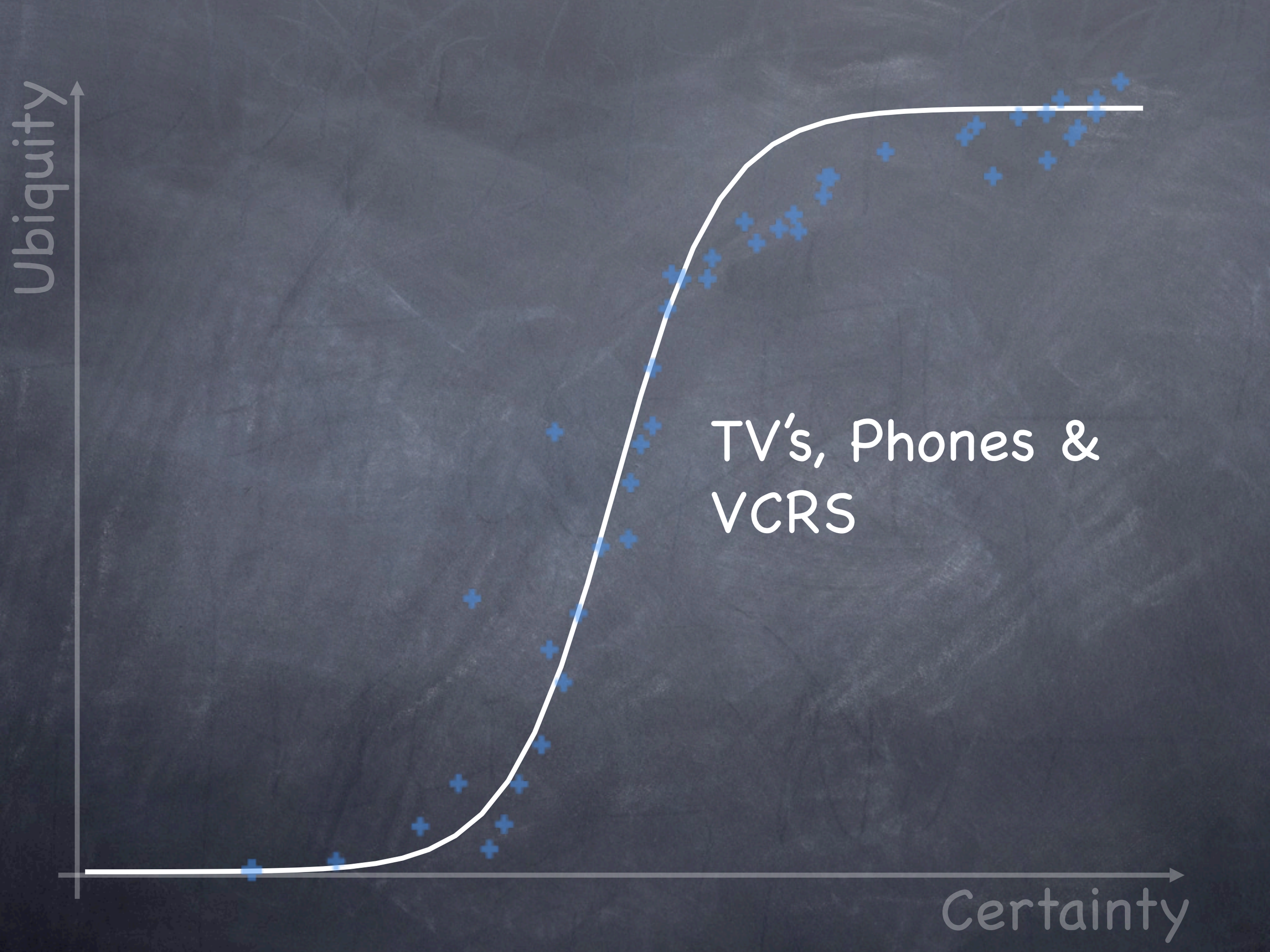
Ubiquity
Certainty

http://www.flickr.com/photos/matthijs/81735277/

Ubiquity

TV's, Phones & VCRS

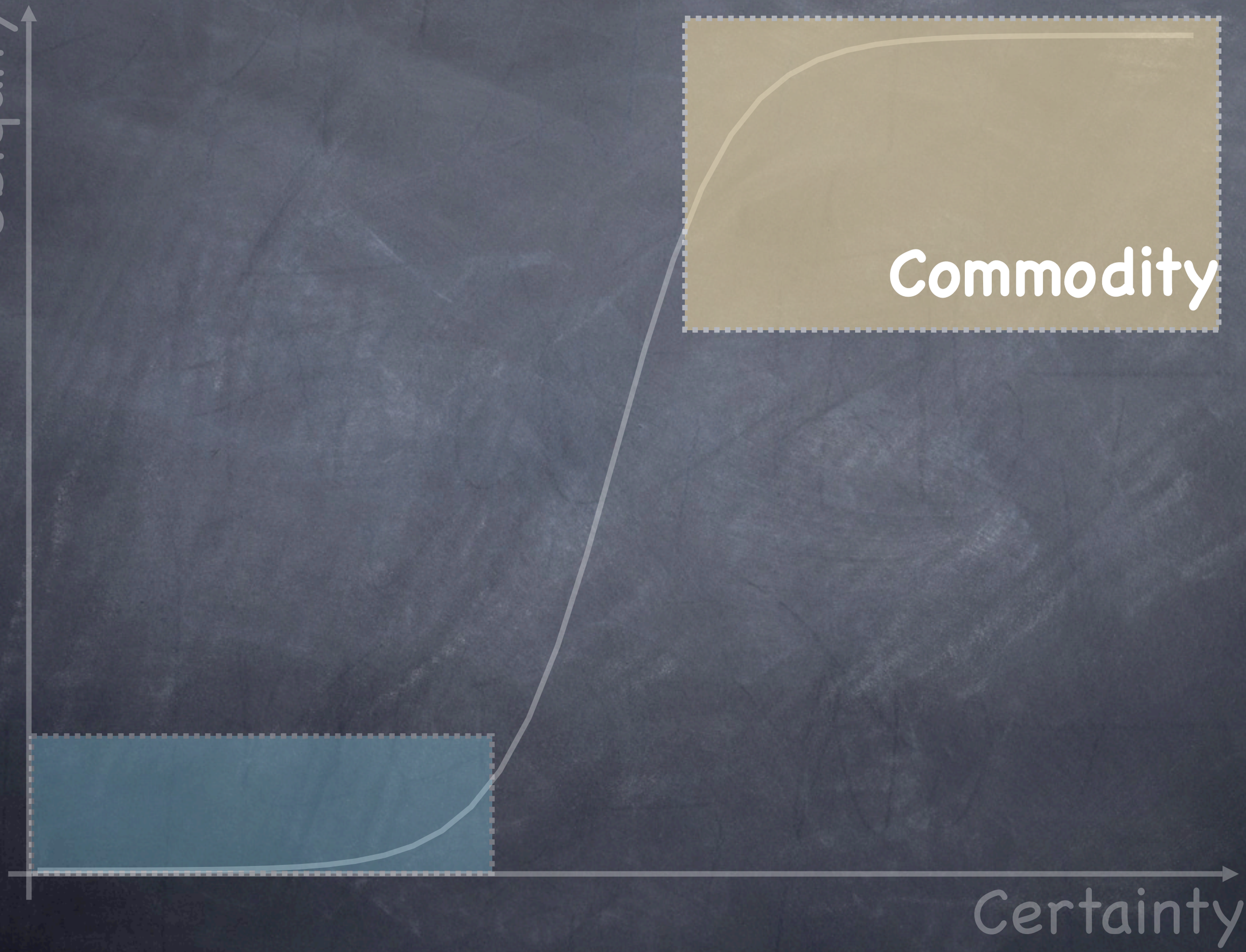
Certainty

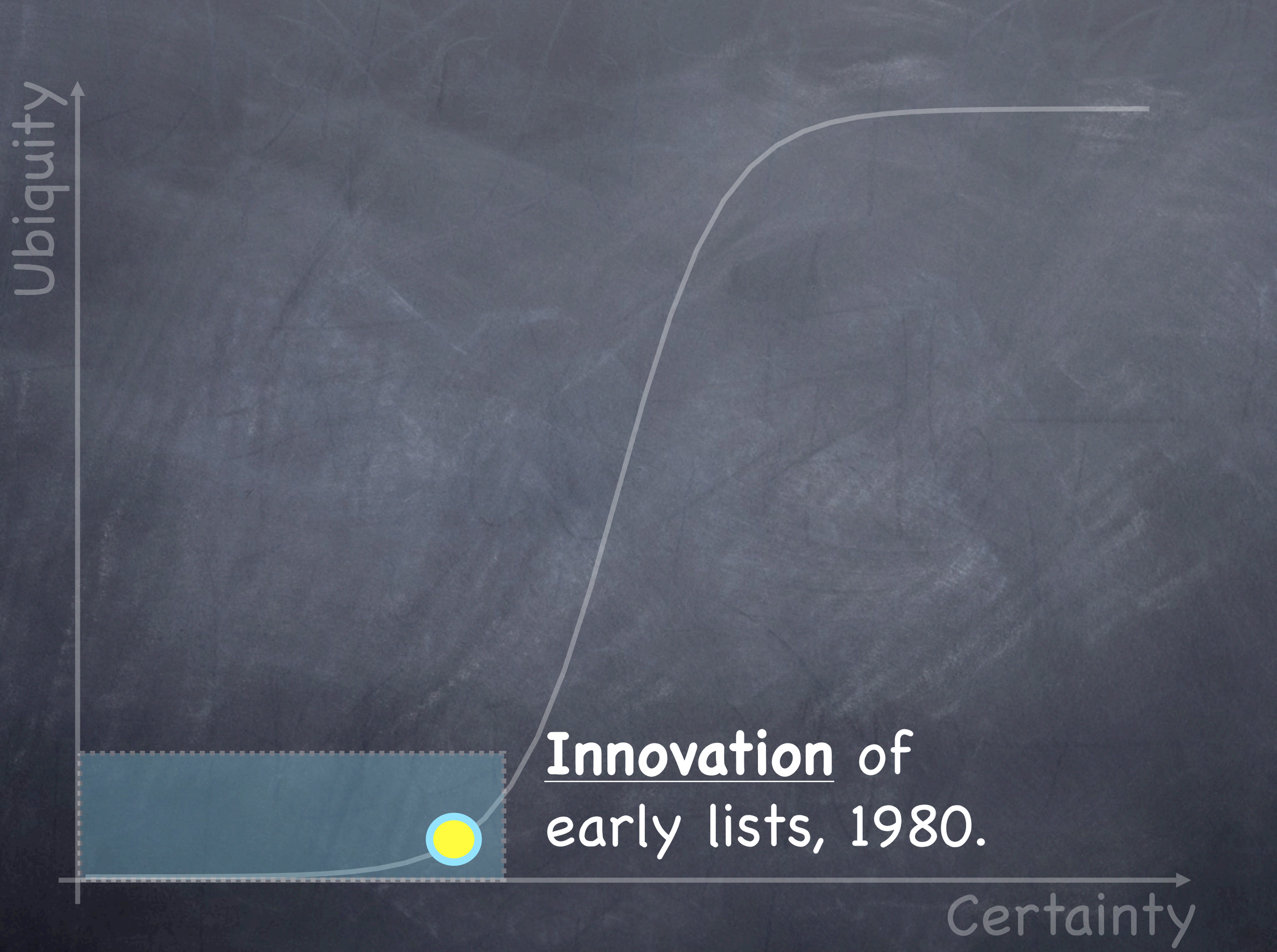

Ubiquity
TV's, Phones &
VCRS
Certainty

Ubiquity

Innovation

Certainty


Ubiquity
Commodity
Certainty



Innovation of
early lists, 1980.

Ubiquity

Certainty

Custom built,
DB Marketing
Mid 80s

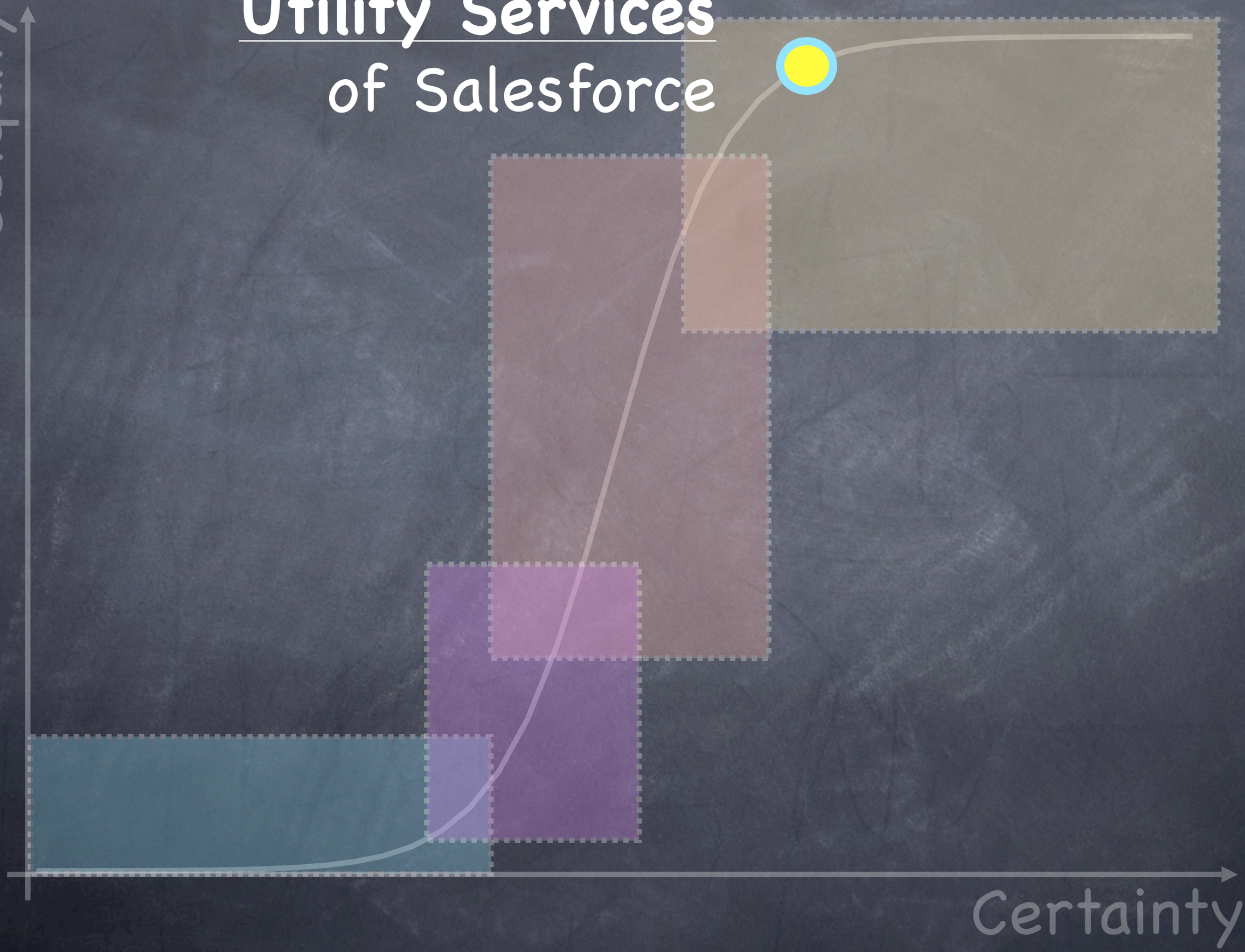
Ubiquity

Certainty

Product

Early 90s

Utility Services
of Salesforce



Ubiquity

Utility Services

Commodity

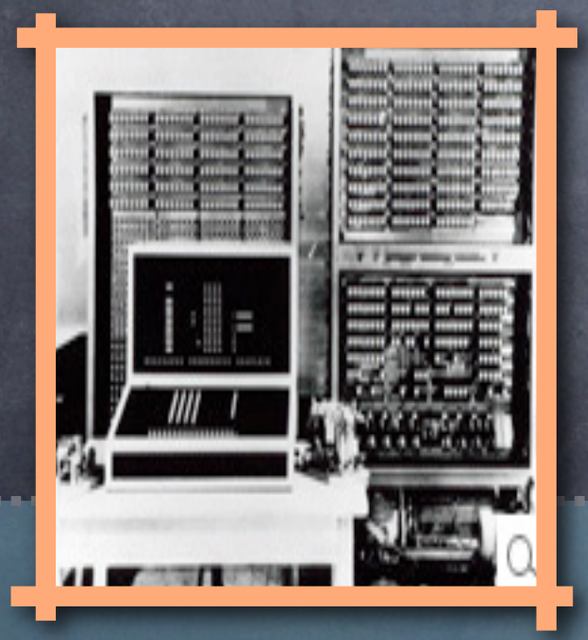
Product

Custom built

Innovation

Certainty

Ubiquity



Innovation of Z3, 1941

Certainty

Ubiquity

Custom Built LEO, 1946

Certainty

Ubiquity

Certainty

Products

IBM 650, 1954

Ubiquity

Certainty

Commodity

Hardware

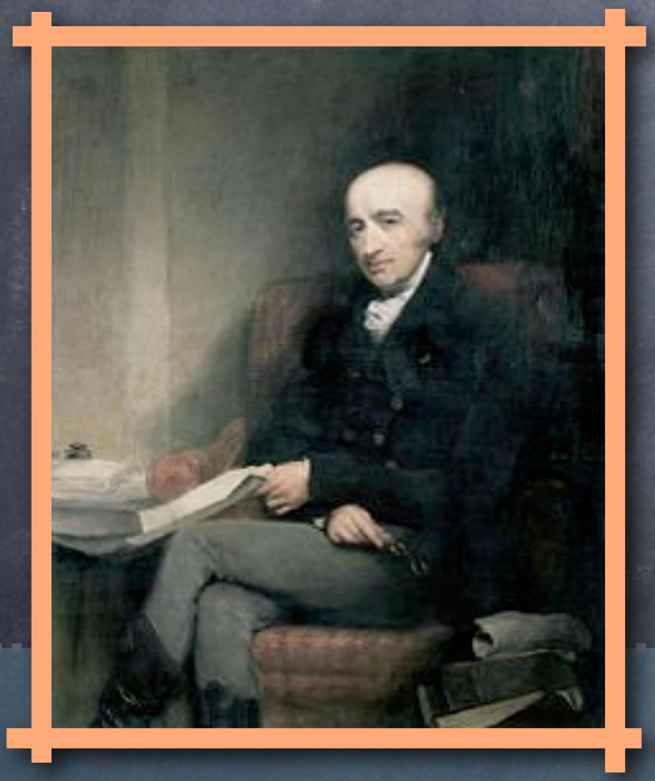
Utility services

of Amazon EC2

Ubiquity

Certainty

Ubiquity



Innovation of W. H. Wollaston, 1821

Certainty

Ubiquity

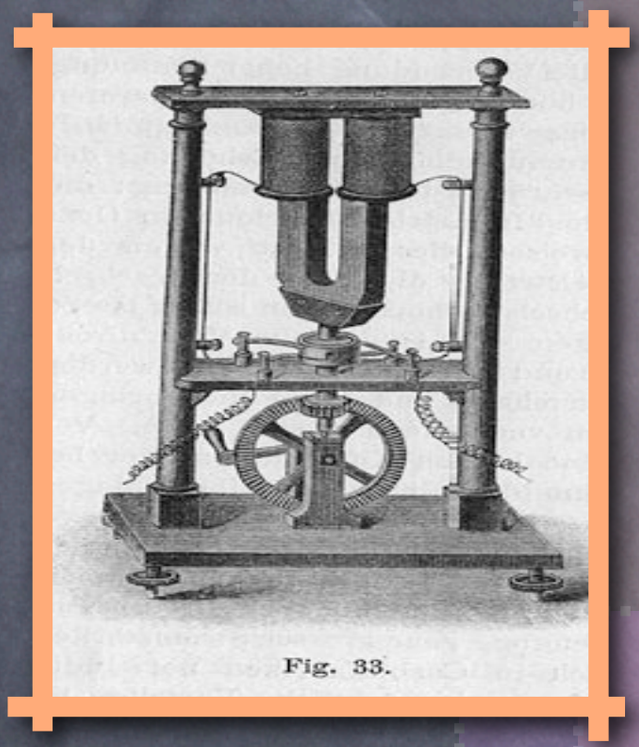
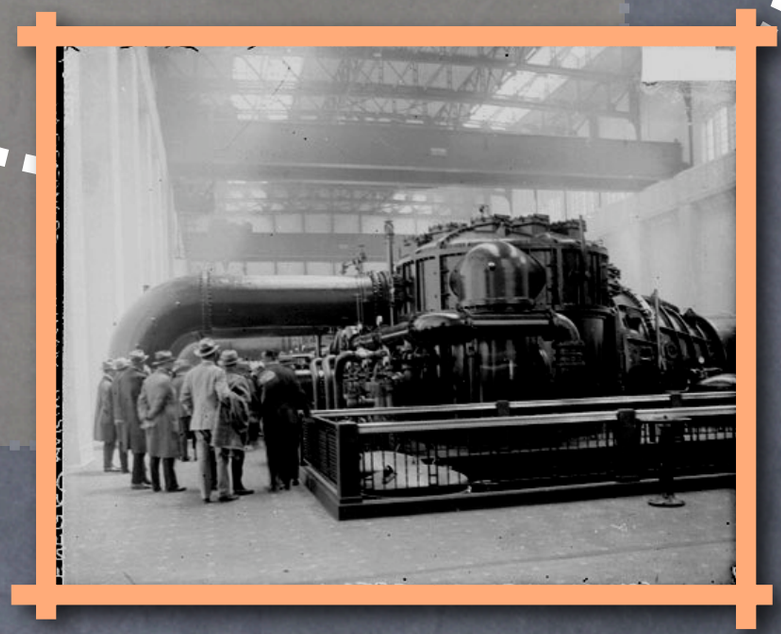


Fig. 33.

Early **Products**,
Hippolyte Pixii, 1830s

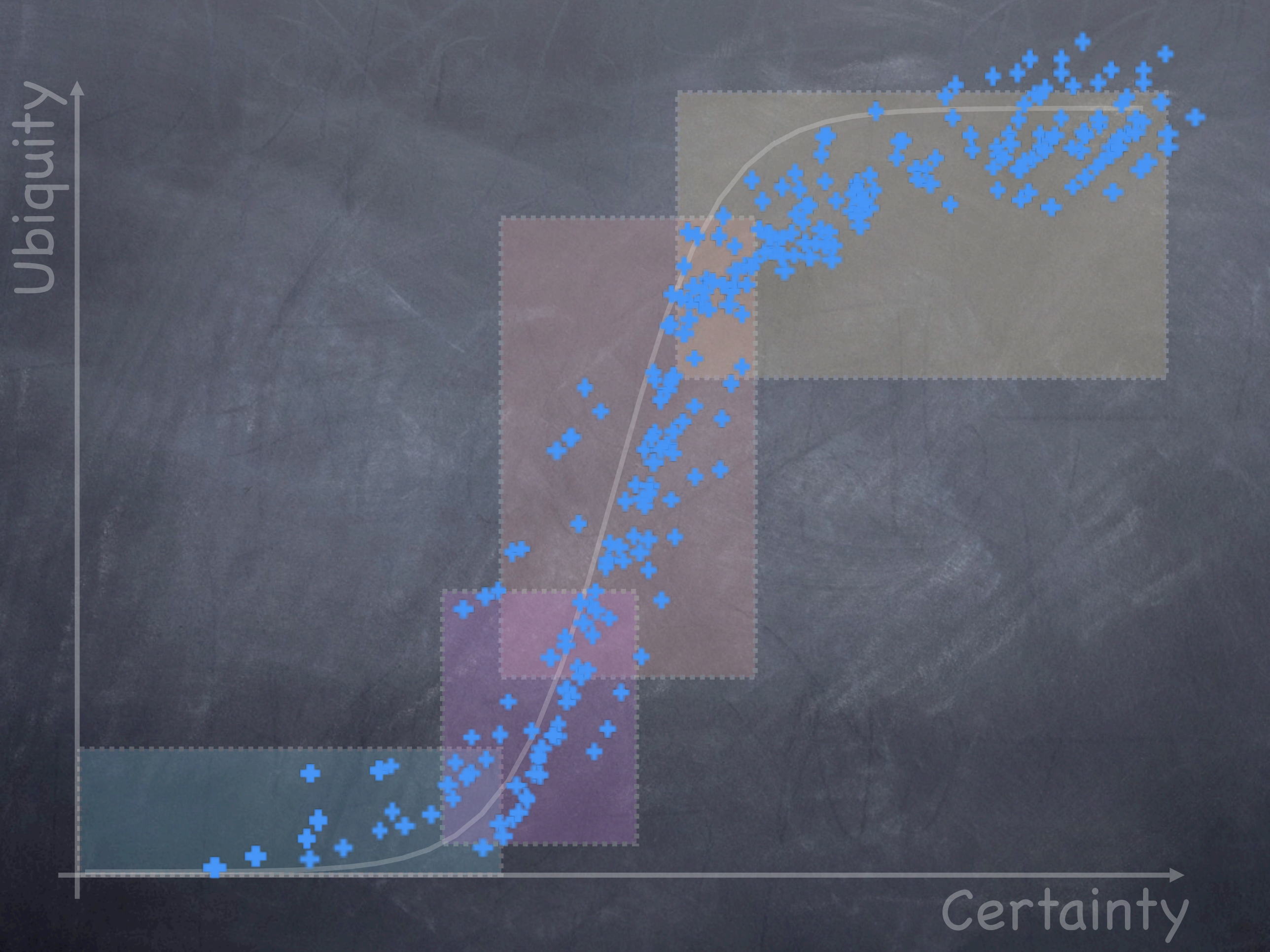
Certainty

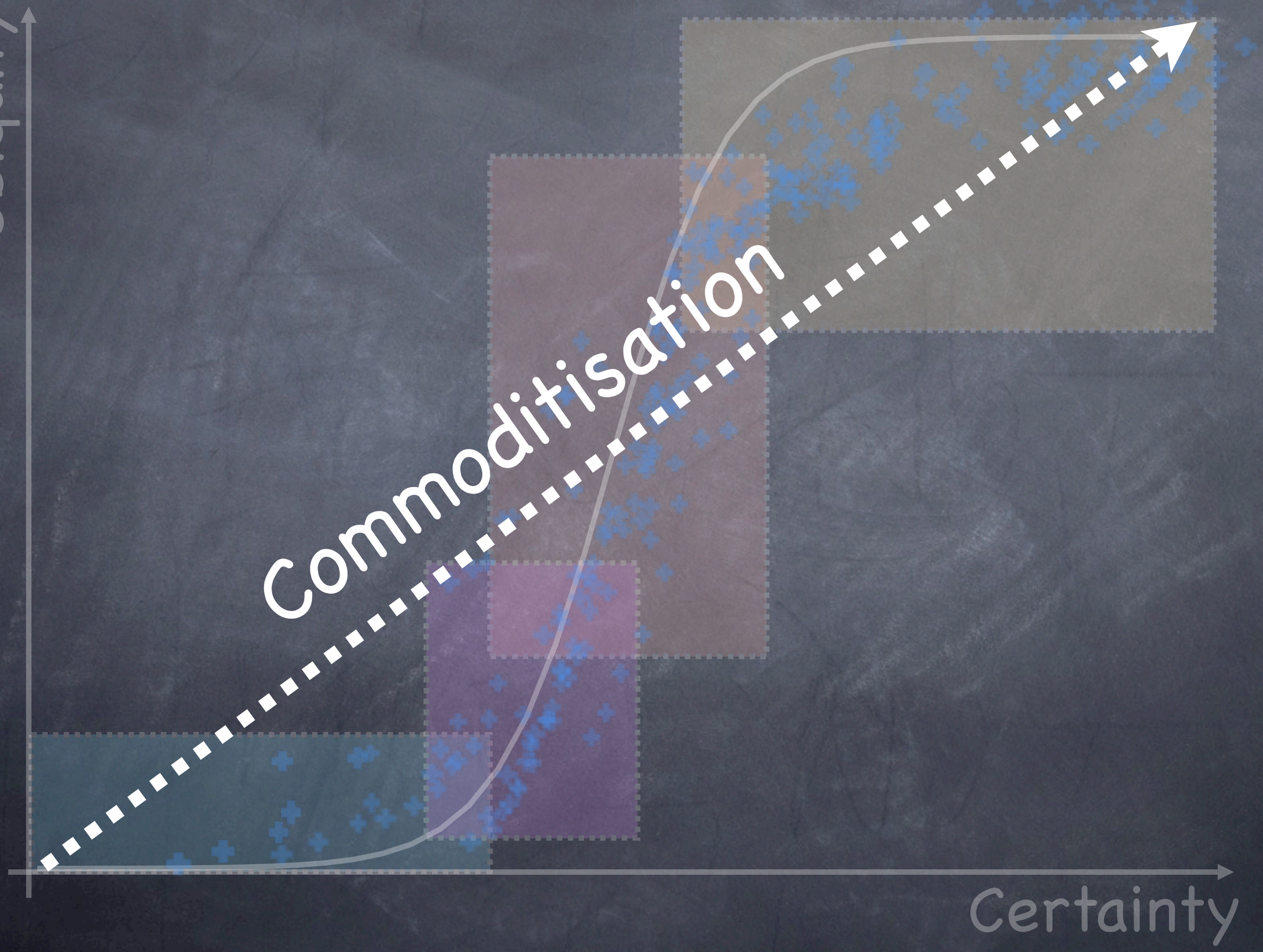
Utility Services of the National Grid



Ubiquity

Certainty


Ubiquity
Certainty


Ubiquity
Commoditisation
Certainty

http://www.flickr.com/photos/privatenobby

http://www.flickr.com/photos/billege

http://www.flickr.com/photos/billege/

Ubiquity

Demand
(user competition)

Certainty

http://www.flickr.com/photos/privatenobby

http://www.flickr.com/photos/mush2274

http://www.flickr.com/photos/mush2274/

Ubiquity

Demand
(user competition)

Improvement
(supply competition)

Certainty

Ubiquity

Demand
(user competition)

Commoditisation

Improvement
(supply competition)

Certainty

Ubiquity

Utility Service

Commodity

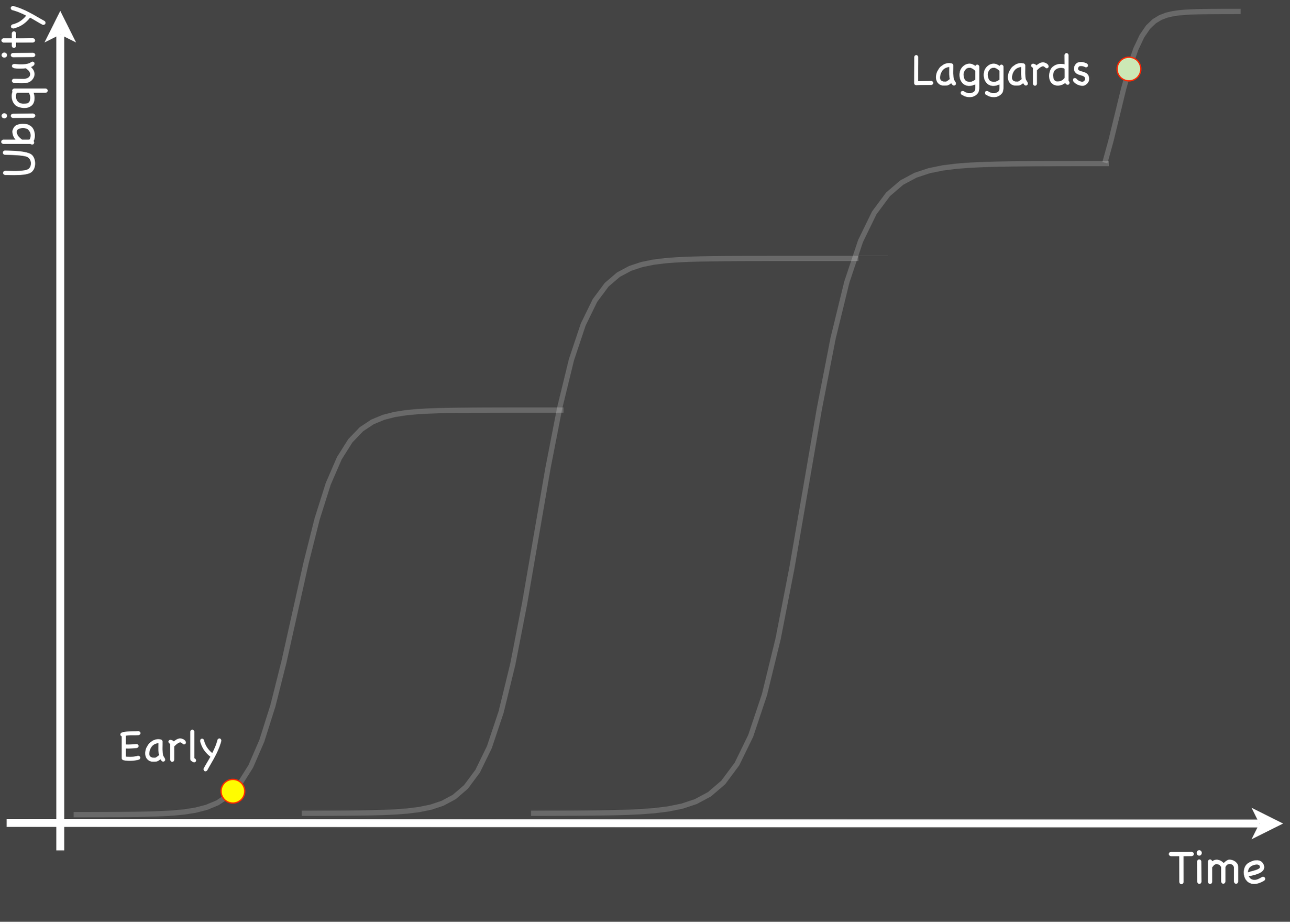
Product

Custom built

Innovation

Certainty

Recap


Ubiquity
Laggards
Early
Time

Ubiquity

Utility Services

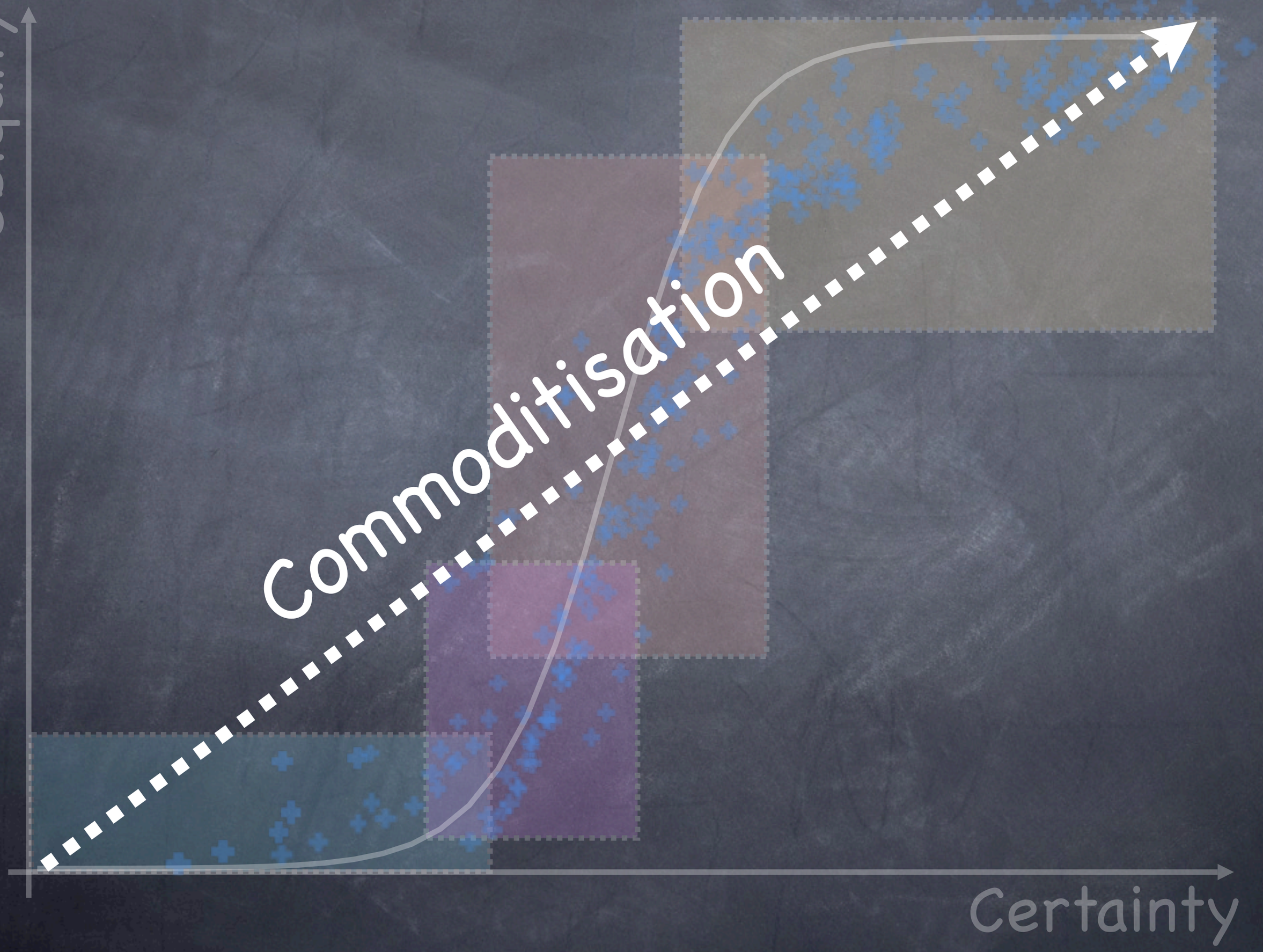
Commodity

Product

Custom built

Innovation

Certainty


Ubiquity
Commoditisation
Certainty

Ubiquity

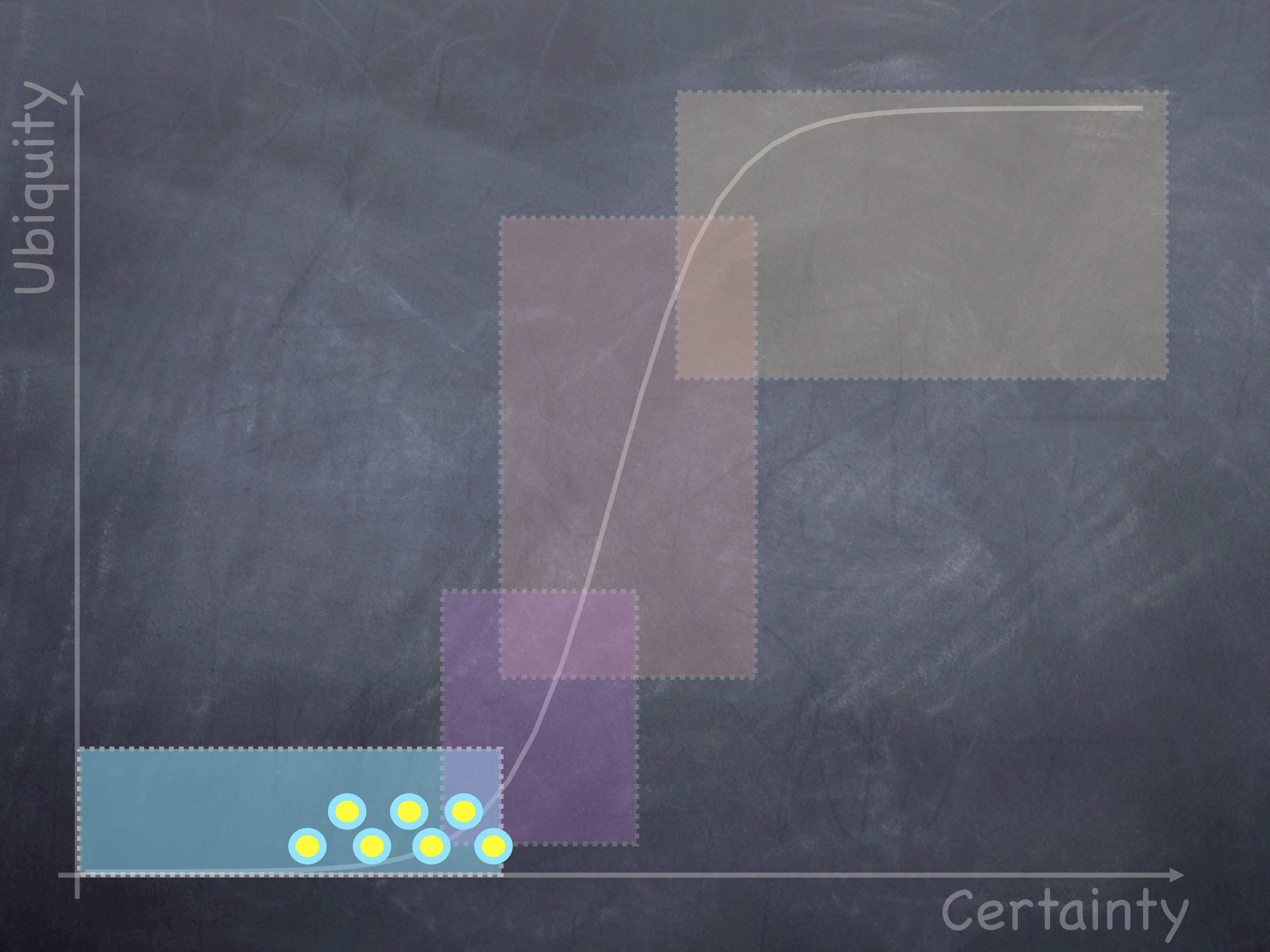
Demand
(user competition)

Improvement
(supply competition)

Certainty

Economics

What is cloud?


Ubiquity
Certainty

Ubiquity

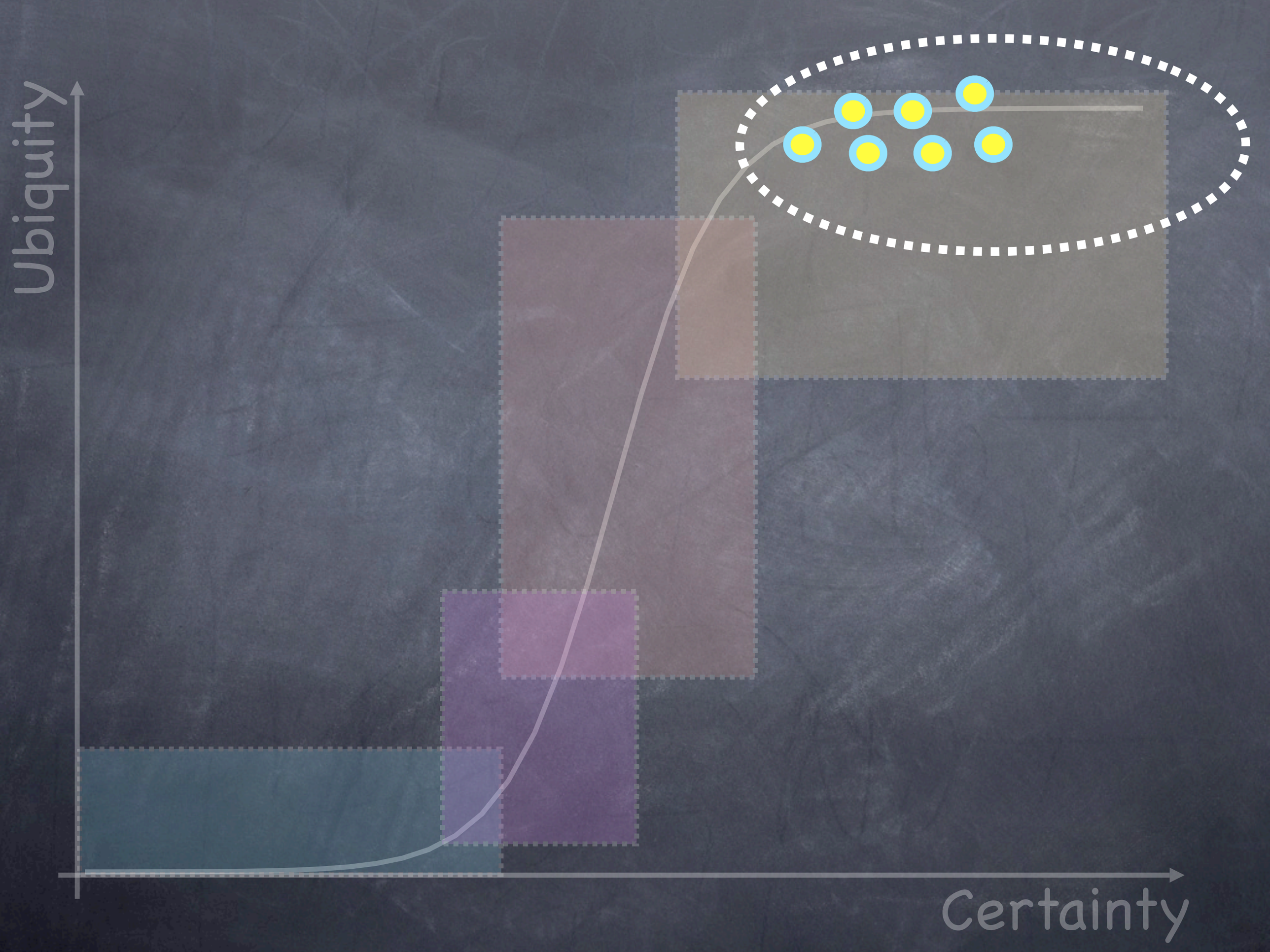
Certainty

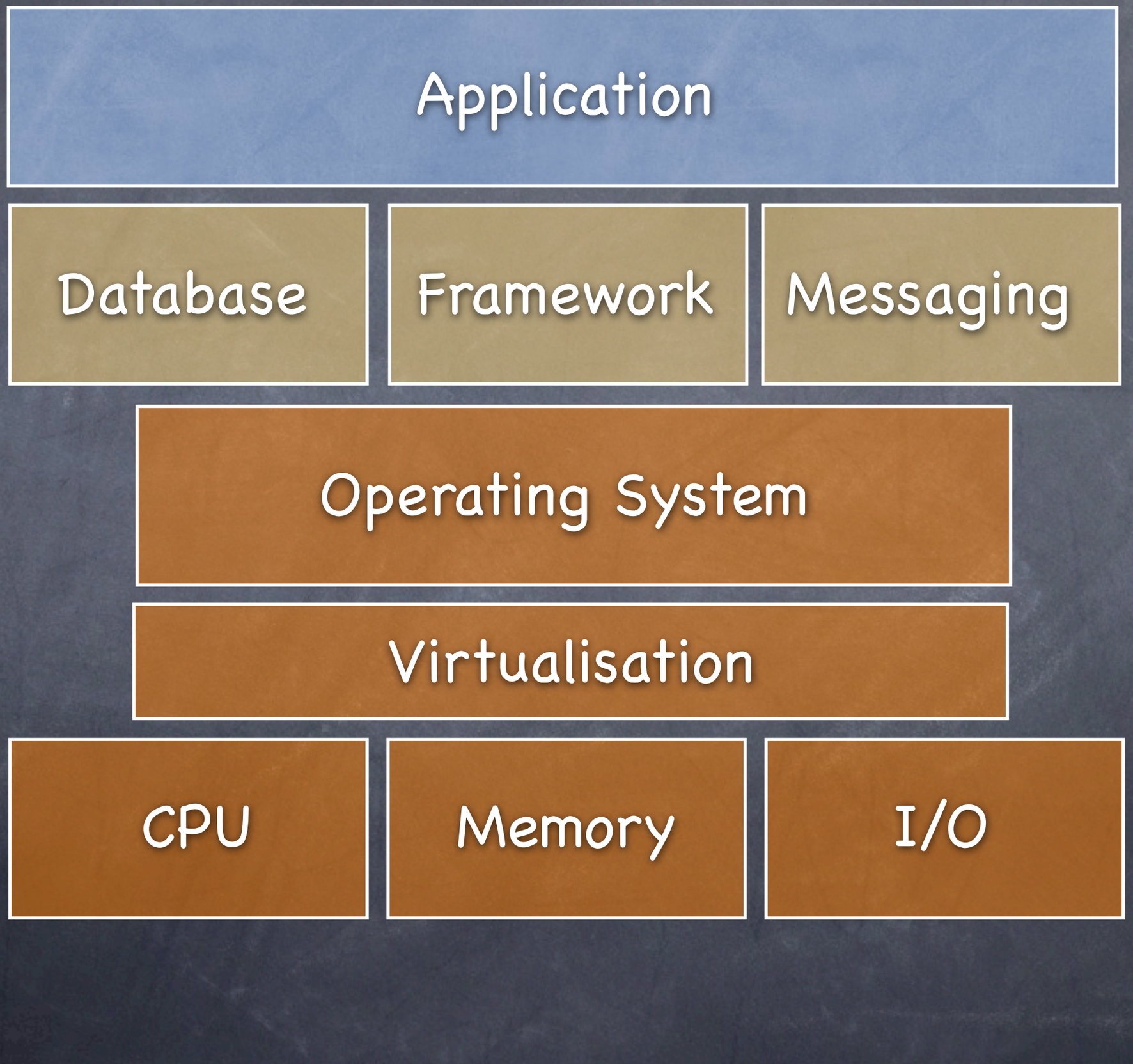
Ubiquity

Widespread
(Demand)

Feature Complete
(Improvement)

Certainty


Ubiquity
Certainty


Application
Database
Framework
Messaging
Operating System
Virtualisation
CPU
Memory
I/O

Application

Framework

Messaging

Operating System

Virtualisation

Memory

I/O

Application

Framework

Messaging

Operating System

Virtualisation

Memory

I/O

Infrastructure

Application

Framework

Messaging

Platform

Operating System

Virtualisation

Memory

I/O

Infrastructure

Application

Framework

Messaging

Operating System

Virtualisation

Memory

I/O

Software

Platform

Infrastructure

Ubiquity

Software

Platform

Infrastructure

… as a **Service**

… as a **Product**

Certainty

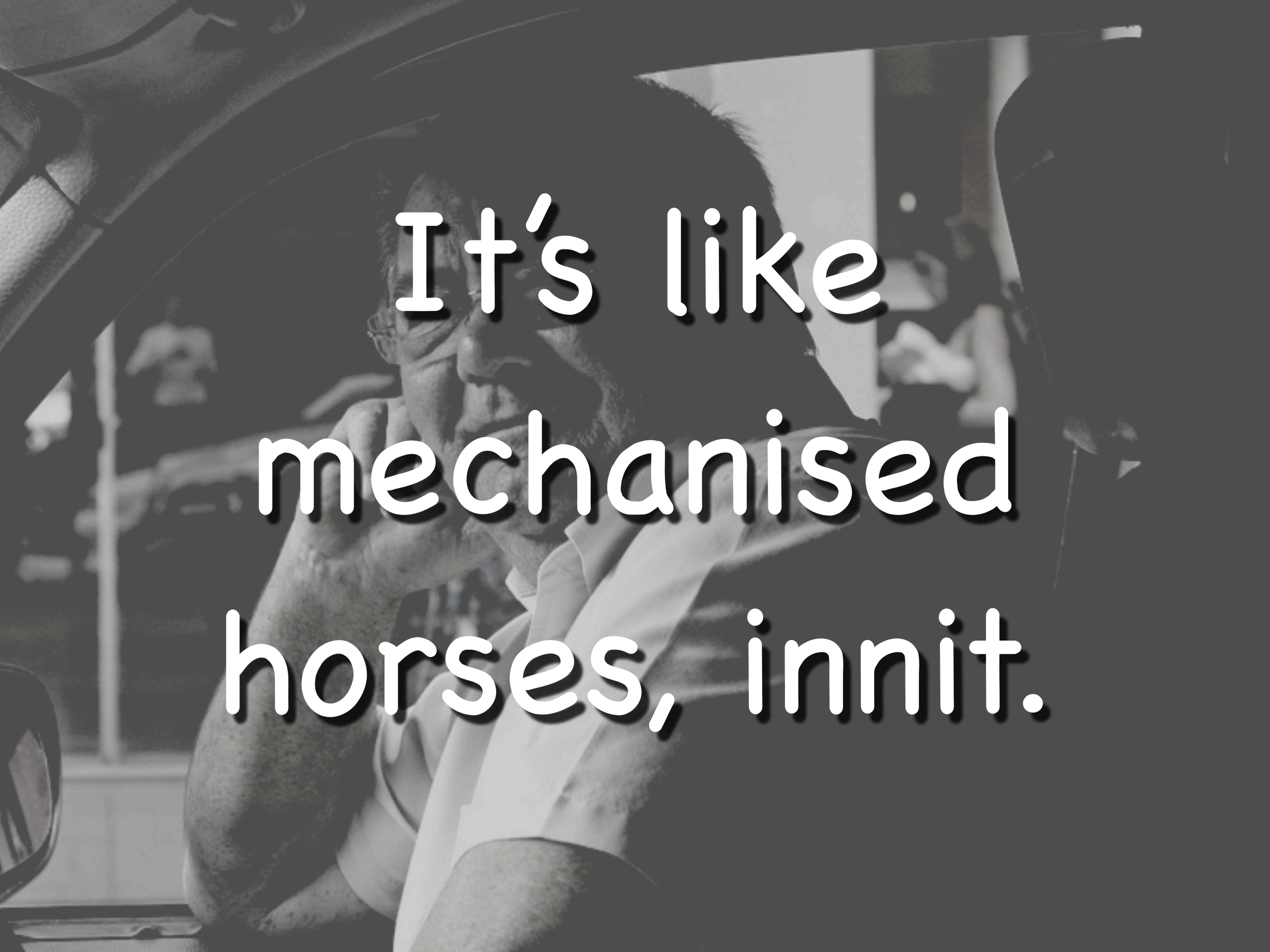
Economics

What is cloud?

Why now?

http://www.flickr.com/photos/matthijs/81735277/

What is Industrial Revolution?


It's like
mechanised
horses, innit.

43 definitions

1. Broad socioeconomic and technological changes starting in the early 18th century.

2. Rapid development of industry in the early 19th century.

No definition

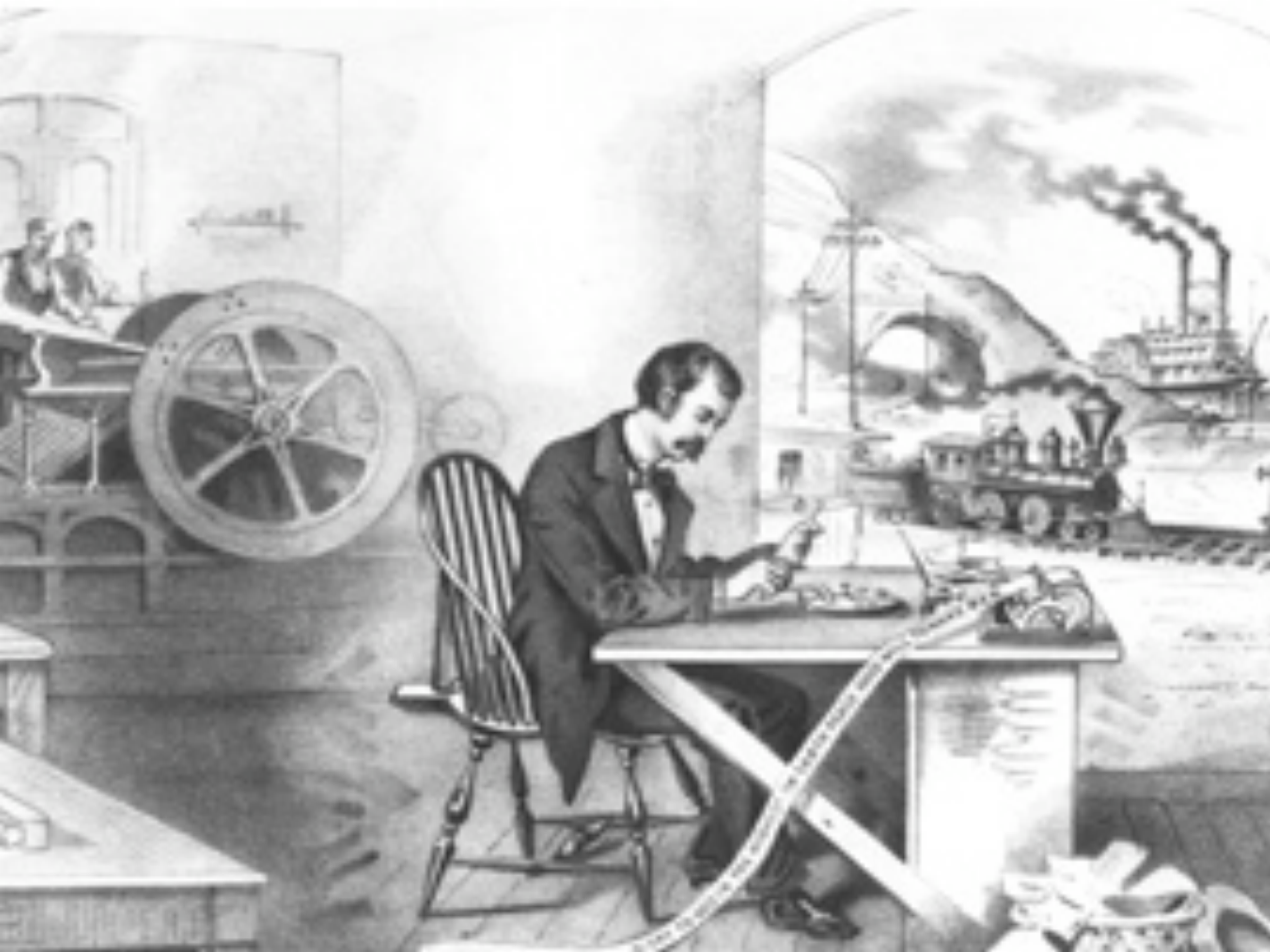
+ 200 years

http://petjunction.blogspot.com/2007/07/adorables.html

Not a thing

Transition

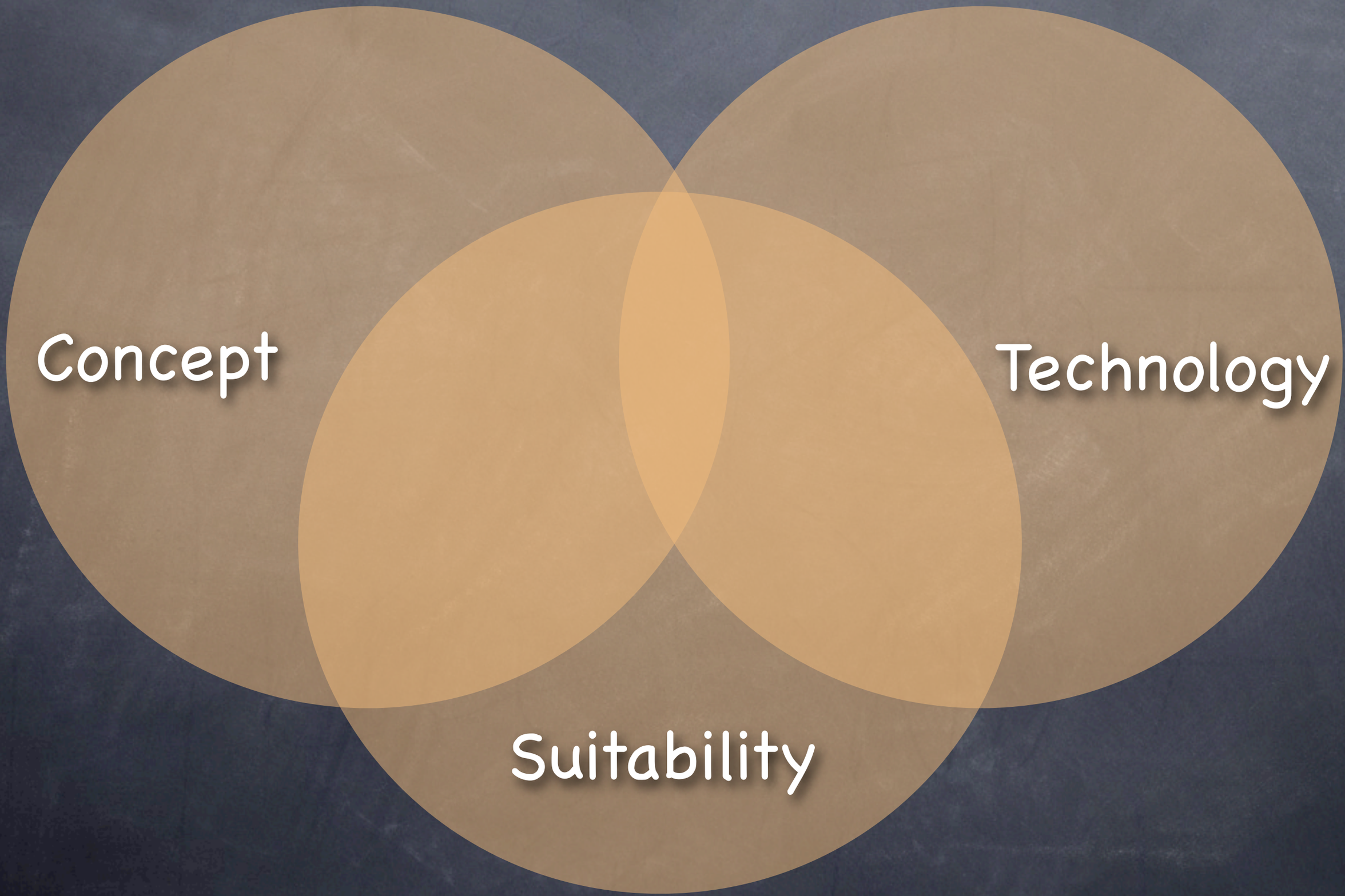
http://www.flickr.com/photos/21734563@N04/2179722280/



Concept

Concept

Suitability


Concept
Technology
Suitability

Attitude

Concept

Technology

Suitability

Attitude

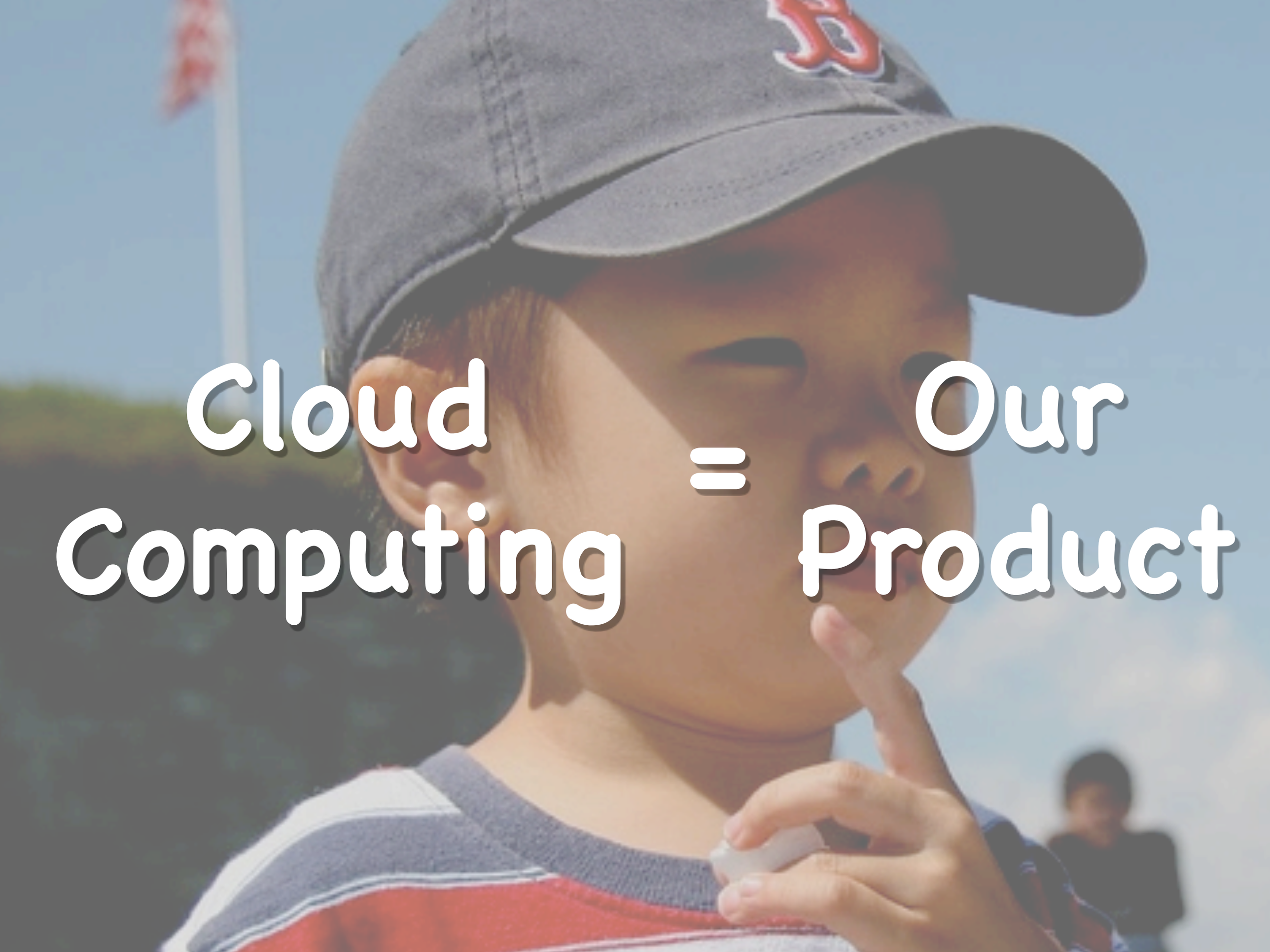
Concept

Technology

Industrial Revolution

Suitability

Industrial Revolution _ Our Product

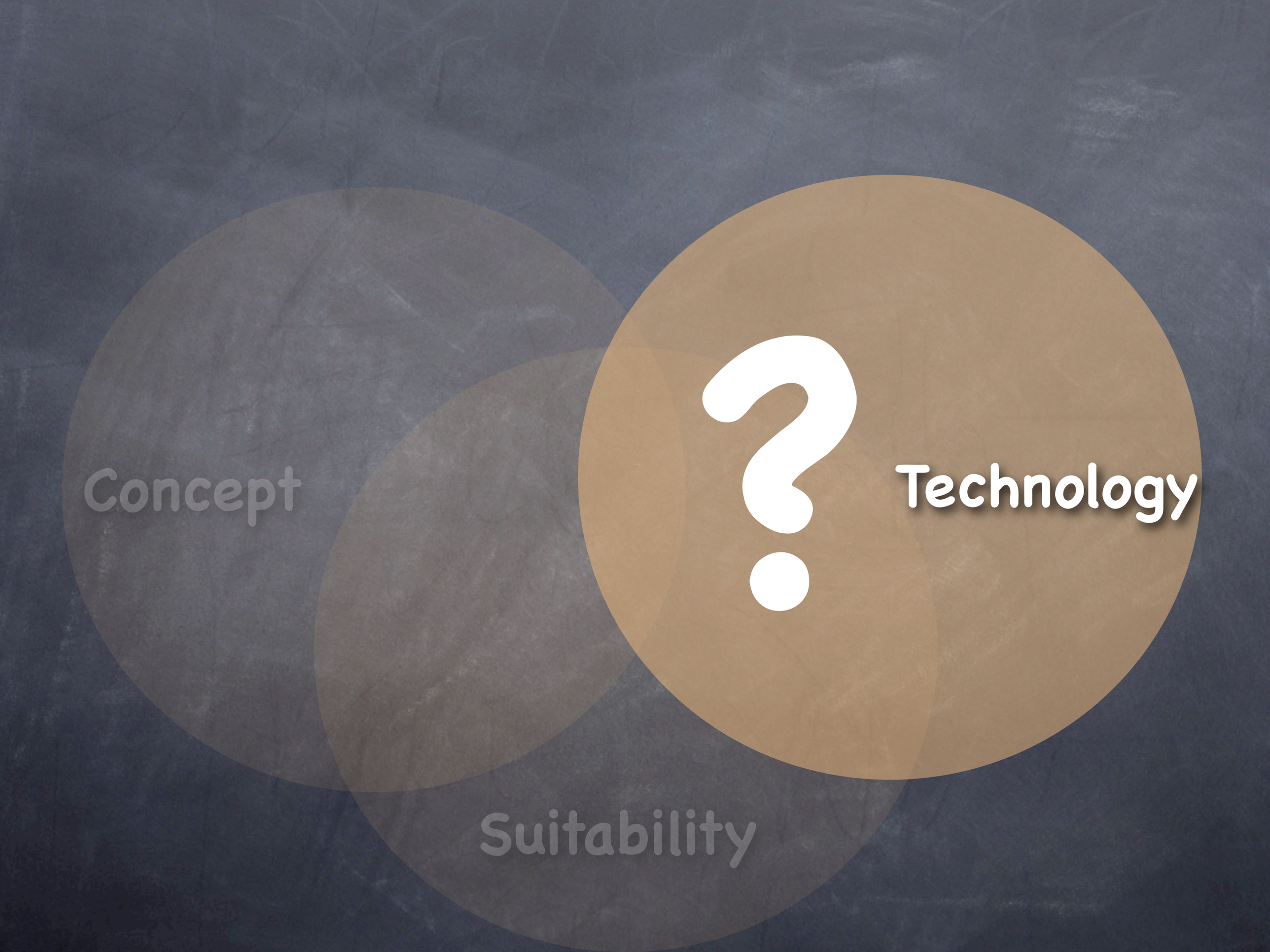

Cloud Computing
Our Product

Cloud Computing

Concept

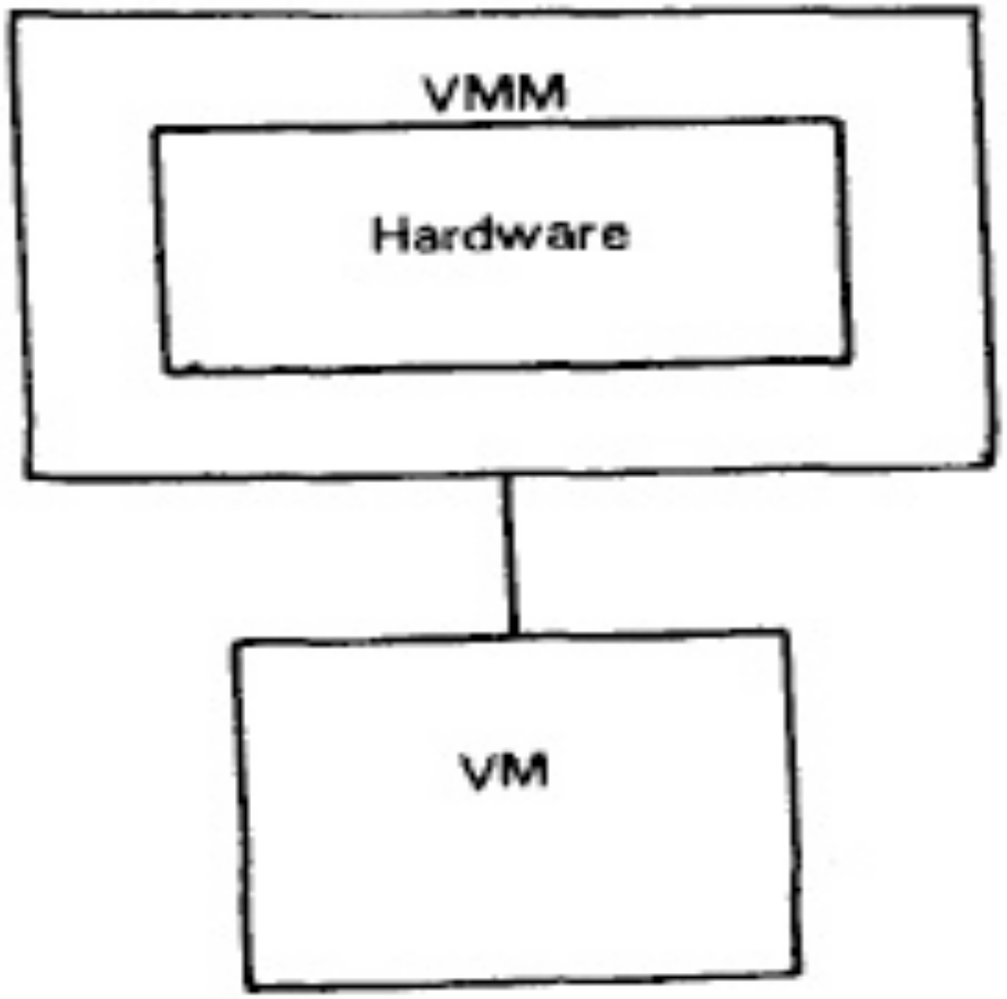
Concept

Suitability


Concept
Technology
Suitability

Gerald J. Popek
(1947-2008)

Fig. 1. The virtual machine monitor.



Attitude

?

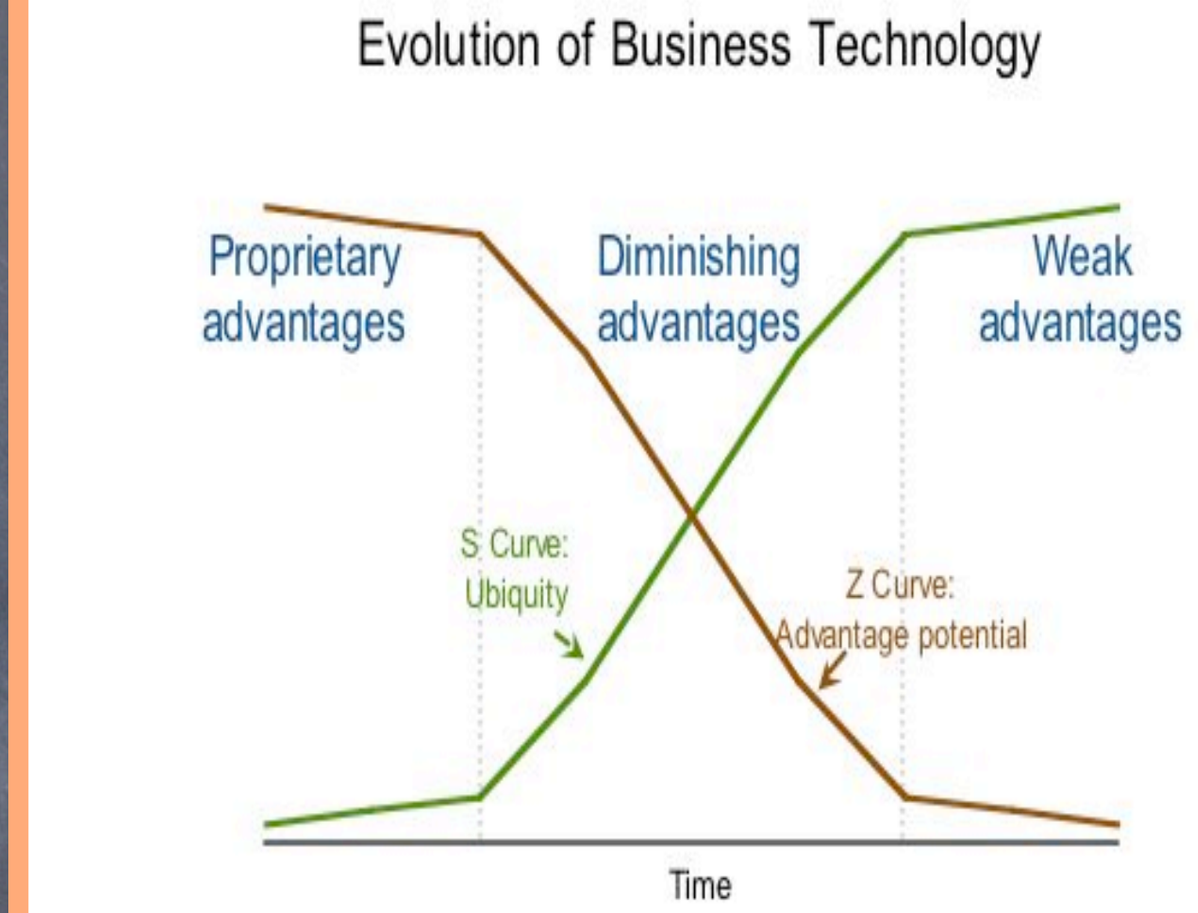
Concept

Technology

Suitability

Paul Strassmann

http://www.strassmann.com/


Evolution of Business Technology
Proprietary advantages
Diminishing advantages
Weak advantages
S Curve: Ubiquity
Z Curve: Advantage potential
Time
Copyright 2004 by Nicholas G. Carr

Nick Carr

Ubiquity

Diminishing
strategic value

Certainty

Ubiquity

Competitive advantage

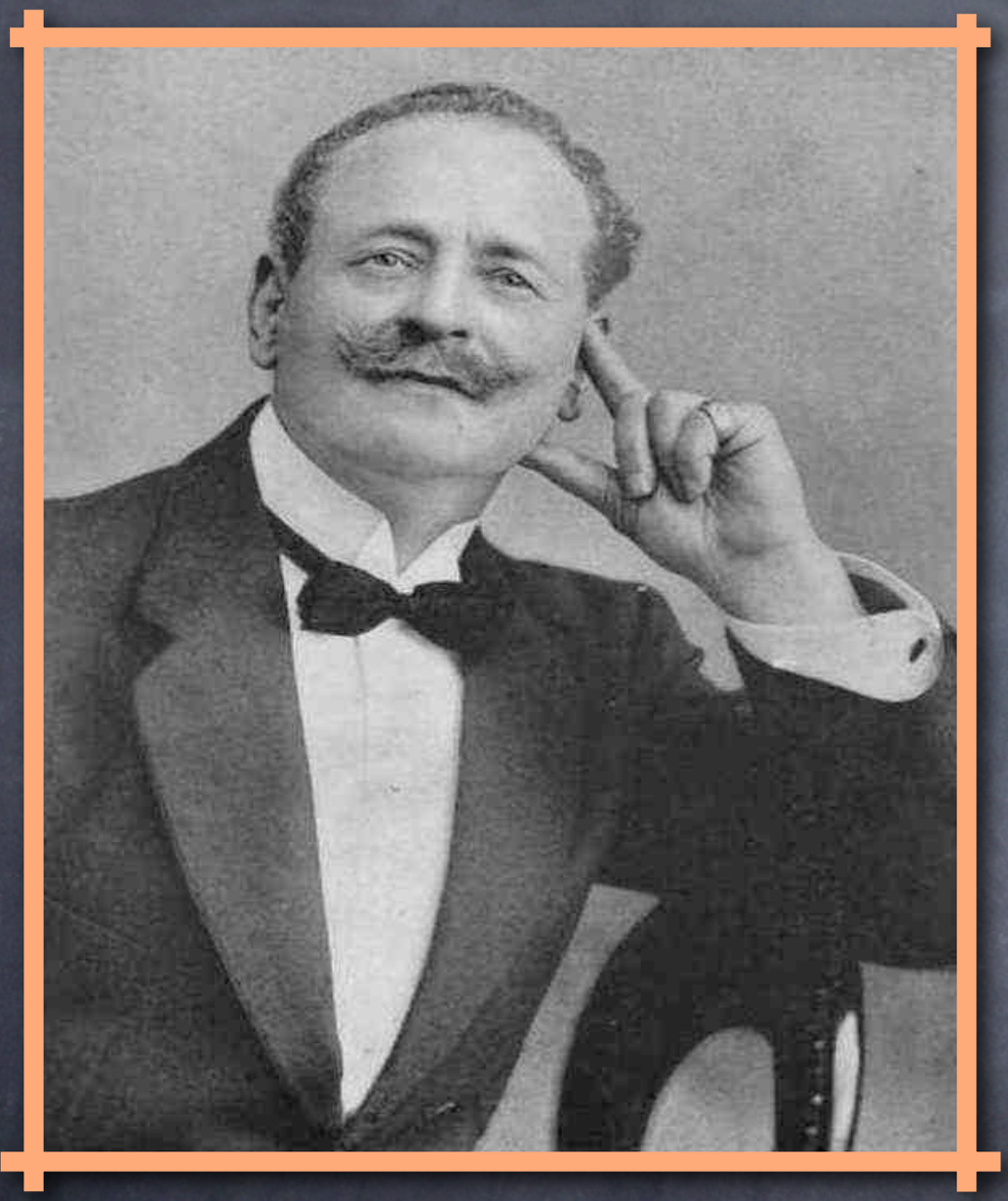
Certainty

Ubiquity

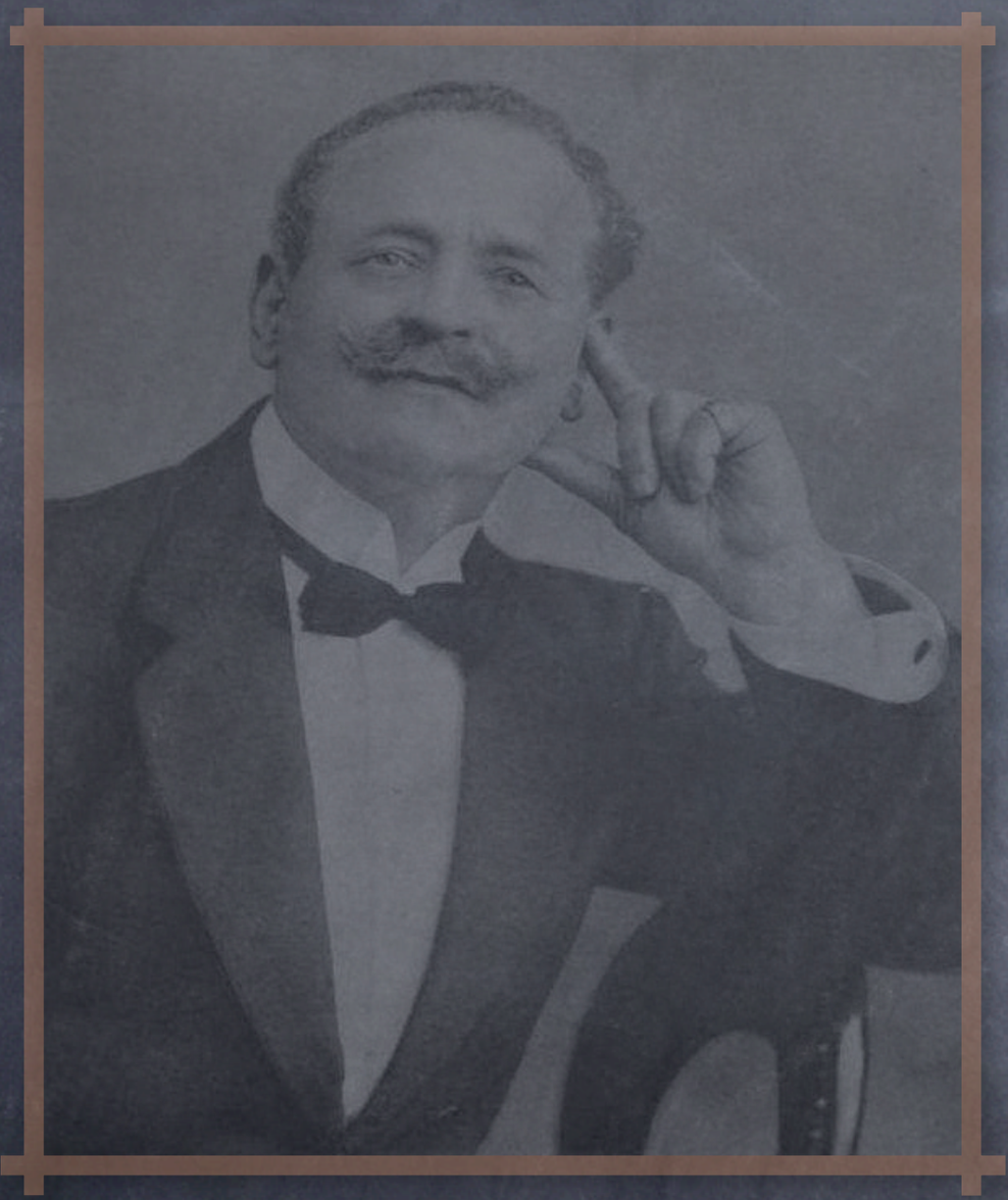
Cost of doing business

Competitive advantage

Certainty



60 CIO & CTO



60 CIO & CTO

No Strategic Value

Payroll

HR Systems

CRM

ERP

Sales Automation

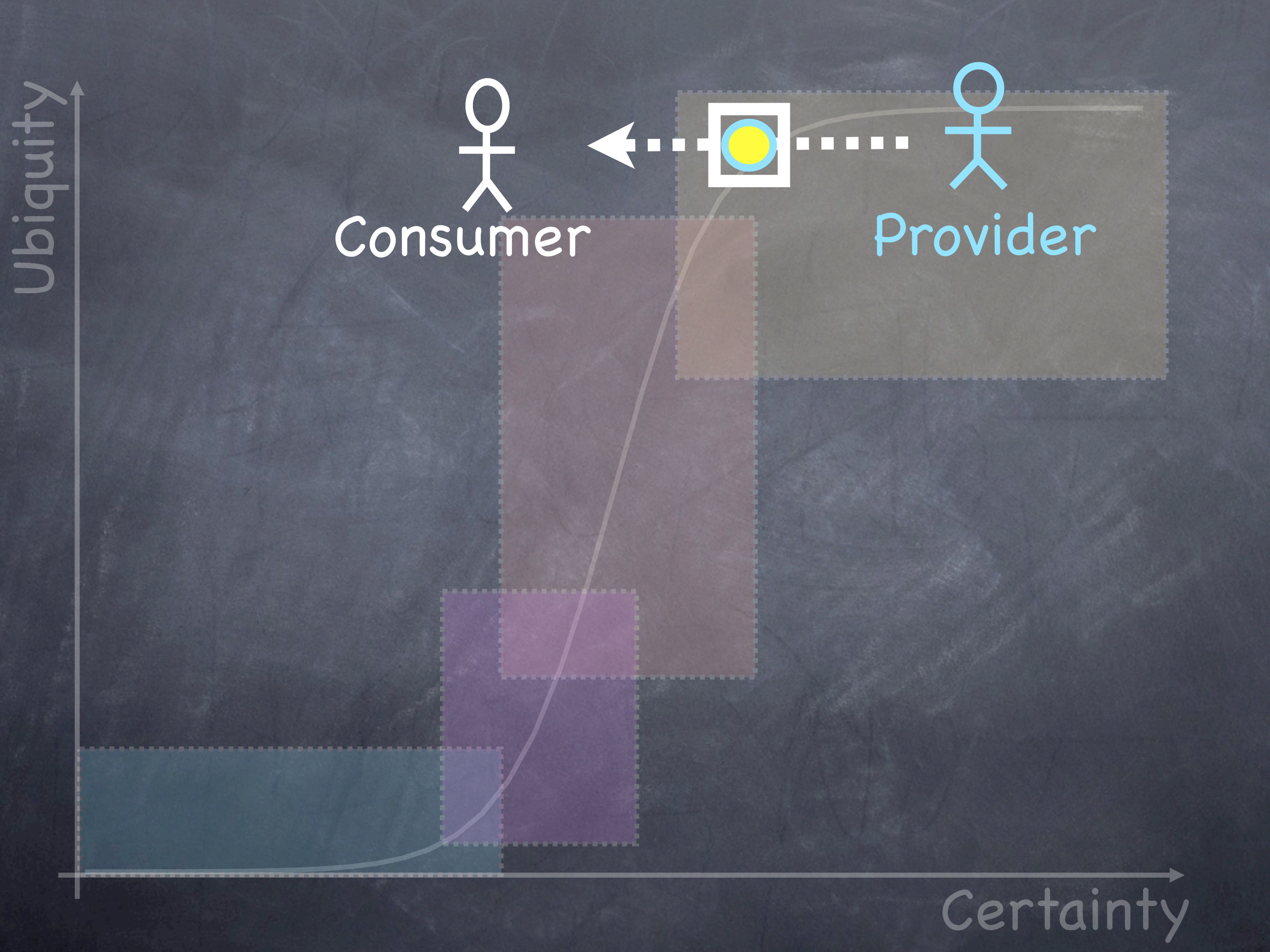
Infrastructure

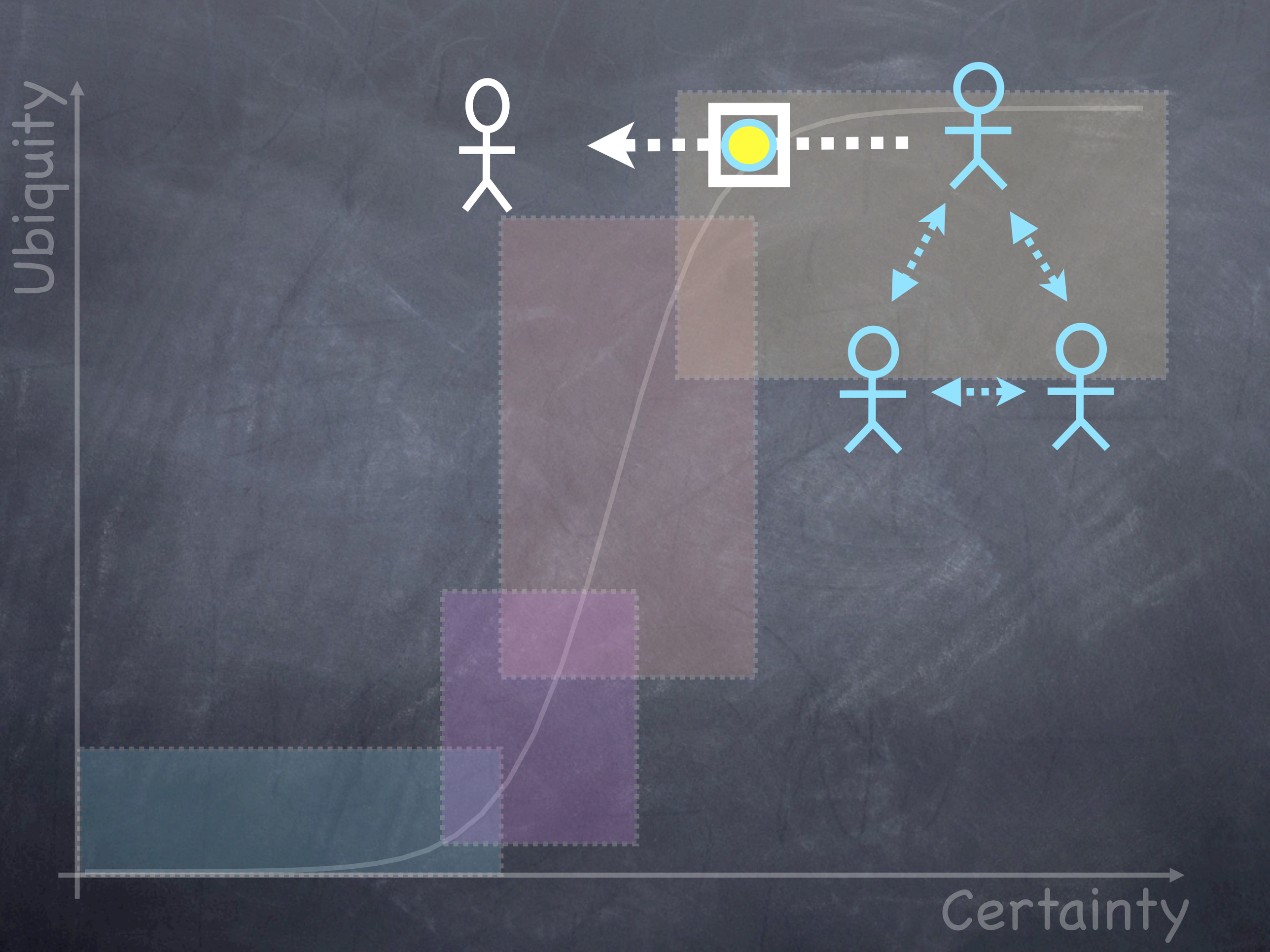
Finance & Accounting

Ubiquity

Cost of doing business

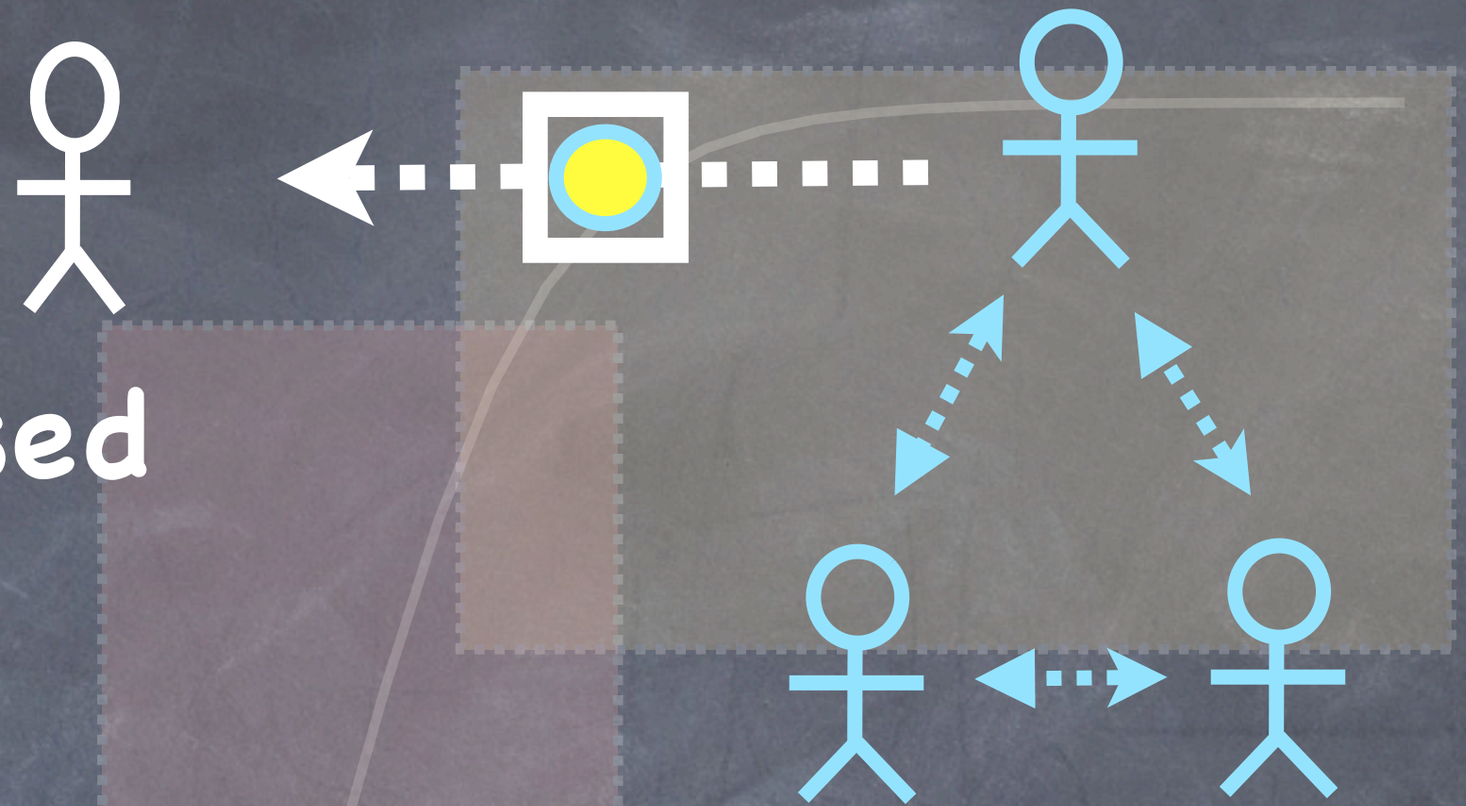
Certainty


Ubiquity
Consumer
Provider
Certainty


Ubiquity
Certainty

Ubiquity

Standardised

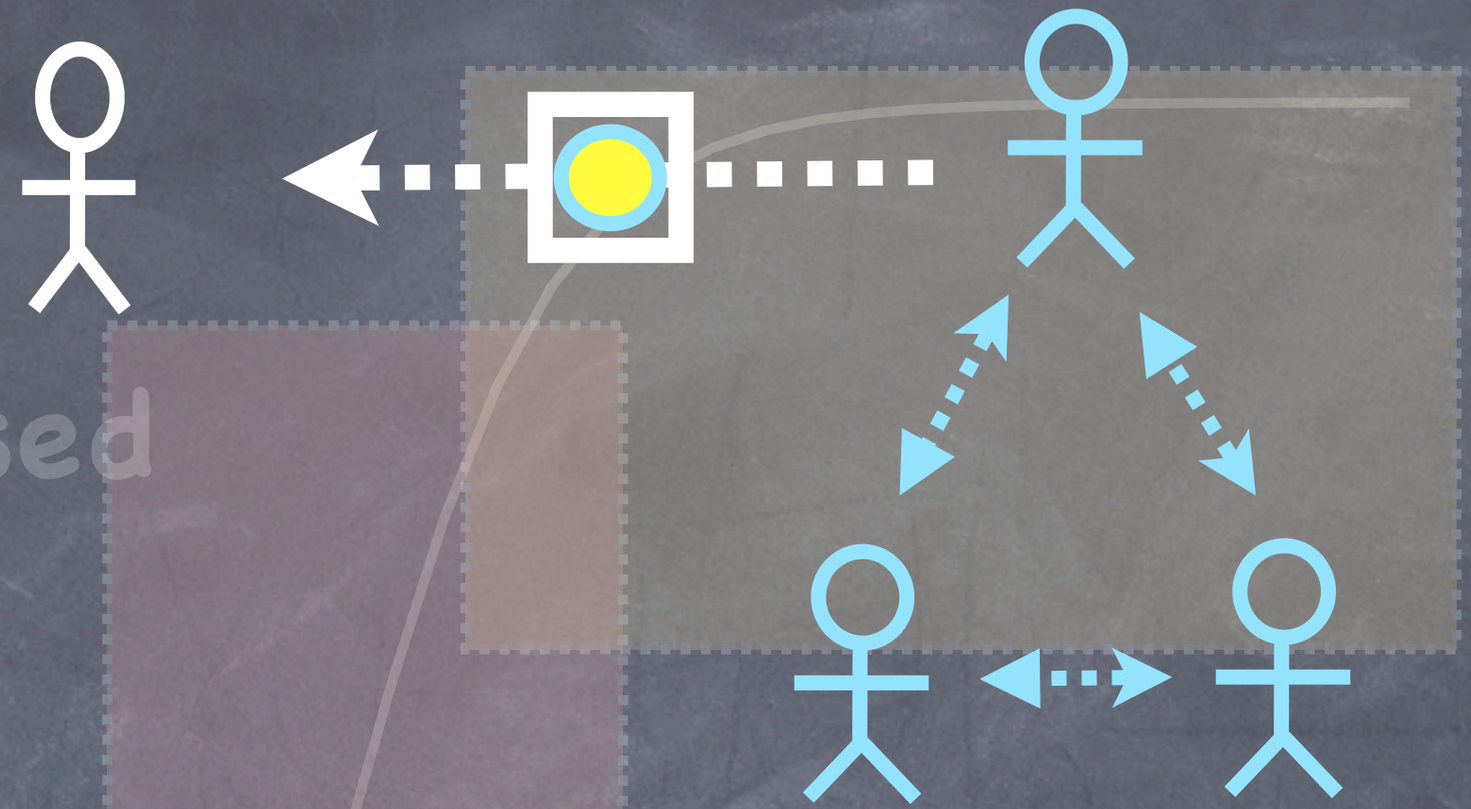


Certainty

Ubiquity

Standardised

Low Cost



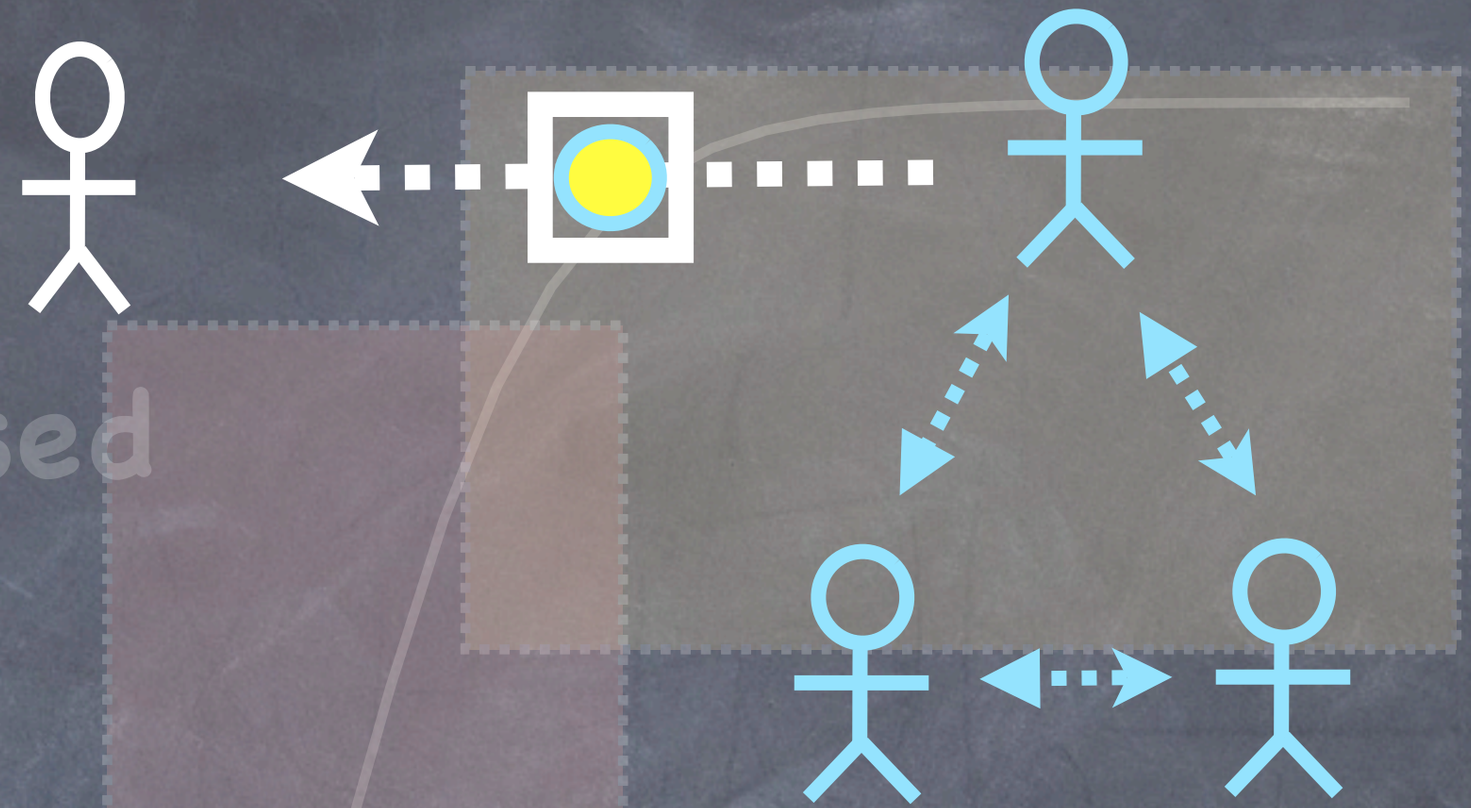
Certainty

Ubiquity

Standardised

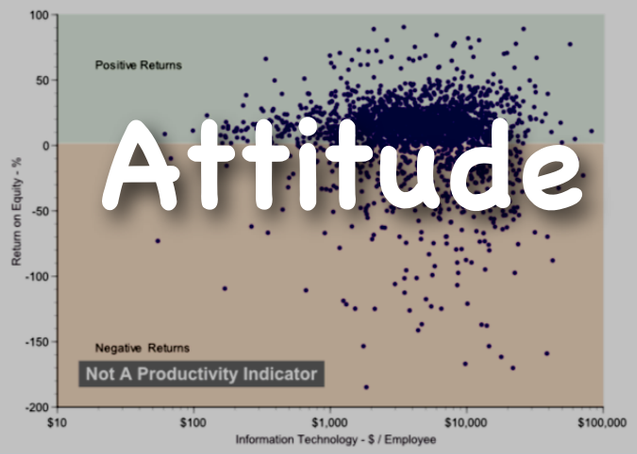
Low Cost

High QoS



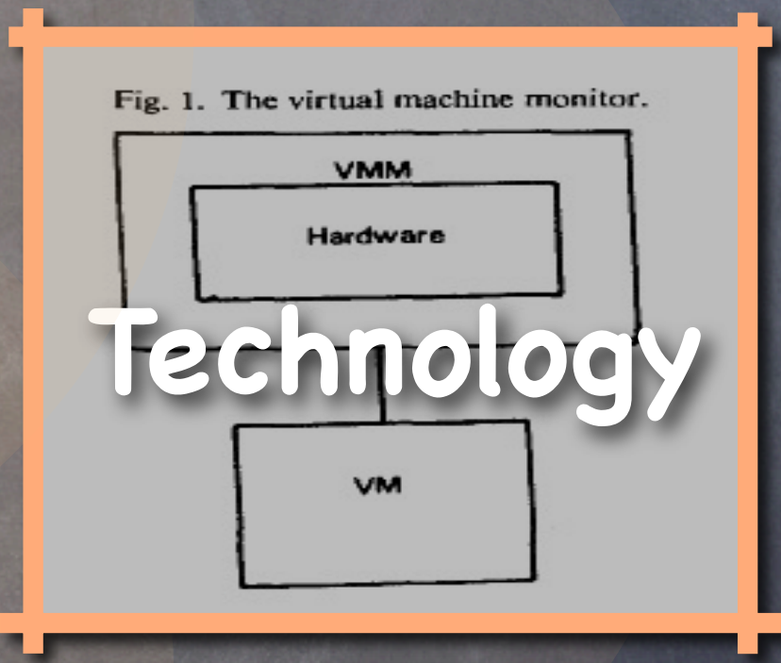
Certainty

http://www.flickr.com/photos/rainbowproject/3928445074/



Attitude

Concept



Technology

Suitability

Ubiquity

Software

Platform

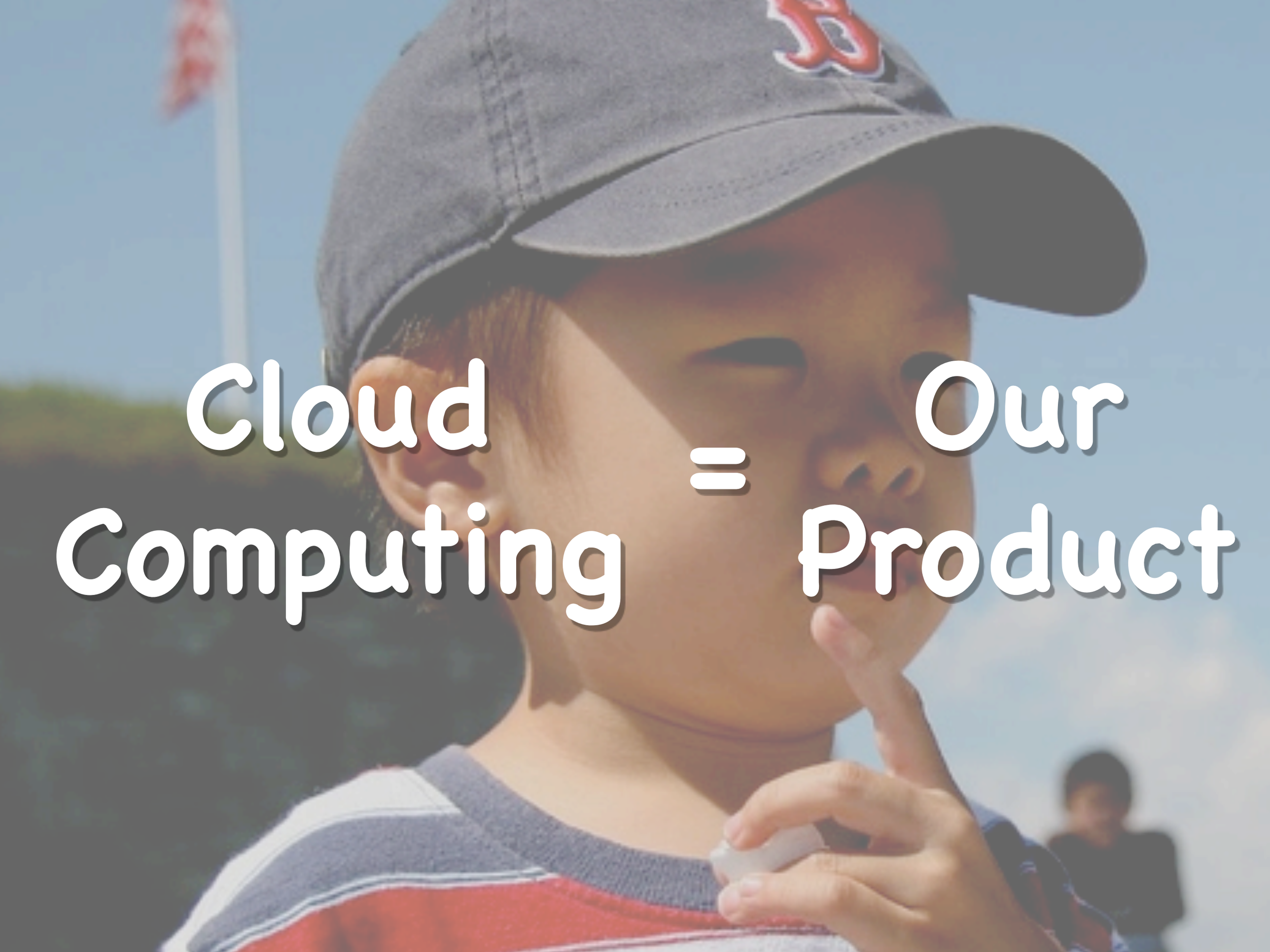
Infrastructure

… as a **Service**

… as a **Product**

Certainty

Recap


Cloud Computing
Our Product

Ubiquity

Software

Platform

Infrastructure

… as a **Service**

… as a **Product**

Certainty

Ubiquity

Utility Services

Commodity

Product

Custom built

Innovation

Certainty

Ubiquity

Demand
(user competition)

Improvement
(supply competition)

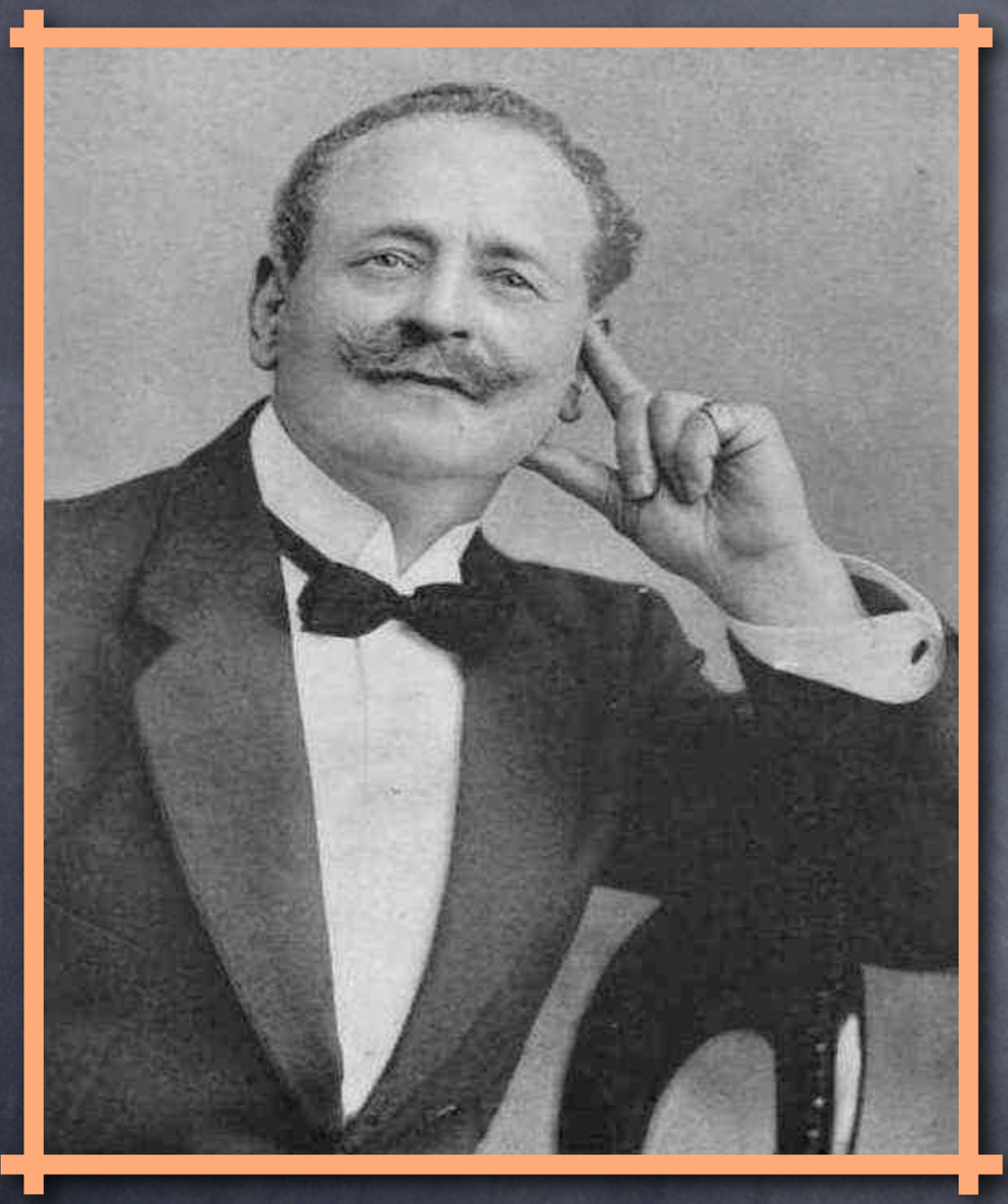
Certainty

Ubiquity

Cost of doing business

Competitive advantage

Certainty



60 CIO & CTO

No Strategic Value

Payroll

HR Systems

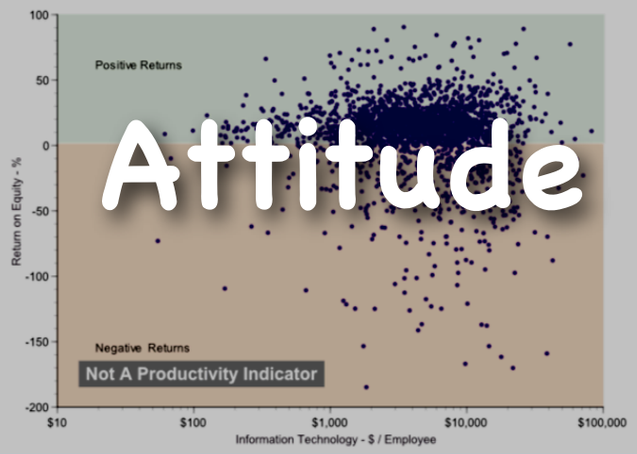
CRM

ERP

Sales Automation

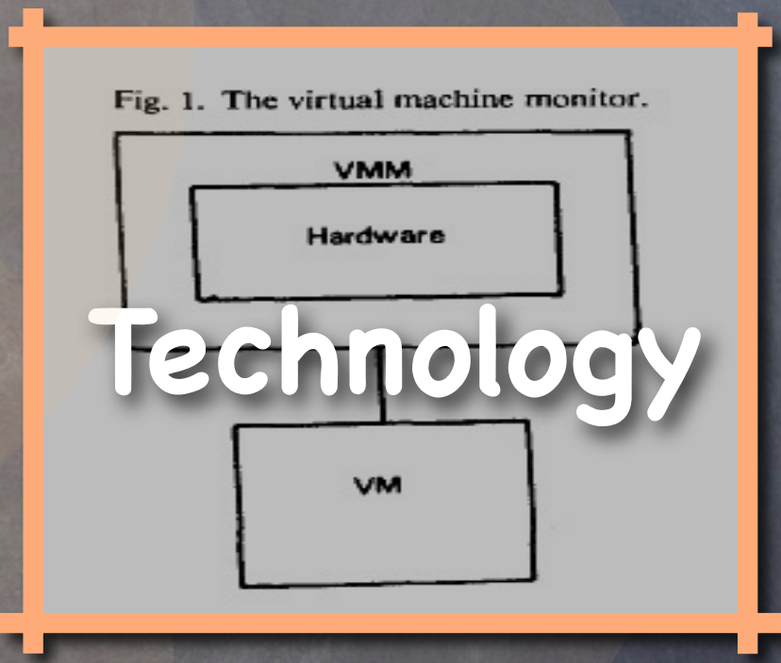
Infrastructure

Finance & Accounting



Attitude

Concept



Technology

Suitability

Cloud Computing

Economics

What is cloud?

Why now?

Benefits & Risks

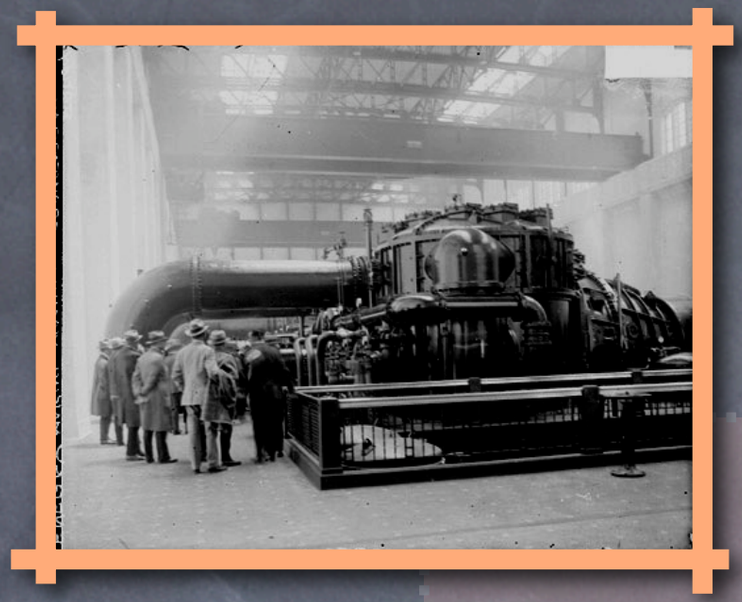
Economics

What is cloud?

Why now?

Benefits & Risks

Ubiquity



Early **Utility**
Westinghouse,
1890s

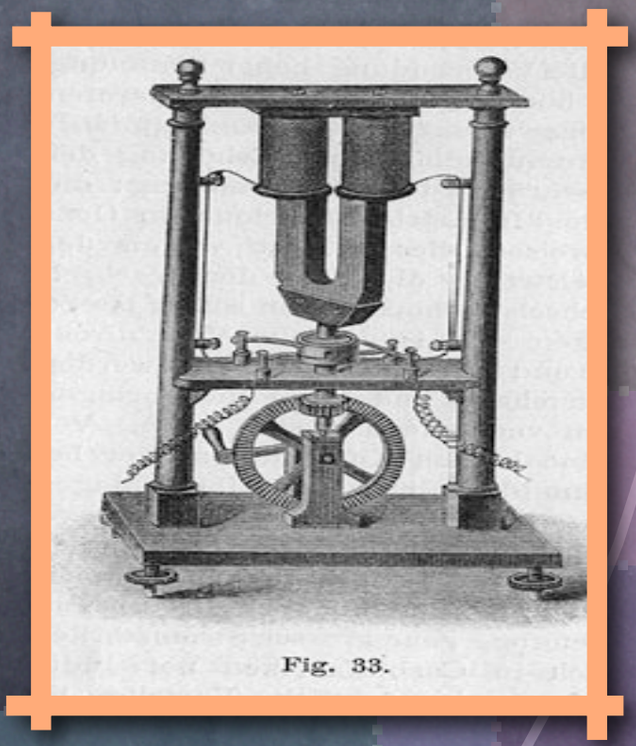


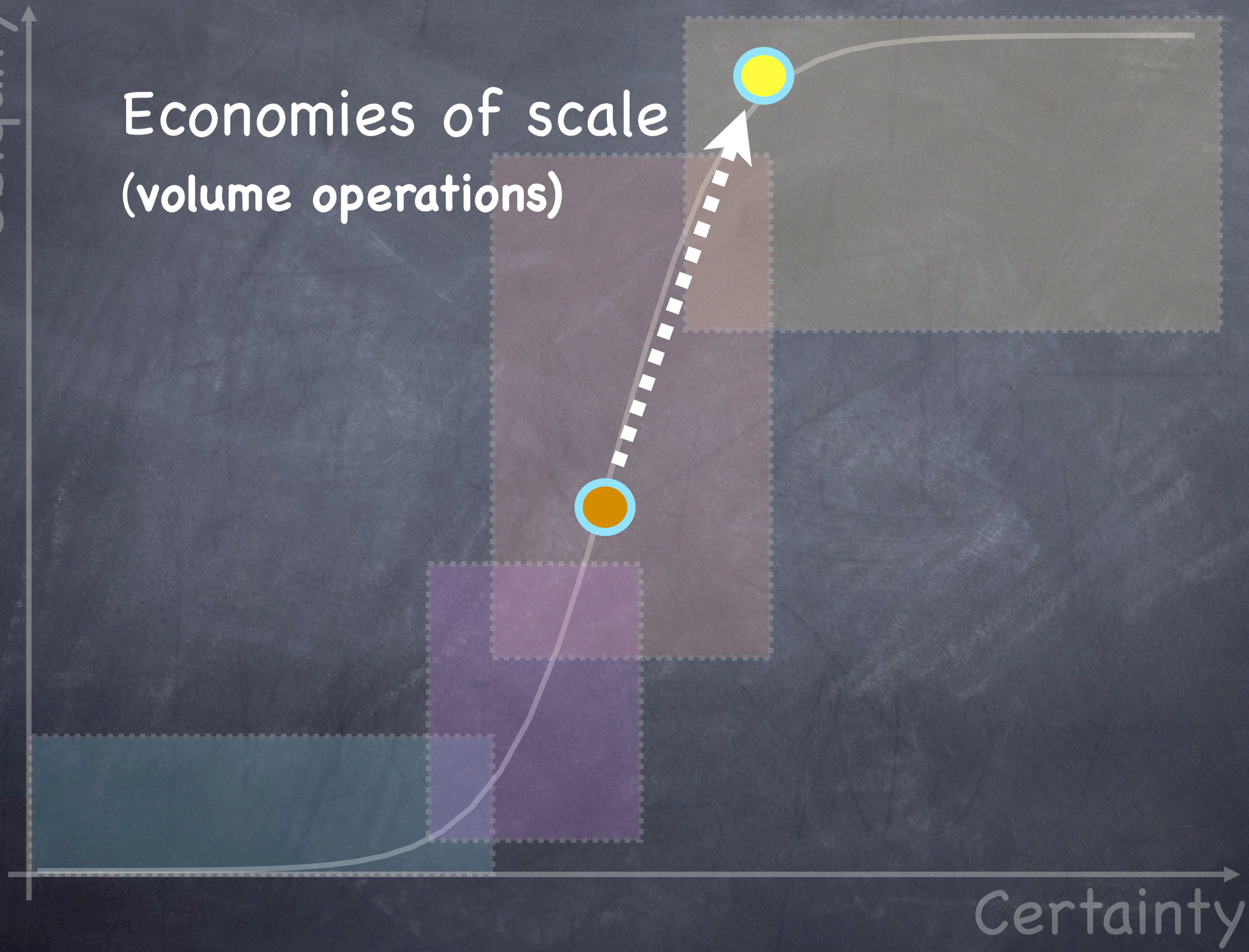
Fig. 33.

Product
Hippolyte Pixii,
1830s

Certainty

Economies of scale

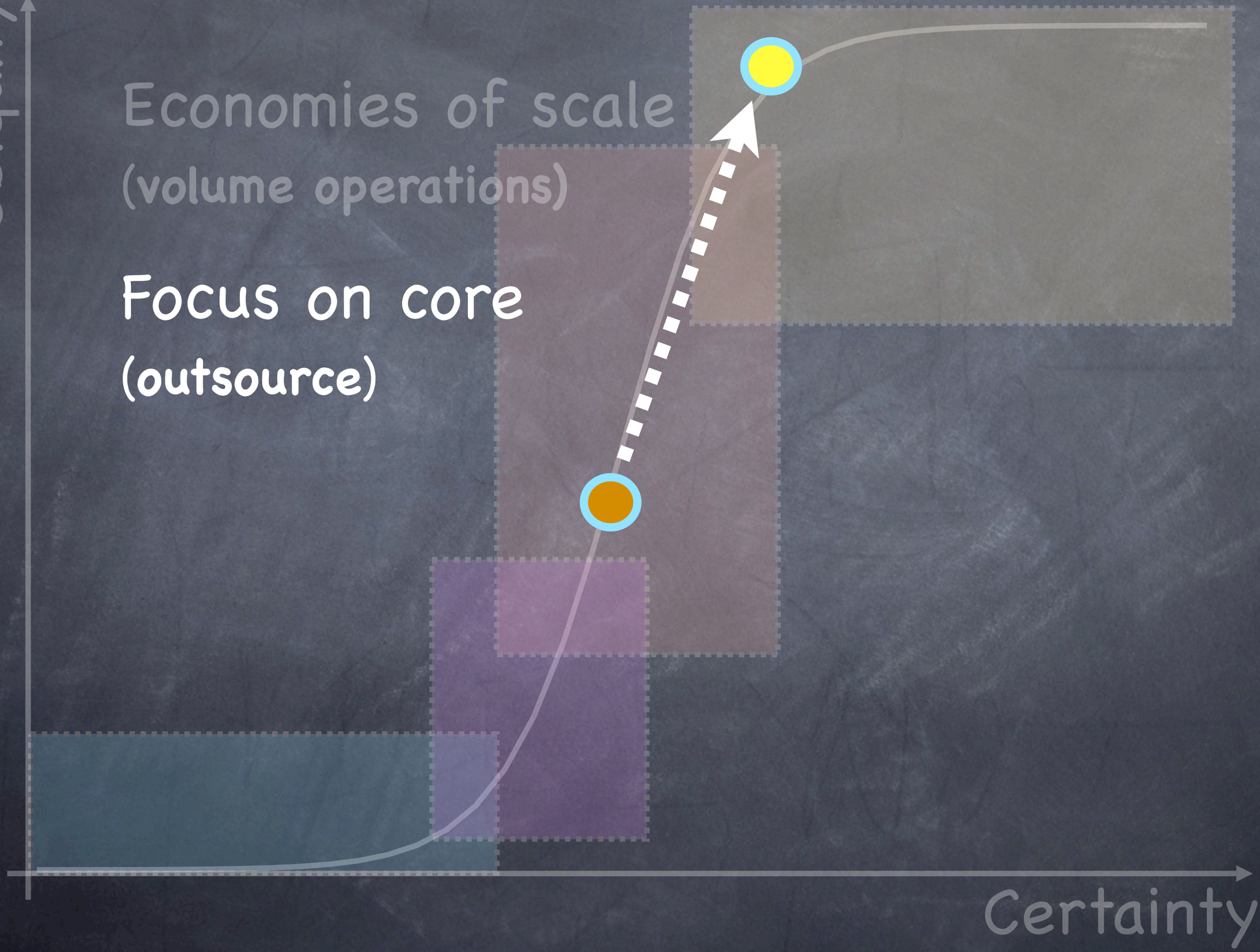
(volume operations)



Ubiquity

Economies of scale
(volume operations)

Focus on core
(outsource)



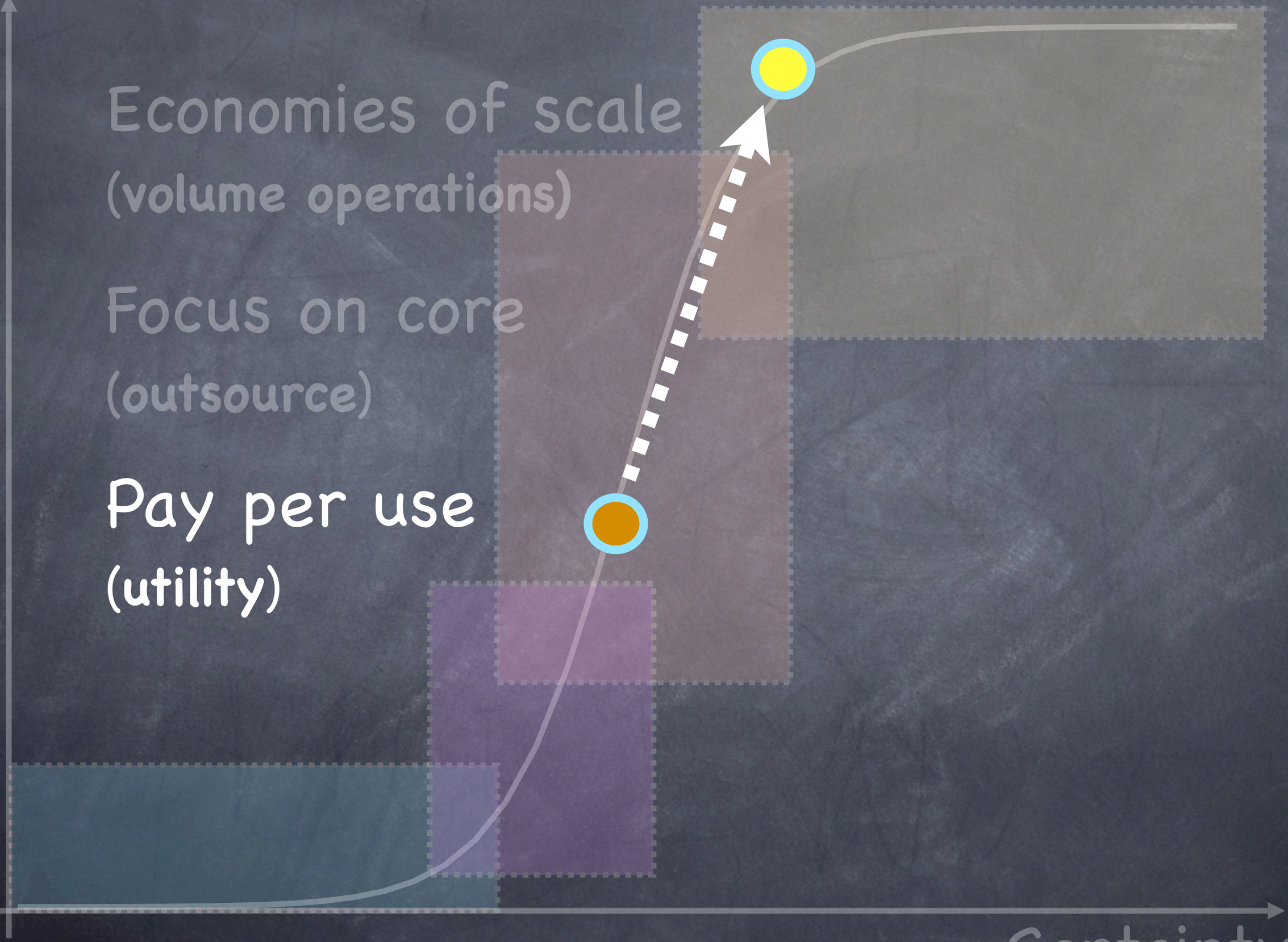
Certainty

Ubiquity

Economies of scale
(volume operations)

Focus on core
(outsource)

Pay per use
(utility)



Certainty

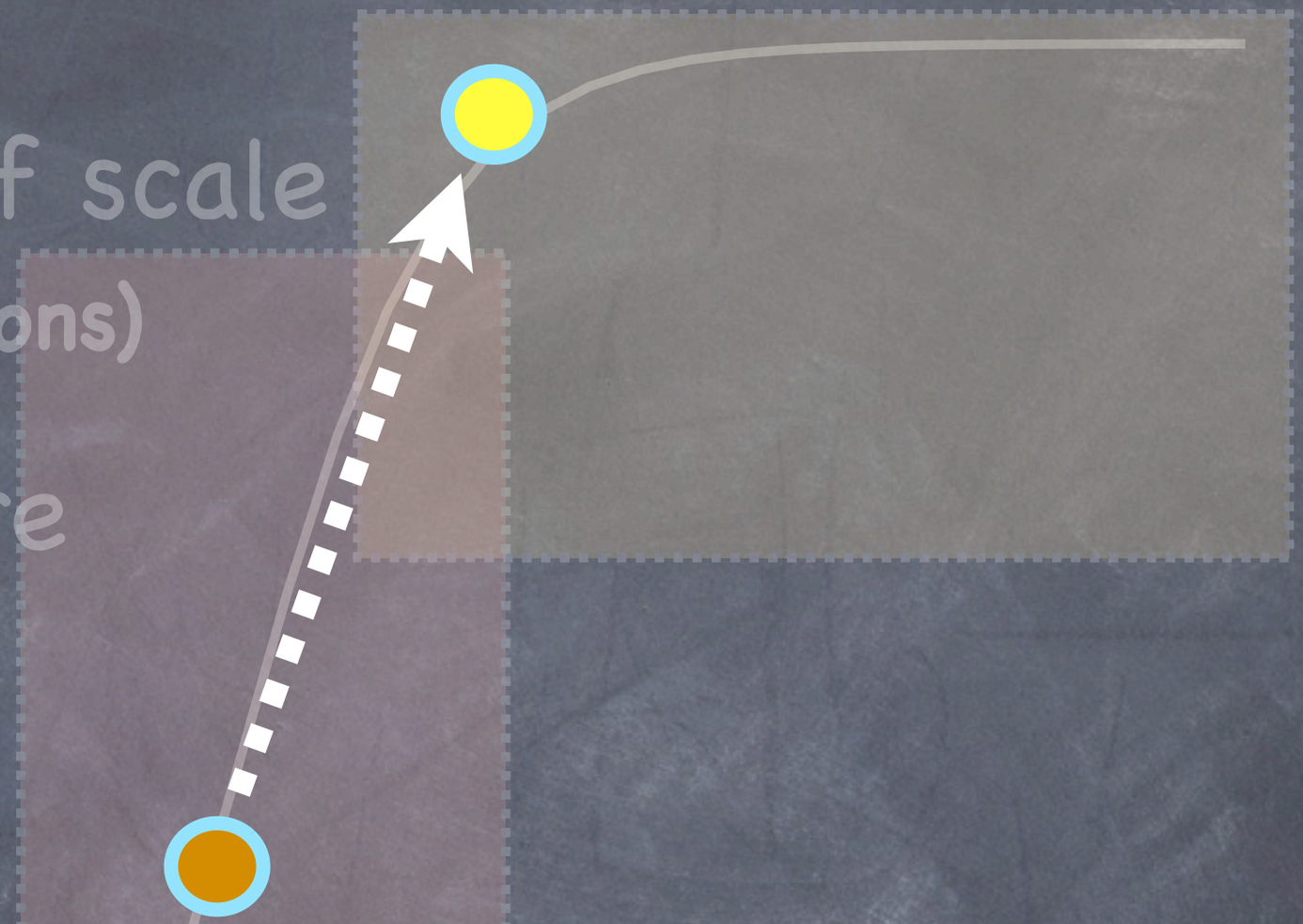
Ubiquity

Economies of scale
(volume operations)

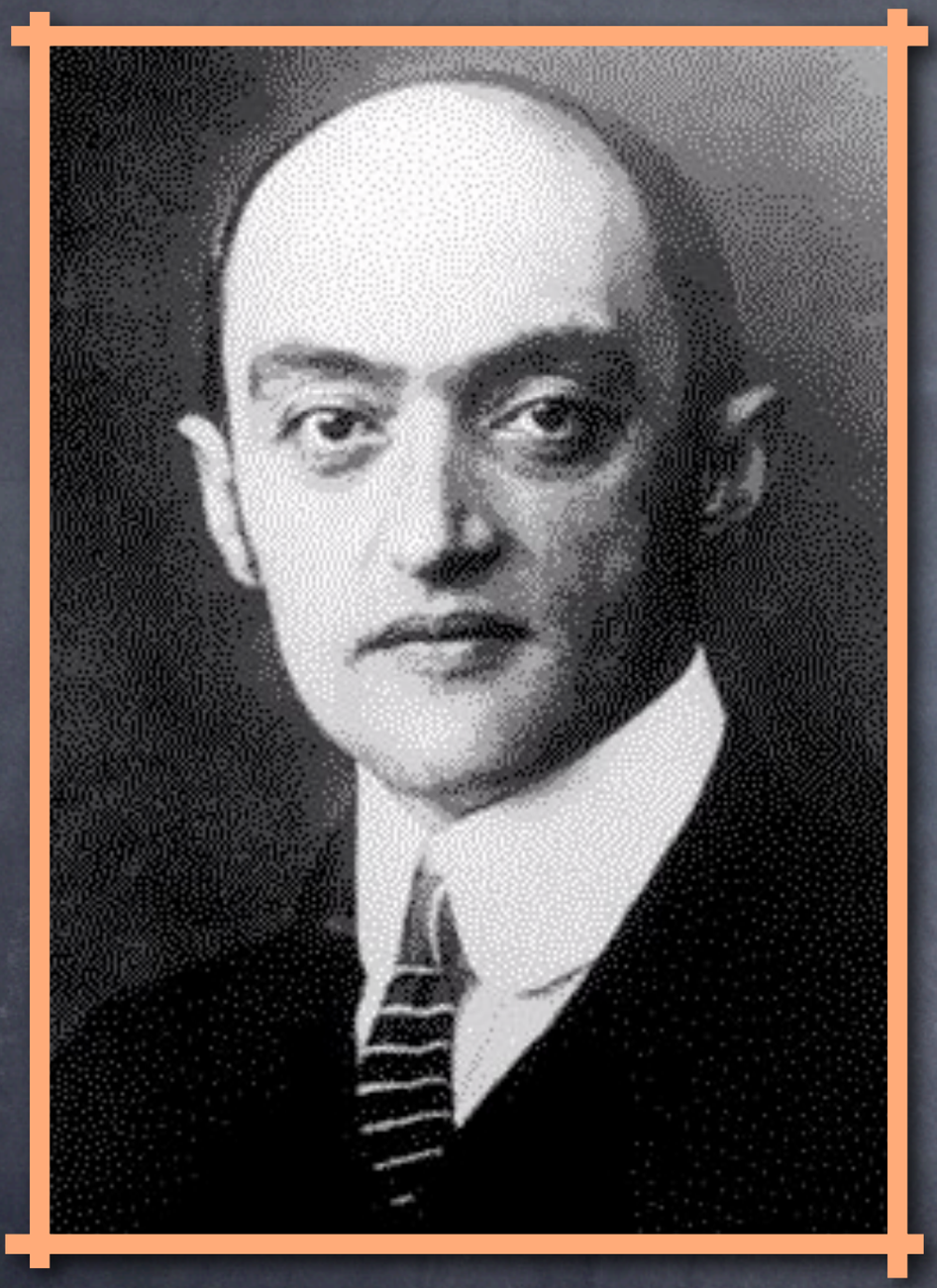
Focus on core
(outsource)

Pay per use
(utility)

Speed
(componentisation)

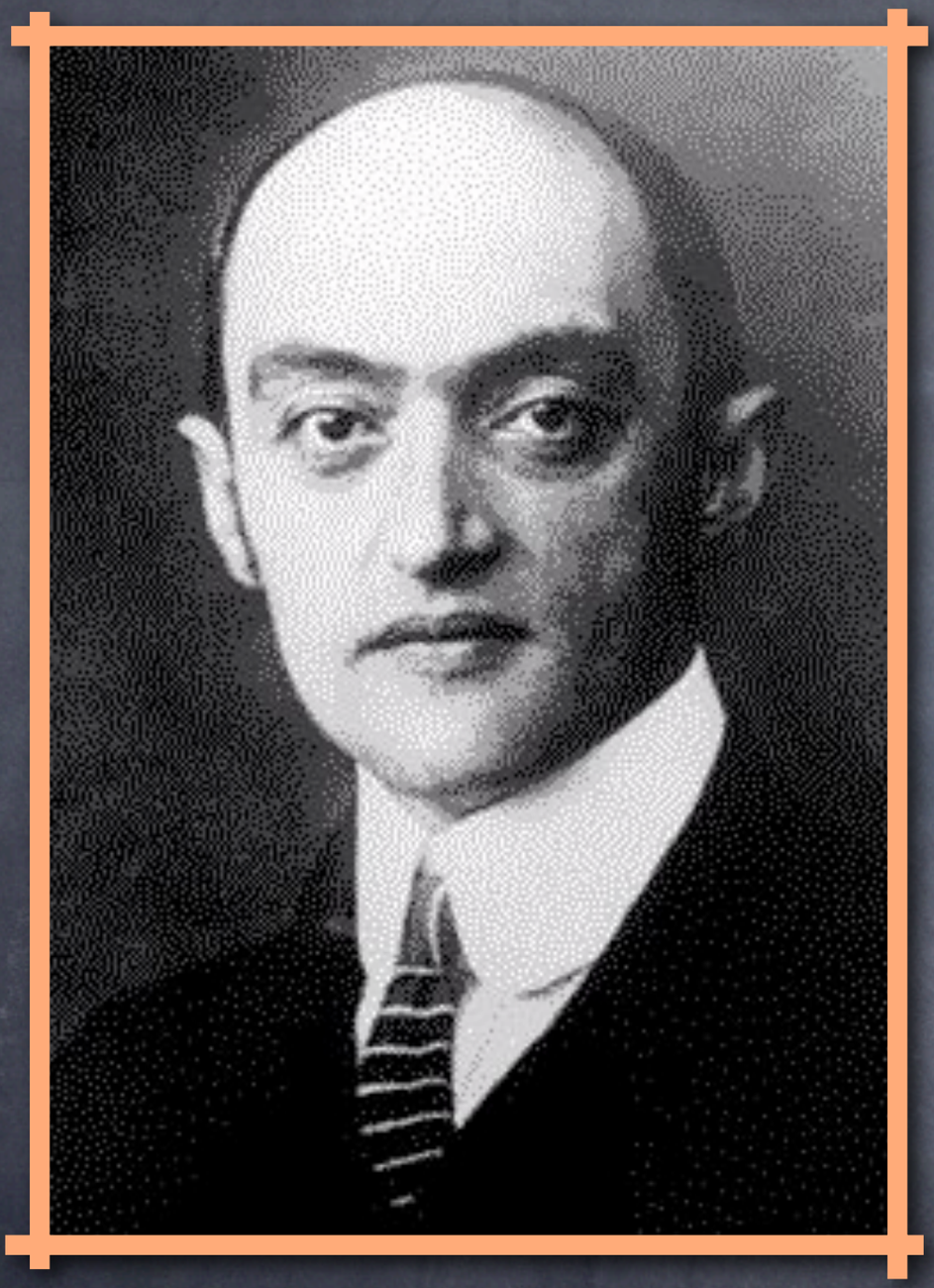


Certainty



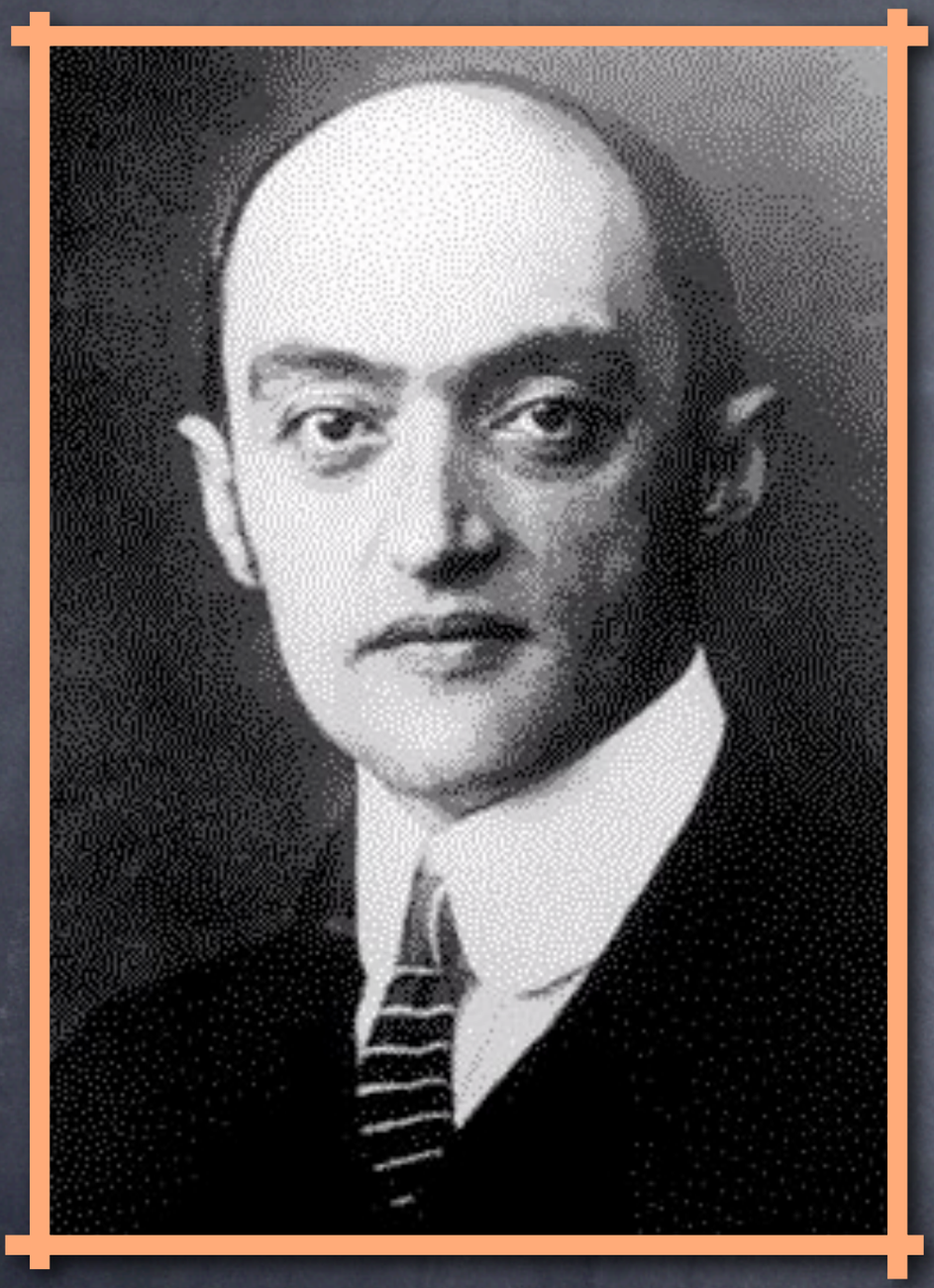
Joseph A. Schumpeter
(1883 - 1950)

The fundamental impulse that sets and keeps the capitalist engine in motion comes from the new consumers, goods, the new methods of production or transportation, the new markets, the new forms of industrial organization that capitalist enterprise creates.



Joseph A. Schumpeter
(1883 - 1950)

The fundamental impulse that sets and keeps the capitalist engine in motion comes from the **new** consumers, goods, the **new** methods of production or transportation, the **new** markets, the **new** forms of industrial organization that capitalist enterprise creates.



Joseph A. Schumpeter
(1883 - 1950)

Creative Destruction

Ubiquity

Eroding Value

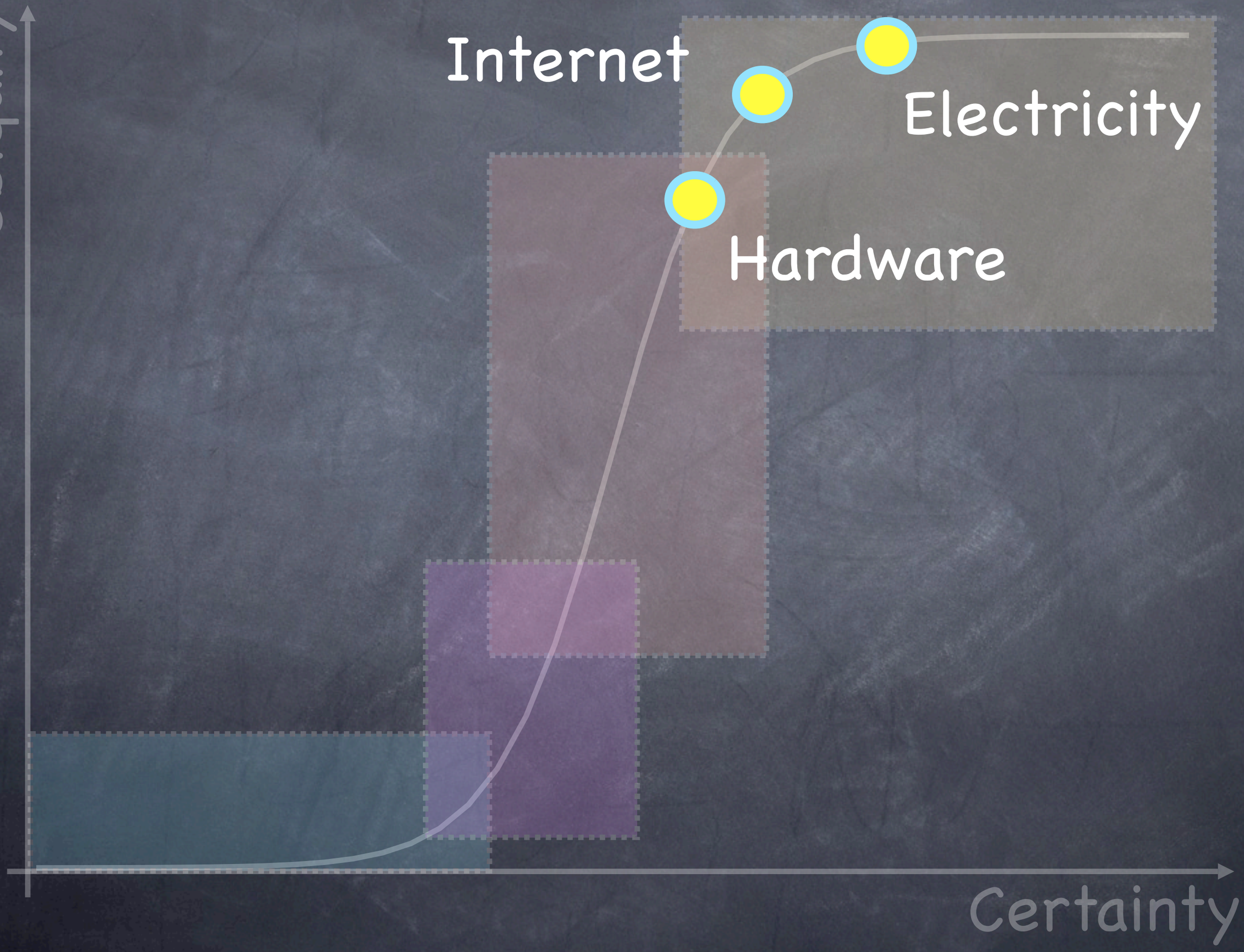
Certainty

Ubiquity

Eroding Value

Enables
Innovation

Certainty


Ubiquity
Internet
Electricity
Hardware
Certainty

Ubiquity

Internet

Electricity

Hardware

Enables
Innovation

Search

Certainty

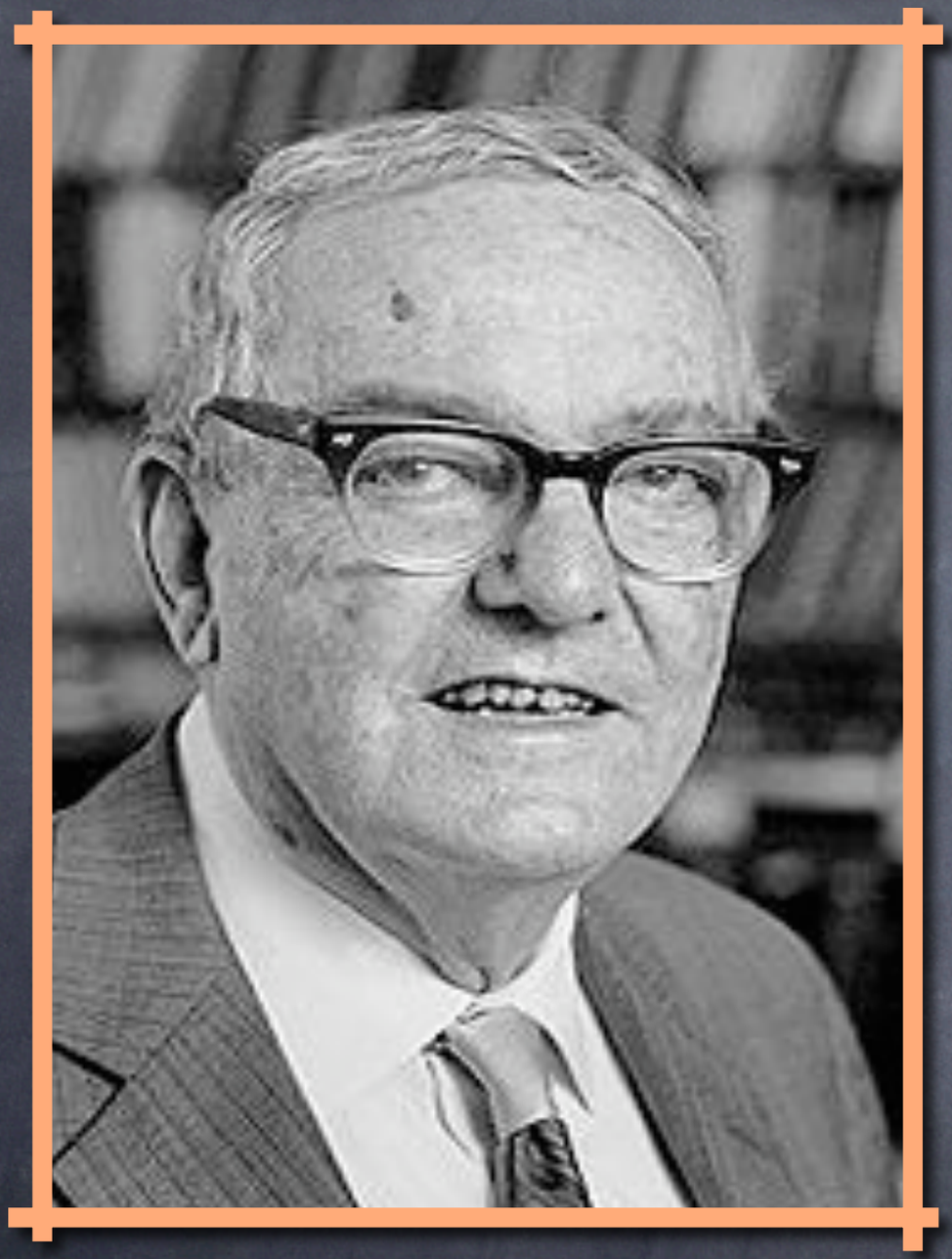
Ubiquity

Commoditisation

Accelerates

Innovation

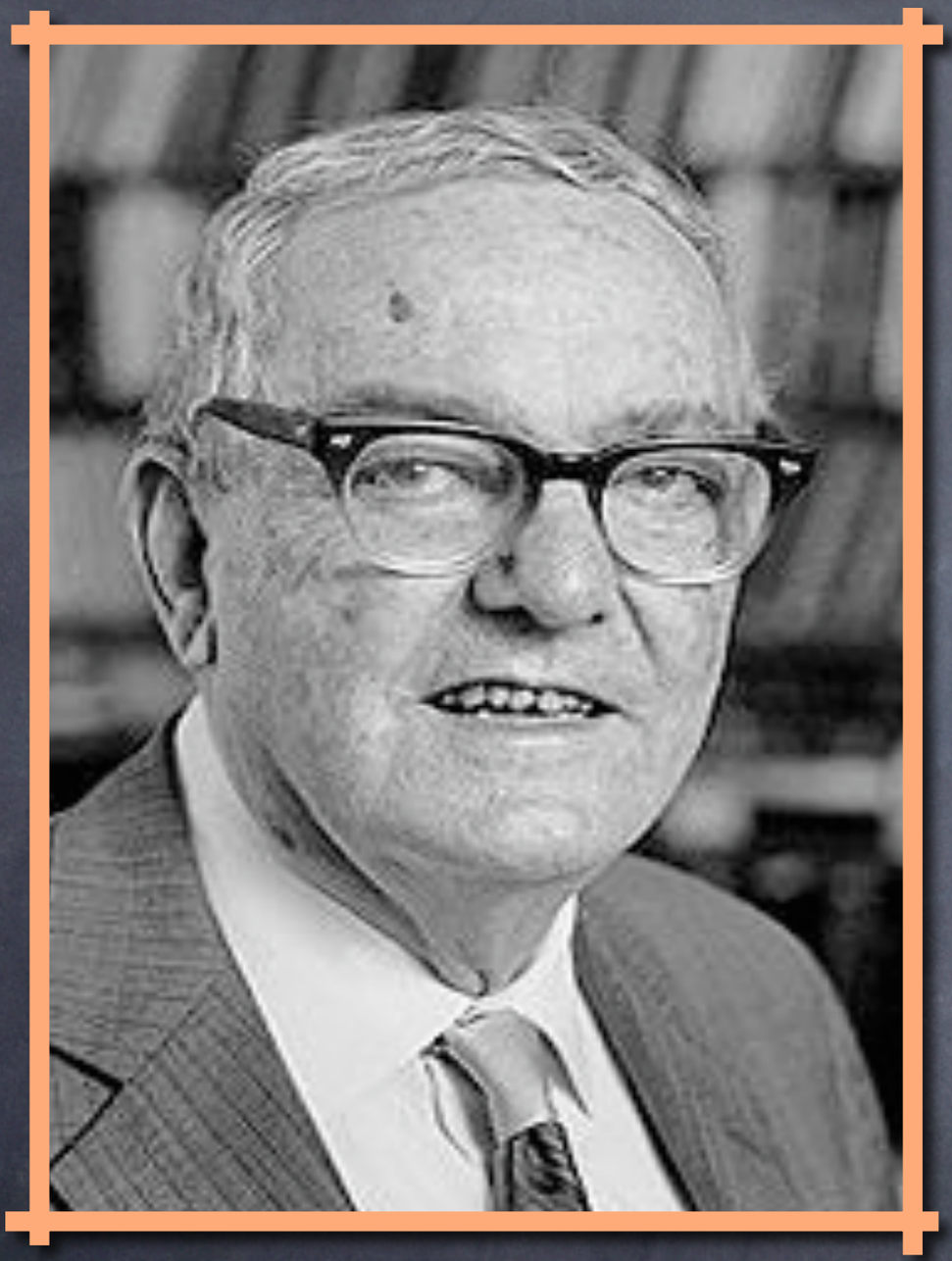
Certainty



Herbert A. Simon
(1916 - 2001)

Theory of Hierarchy

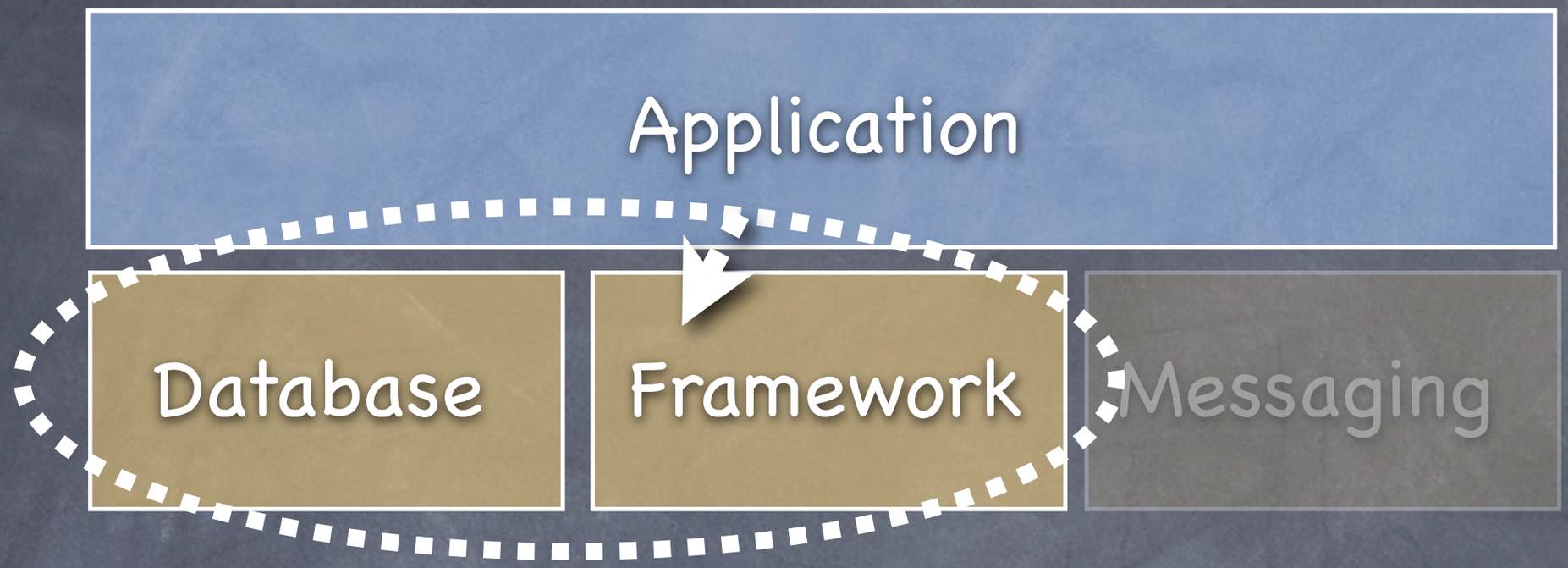
Componentisation

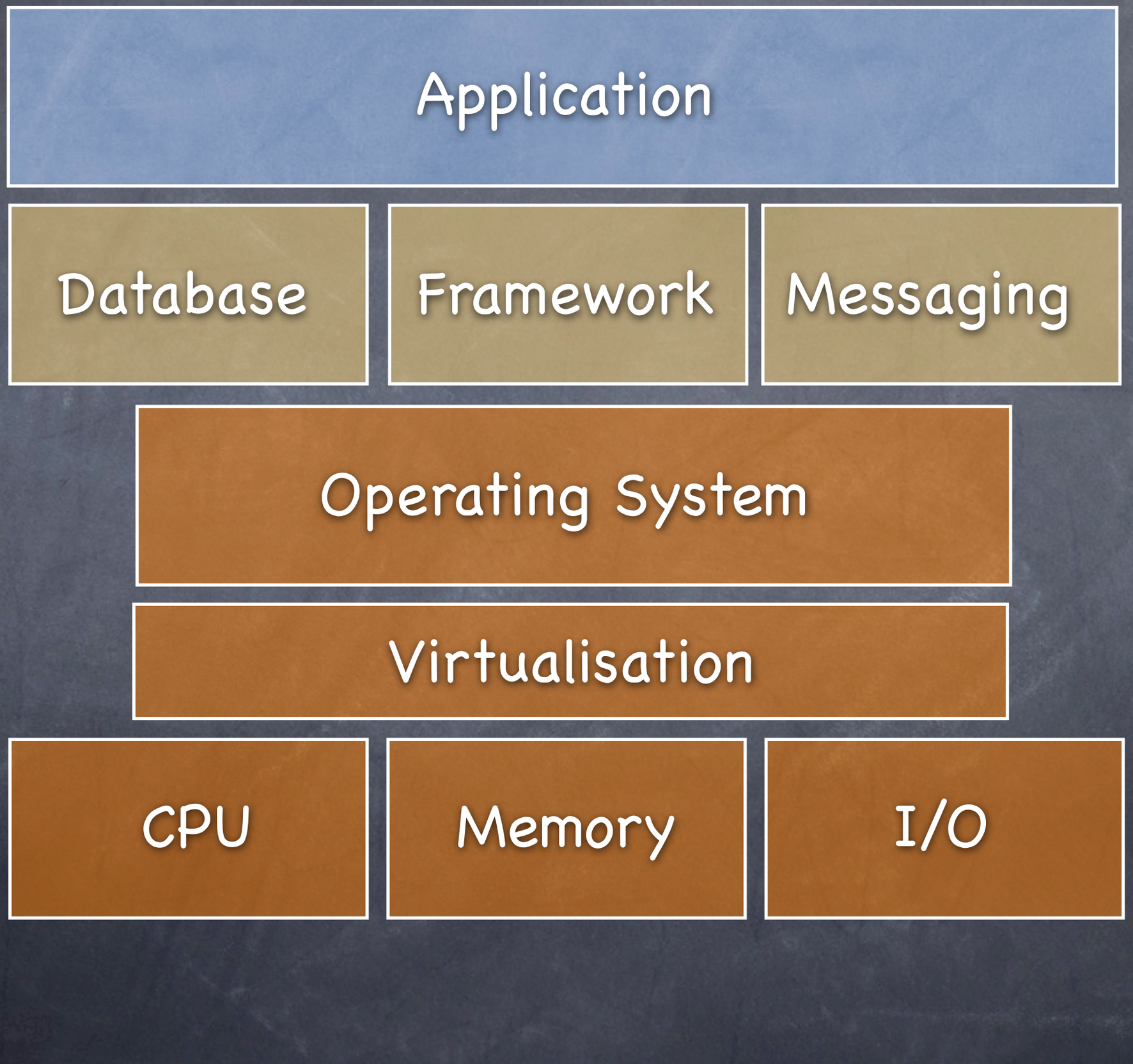


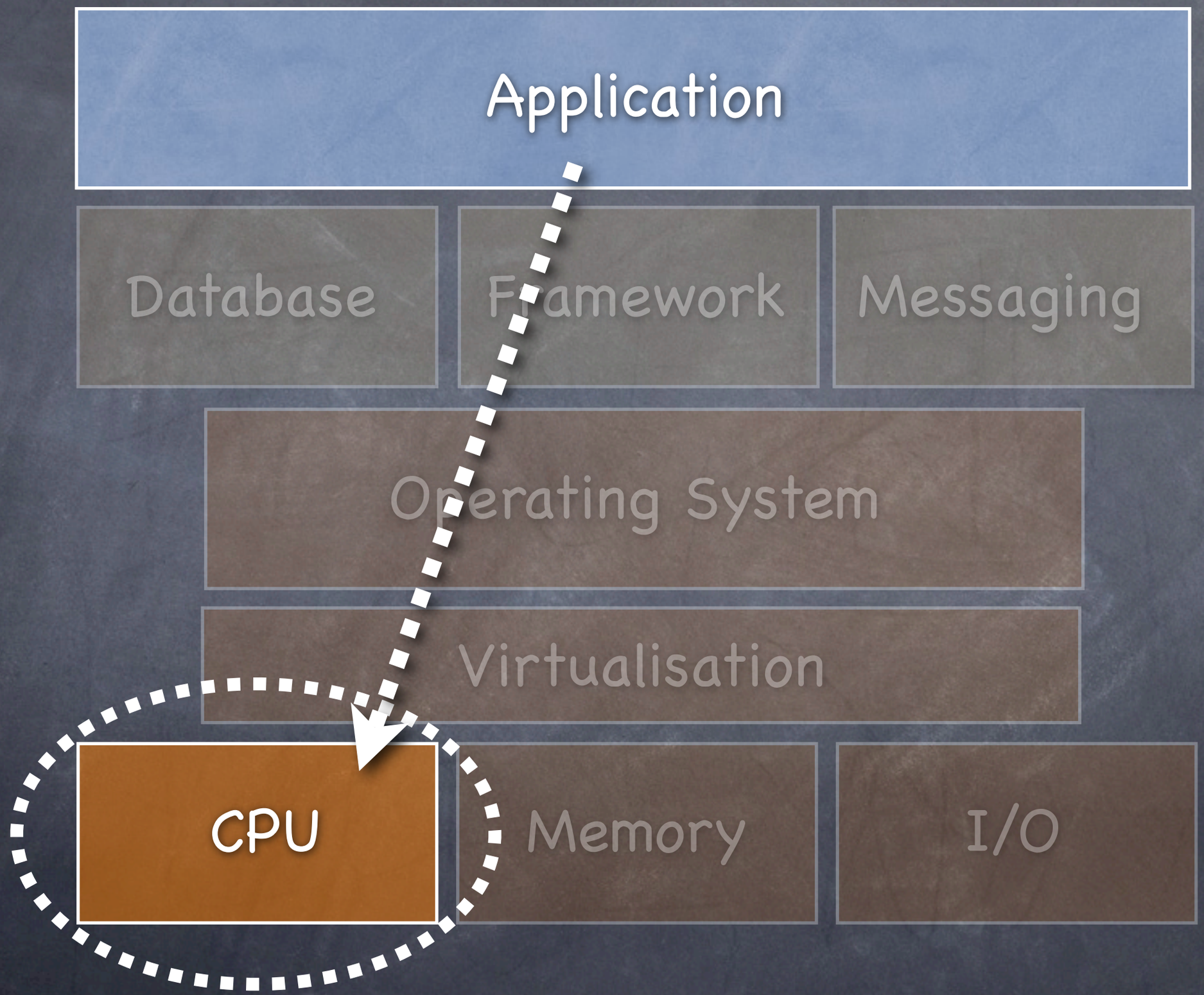
Herbert A. Simon
(1916 - 2001)

Rate of evolution of a system is dependant upon the organisation of its subsystems.

Application

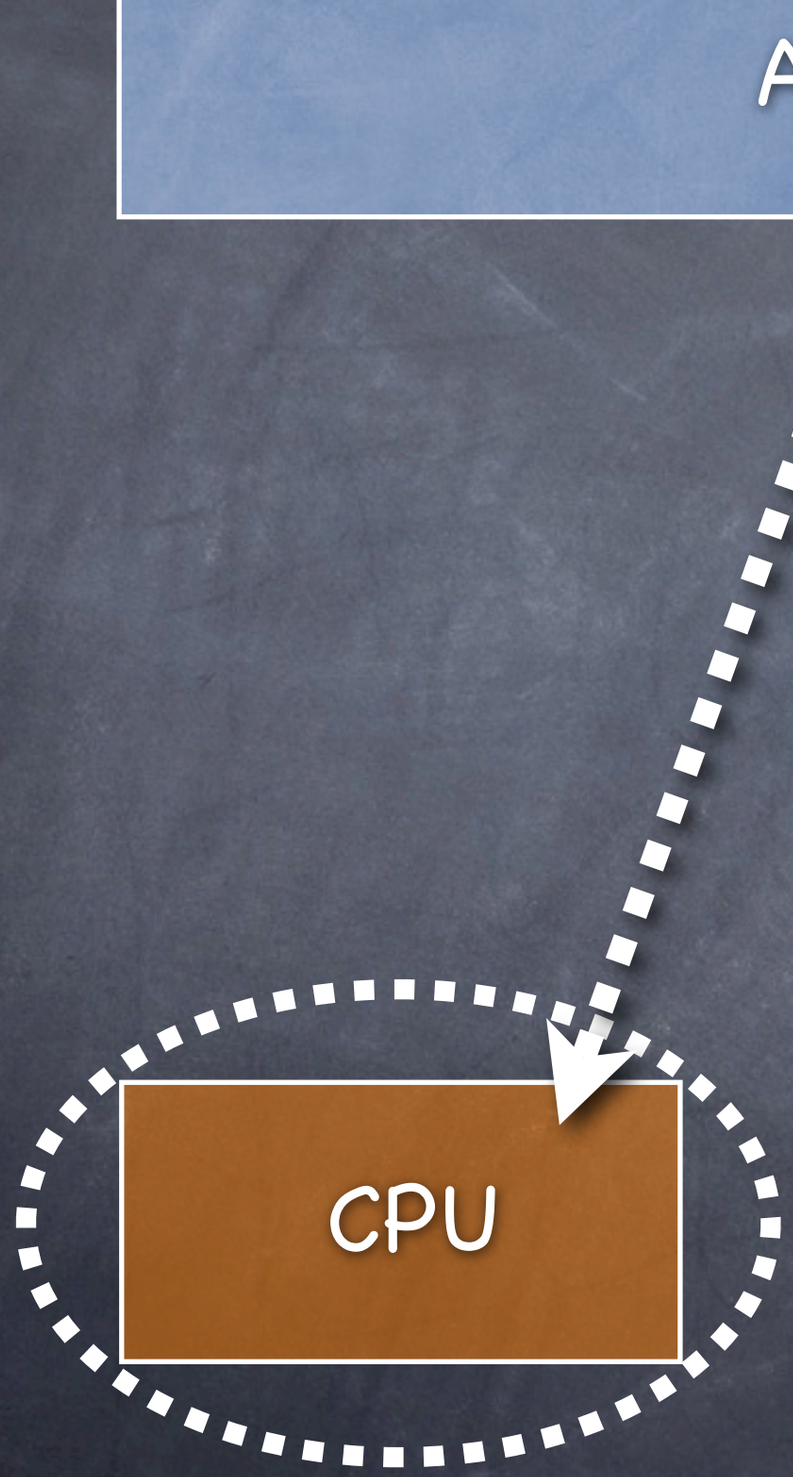

Application
Database
Framework
Messaging


Application
Database
Framework
Messaging
Operating System
Virtualisation
CPU
Memory
I/O

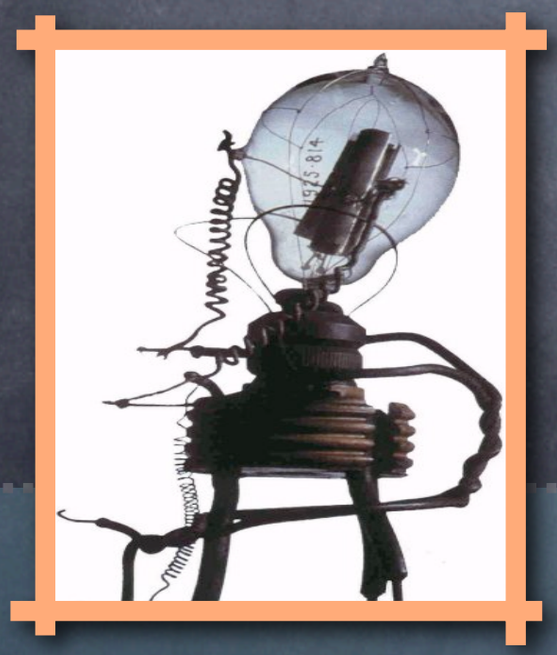

Application
Database
Framework
Messaging
Operating System
Virtualisation
CPU
Memory
I/O

Application

Orders of Magnitude



Ubiquity

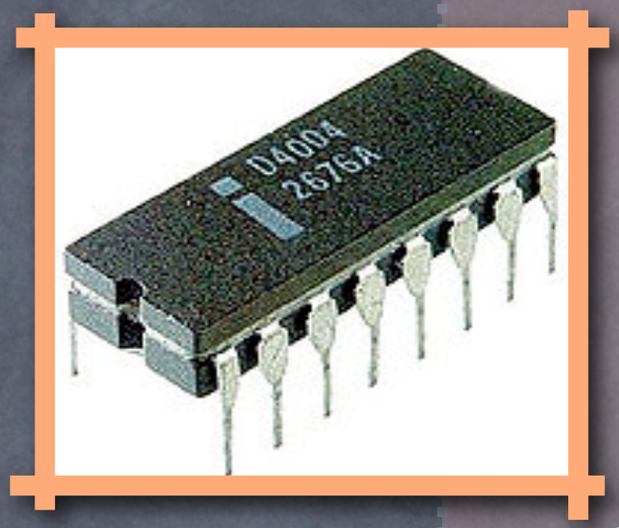


Innovation

Flemming Valve, 1904

Certainty

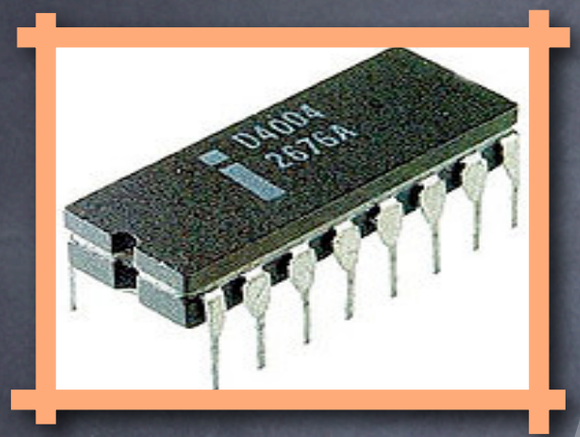
Ubiquity



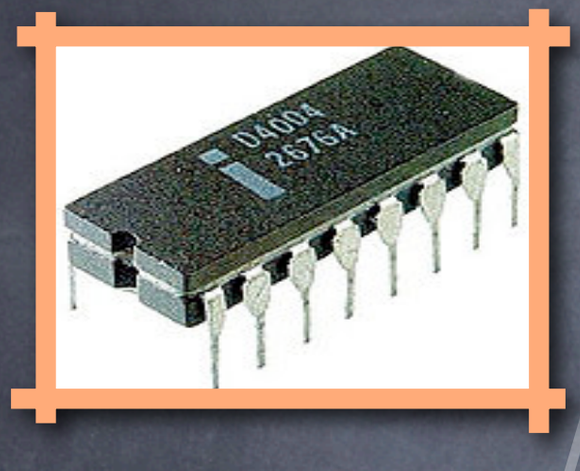
Products

Intel 4004,
2300 Transistors, 1971

Certainty

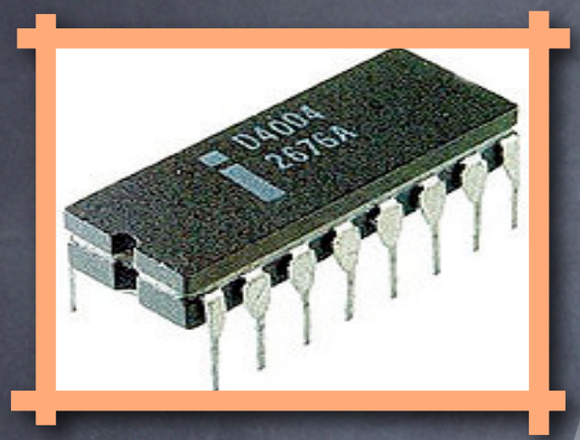


Busicom



Busicom

MCS-4

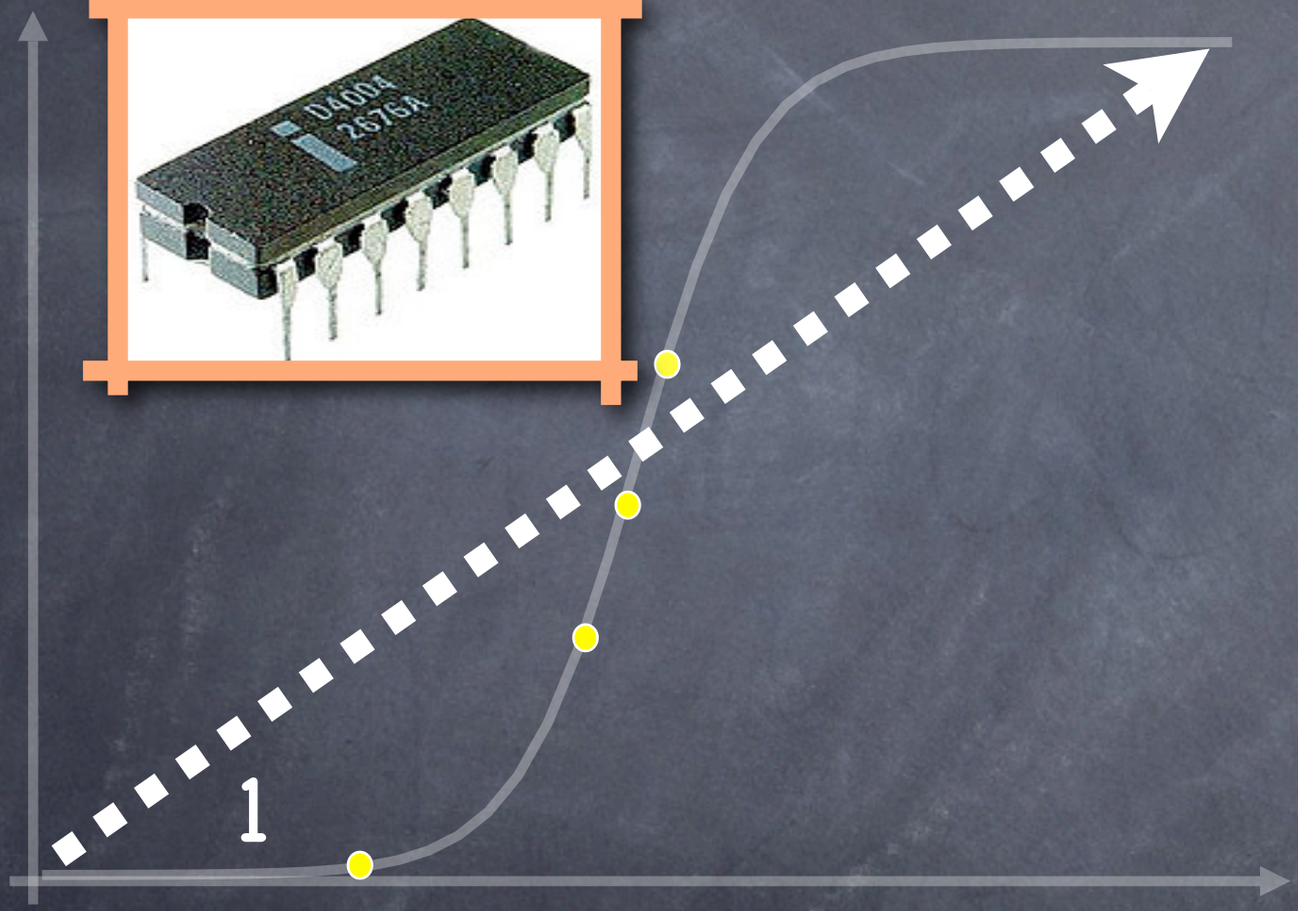


Busicom

Co-Evolution

MCS-4

> 1,000,000,000,000,000,000



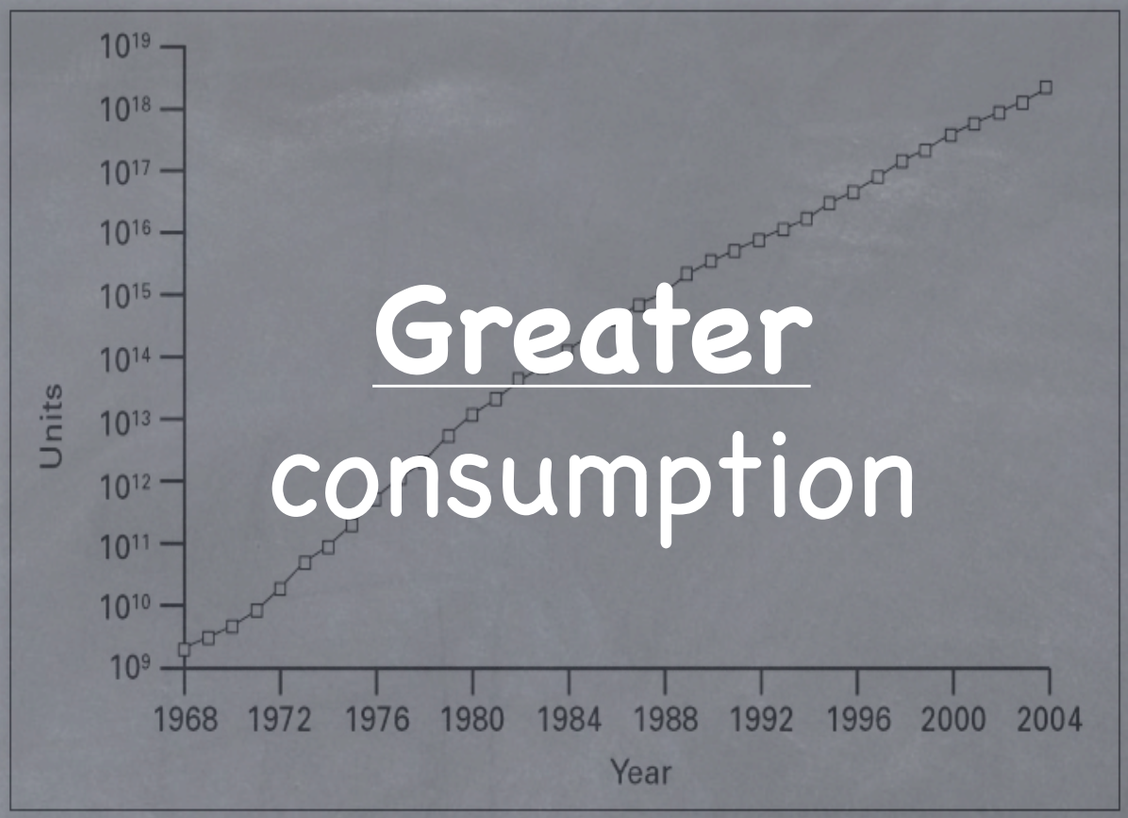
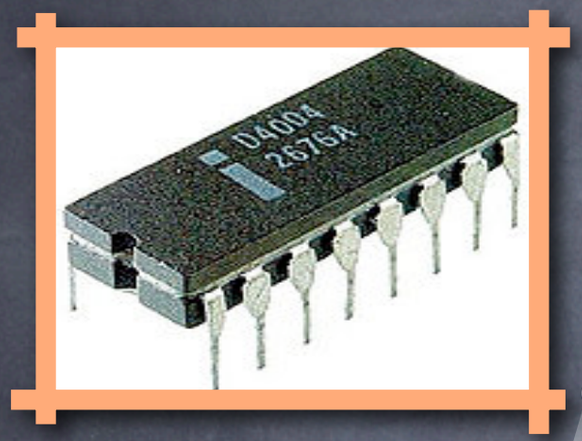


FIGURE 2. Total number of transistors shipped by the semiconductor industry (1968–2004). Source: Intel/WSTS, May 2005.

Greater consumption



0.0002c

$700

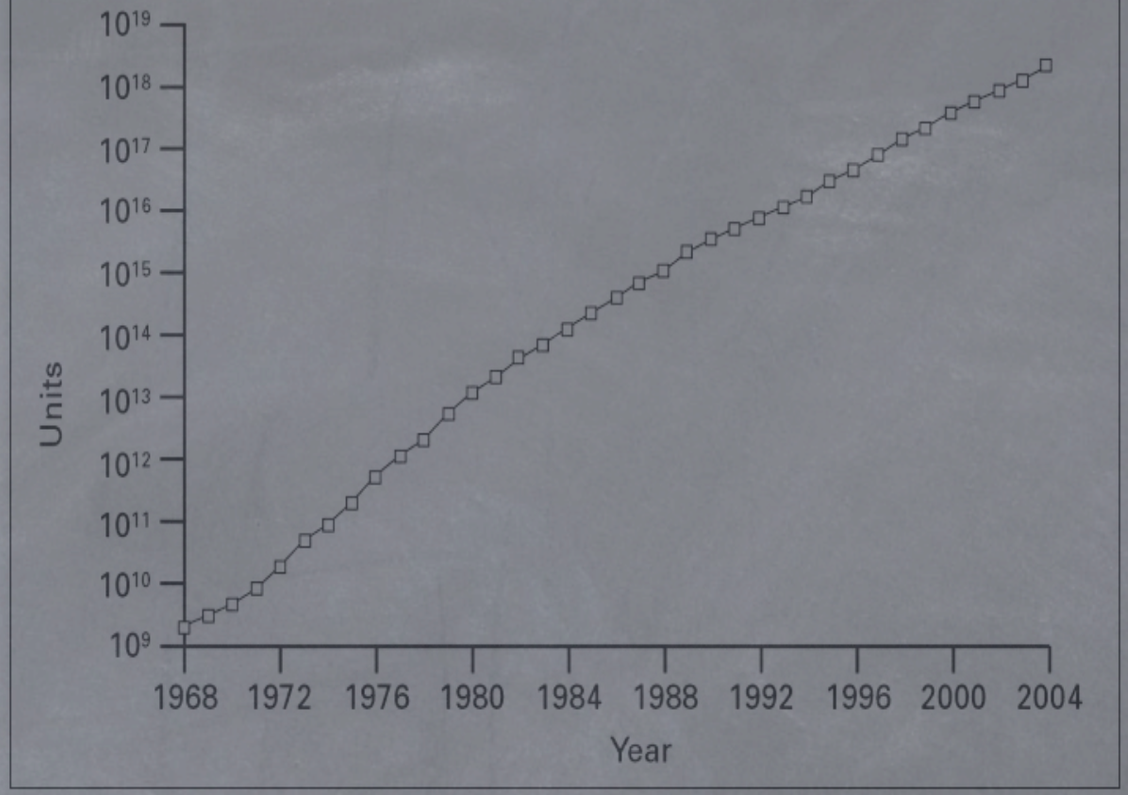
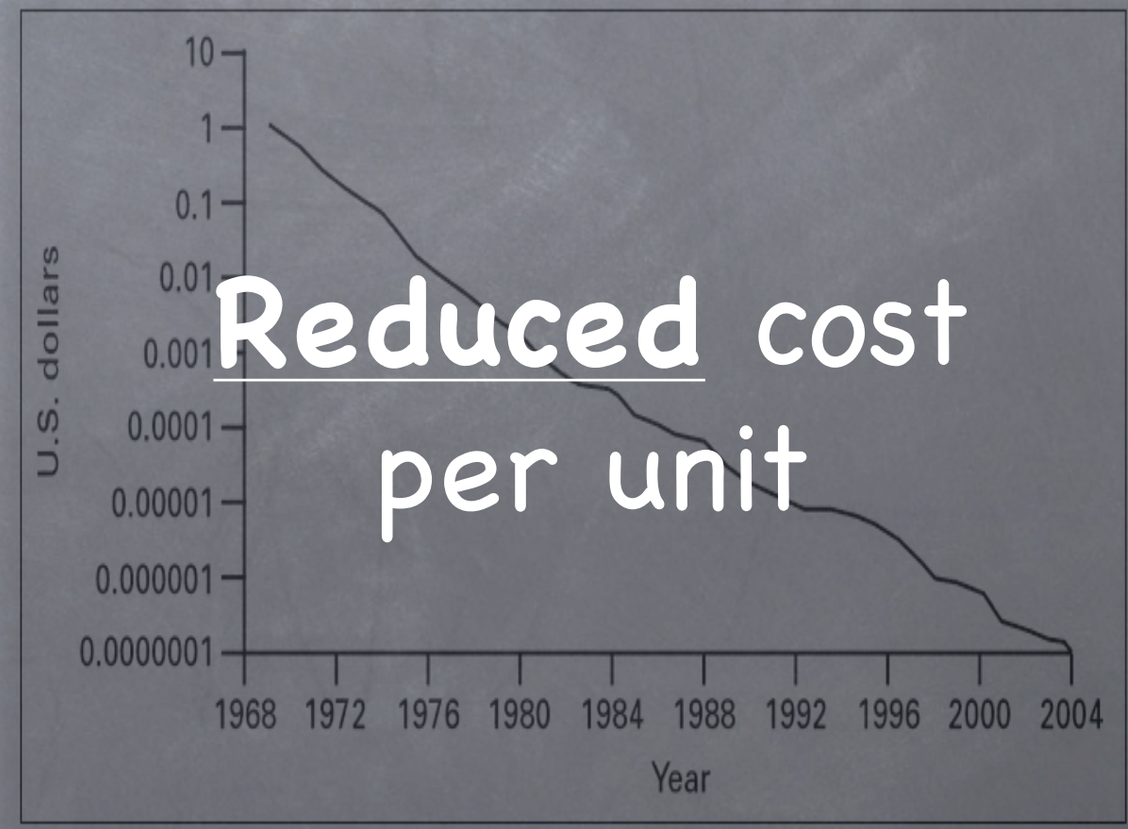


FIGURE 2. Total number of transistors shipped by the semiconductor industry (1968–2004). Source: Intel/WSTS, May 2005.



Reduced cost per unit

Figure 3. Average price of a transistor (1968–2004). Source: Intel/WSTS, May 2005.

Ubiquity

Economies of scale
(volume operations)

Focus on core
(outsource)

Pay per use
(utility)

Speed
(componentisation)

Certainty

Ubiquity

Accelerated Innovation

Greater consumption

Reduced cost per unit

Certainty

Ubiquity

Software

Platform

Infrastructure

… as a **Service**

… as a **Product**

Certainty

Ubiquity

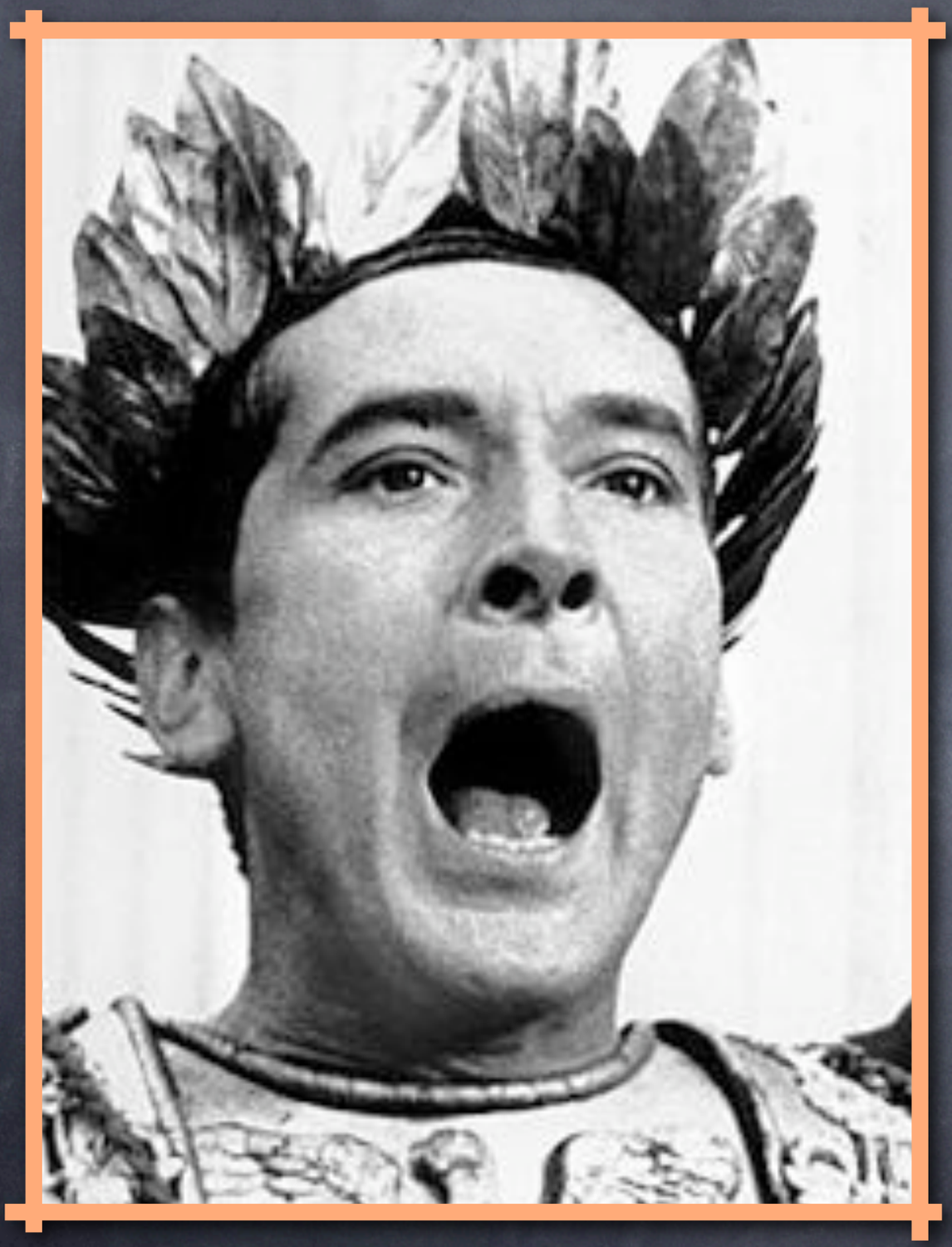
Commoditisation

Accelerates

Innovation

Certainty

process engineering
secure
Web 2.0
adaptable
show ROI
Outsource
flexible
innovate
Six Sigma
Open source
align to the
SOA
Agile
SAAS
business
Enterprise 2.0
Cloud
cost efficient
REST
Offshore
good governance
Organic
ITIL
focus on core
KPIs
Demand management



Infamy,

Infamy ...

Economics

What is cloud?

Why now?

Benefits & Risks

Ubiquity

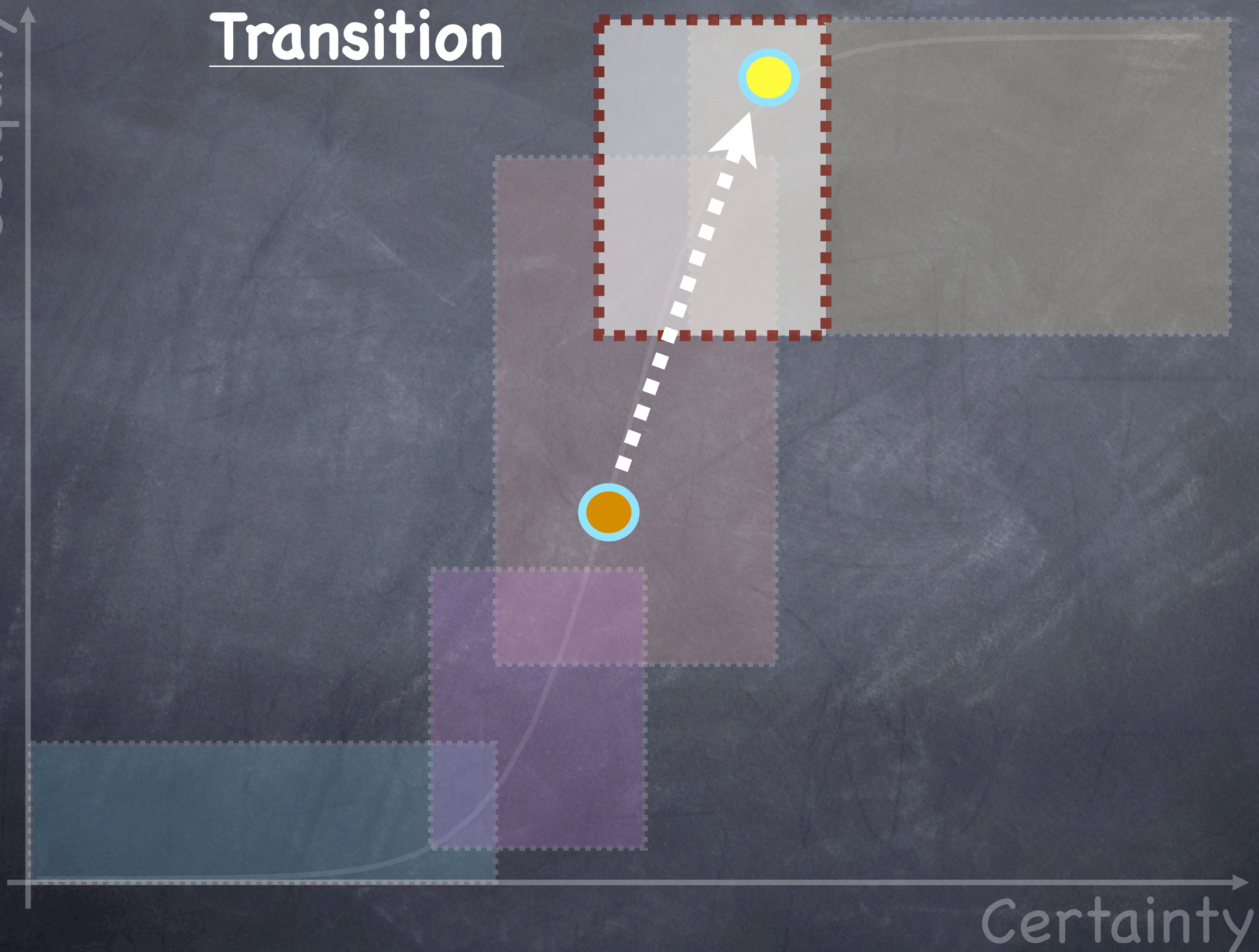
Disruptive

… as a

Product

Certainty

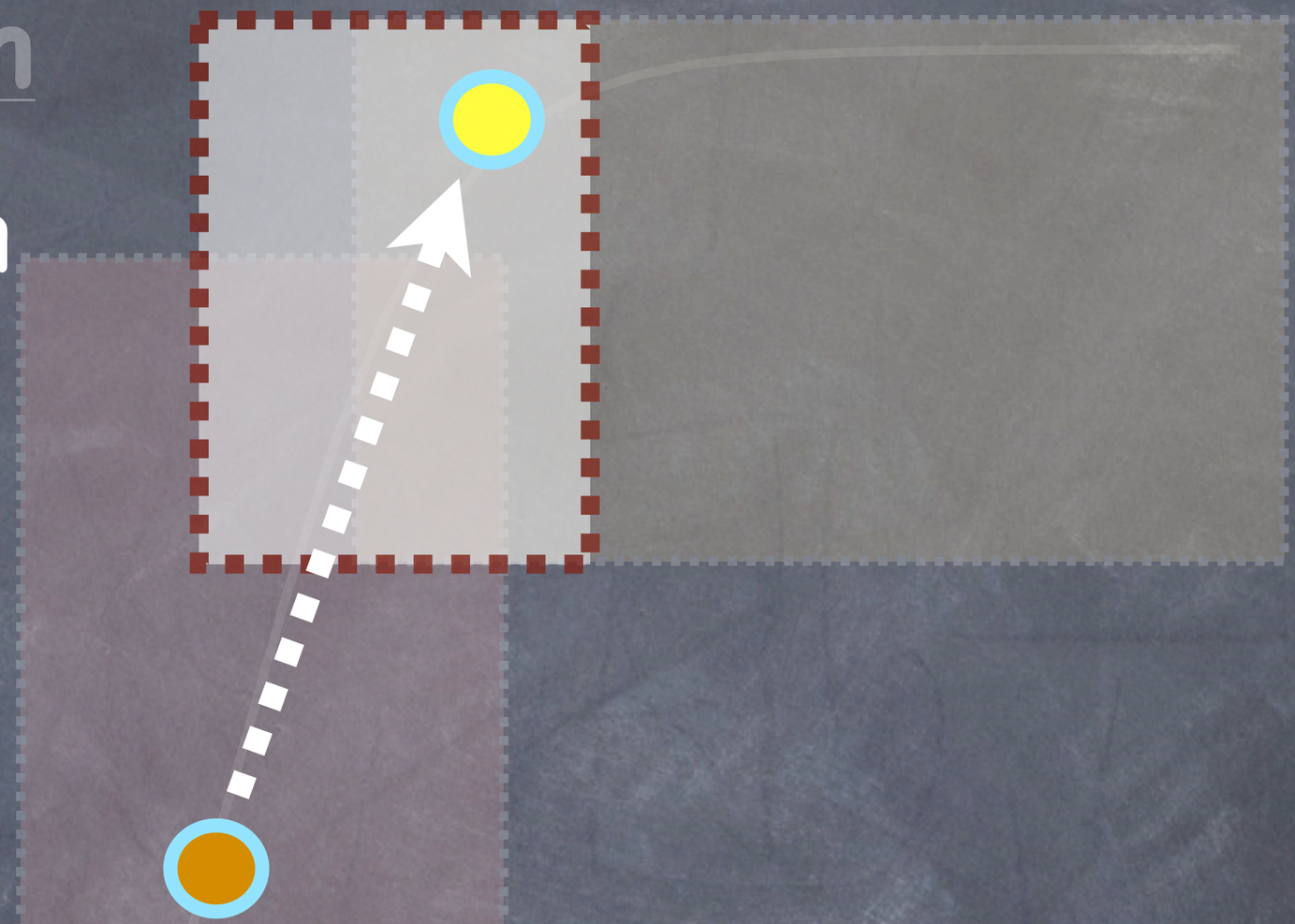
Transition



Ubiquity

Transition

Confusion

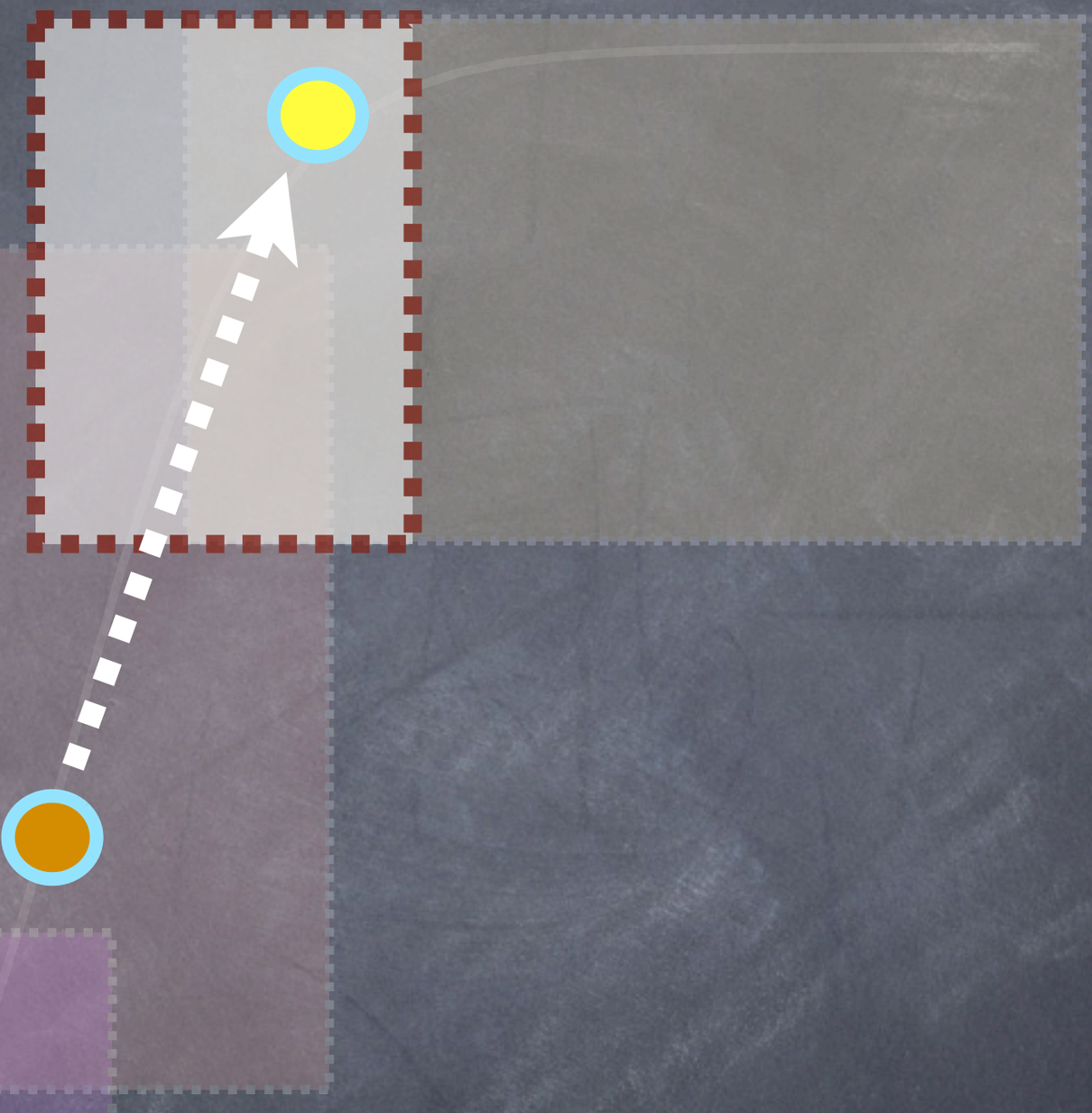


Certainty

Transition

Confusion

Governance



Ubiquity

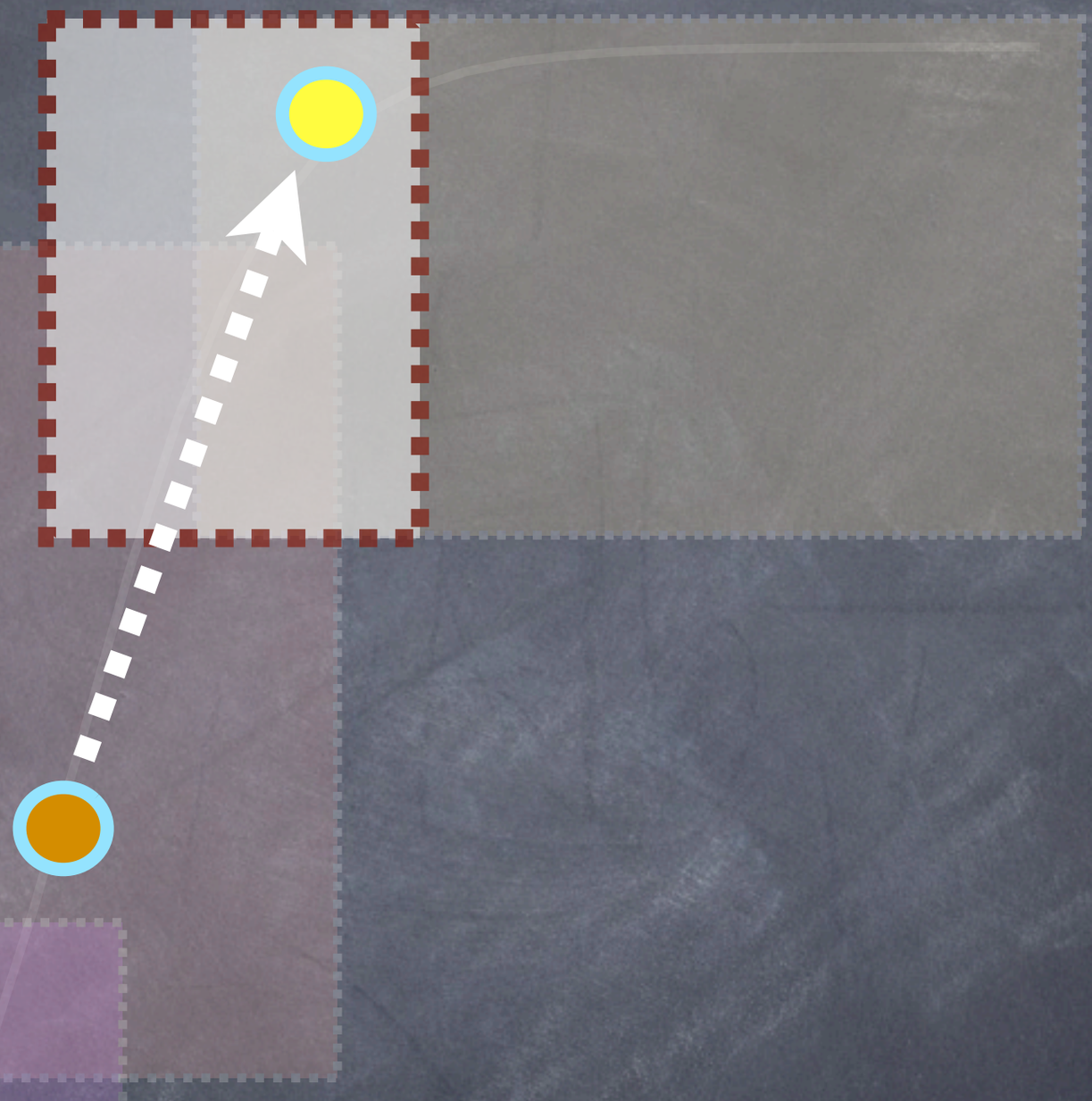
Certainty

Transition

Confusion

Governance

Trust



Ubiquity

Certainty

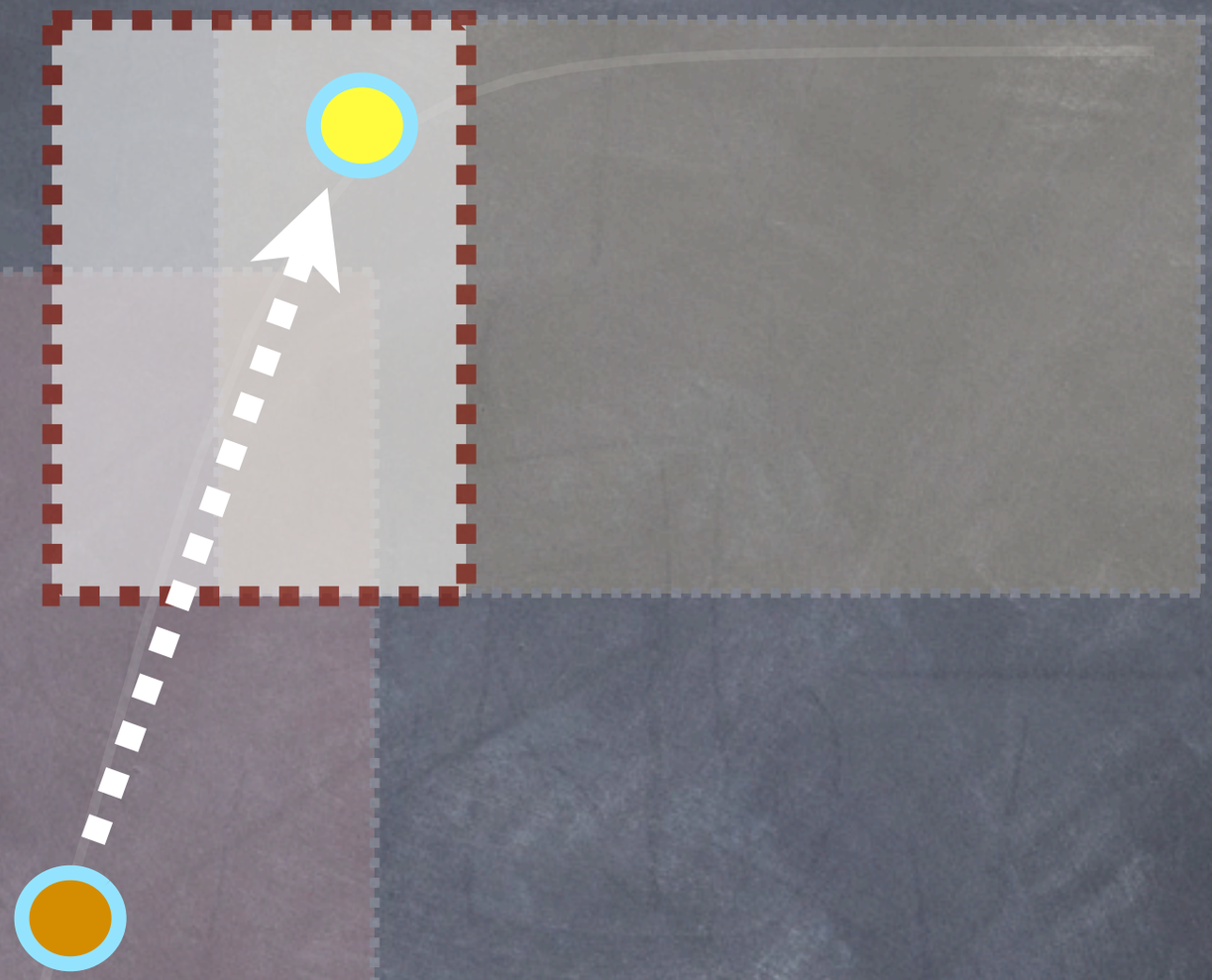
Transition

Confusion

Governance

Trust

Security



Ubiquity

Certainty

Ubiquity

Transition

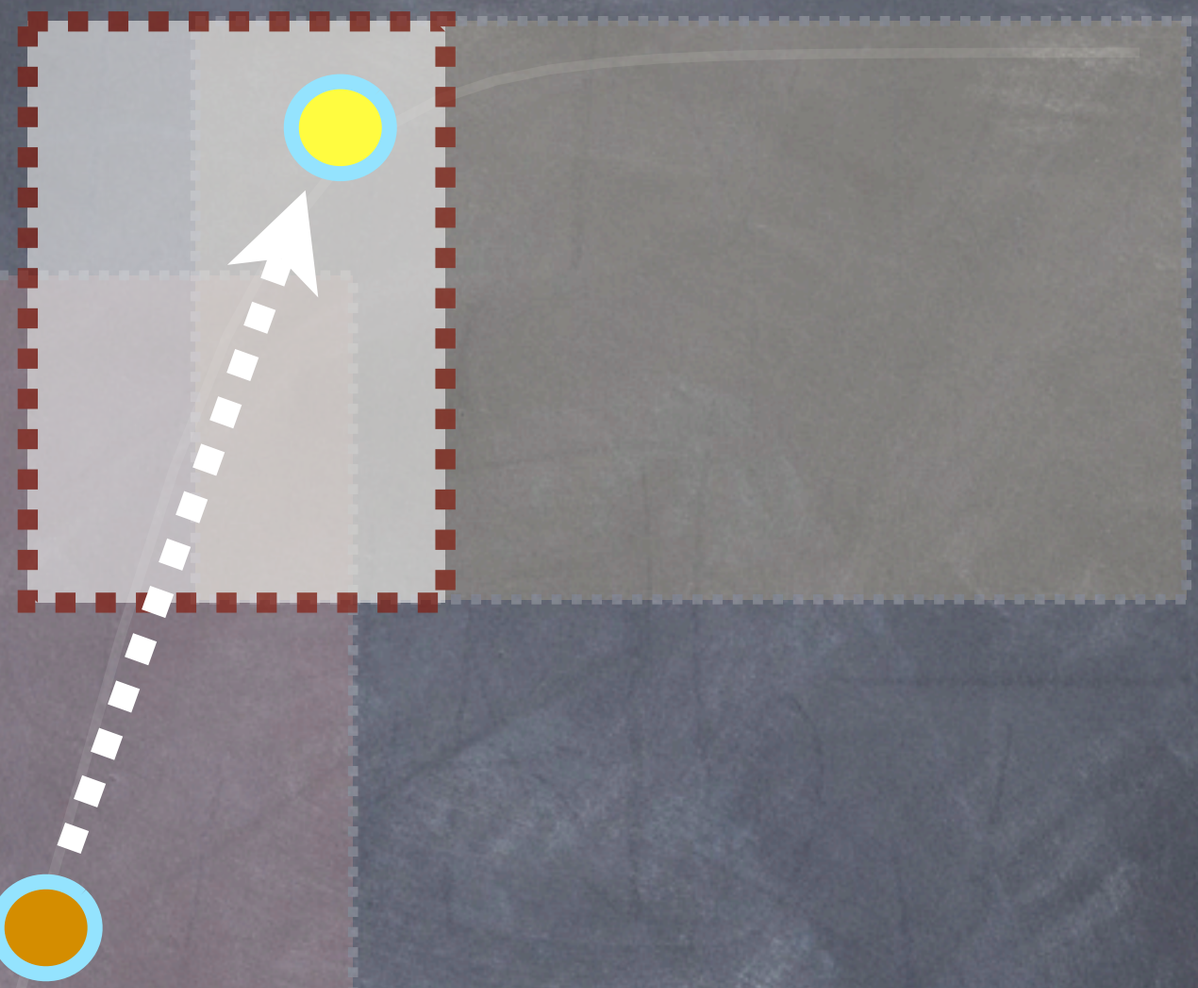
Confusion

Governance

Trust

Security

Transparency



Certainty

Outsourcing

Ubiquity

Certainty

Ubiquity

Outsourcing

Suitability

Certainty

Ubiquity

Outsourcing

Suitability

Competition

Certainty

Ubiquity

Outsourcing

Suitability

Competition

Lock-in

Certainty

Ubiquity

Outsourcing

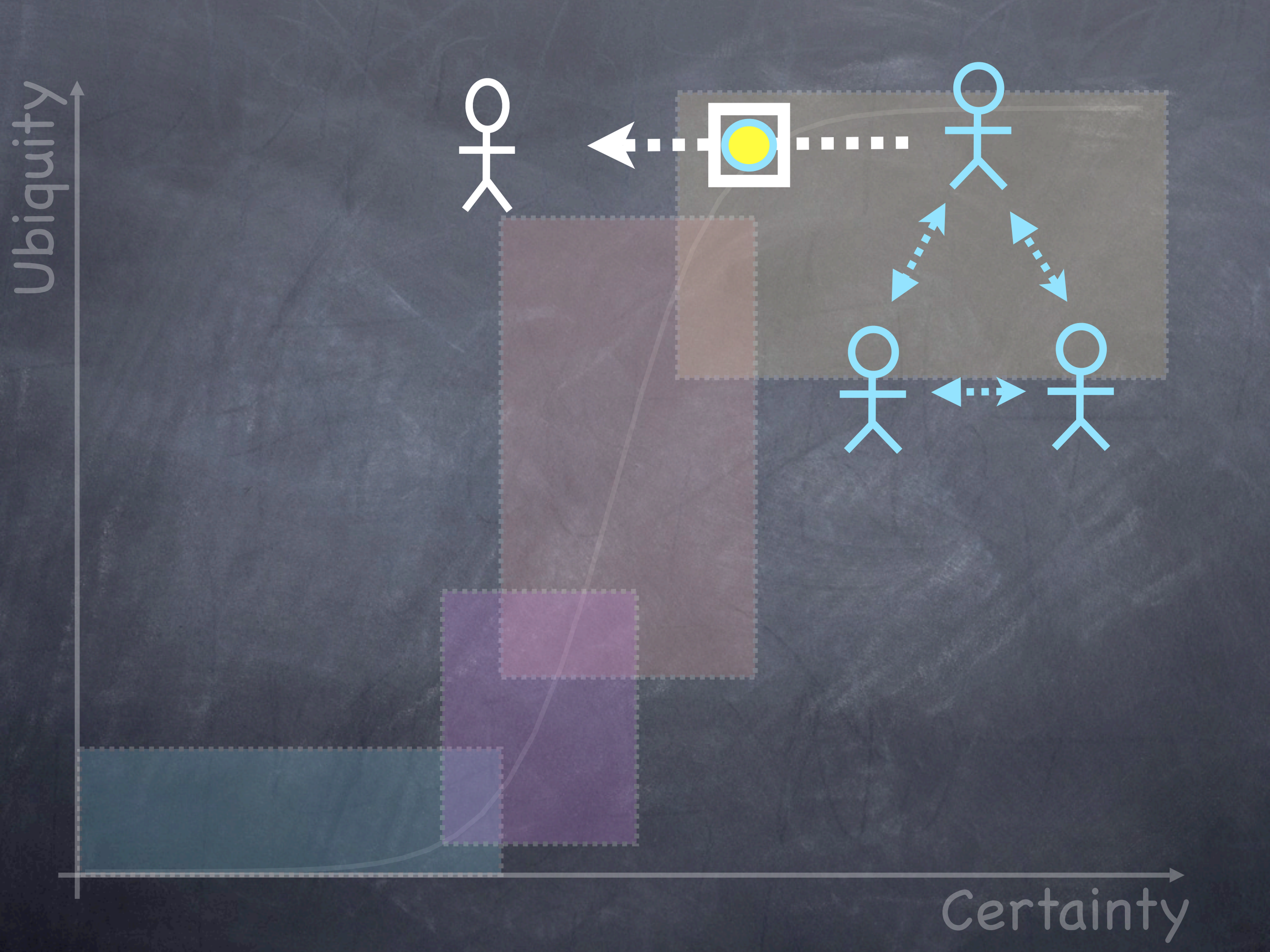
Suitability

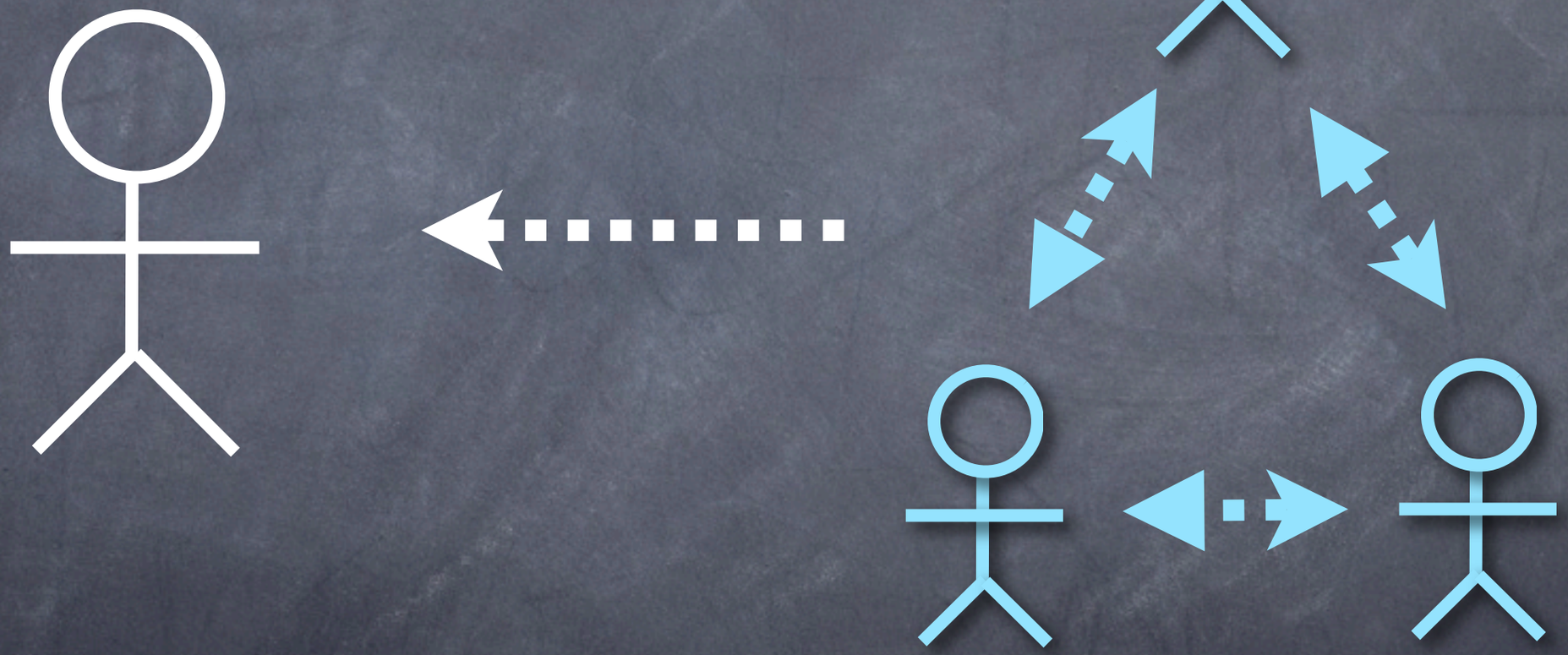
Competition

Lock-in

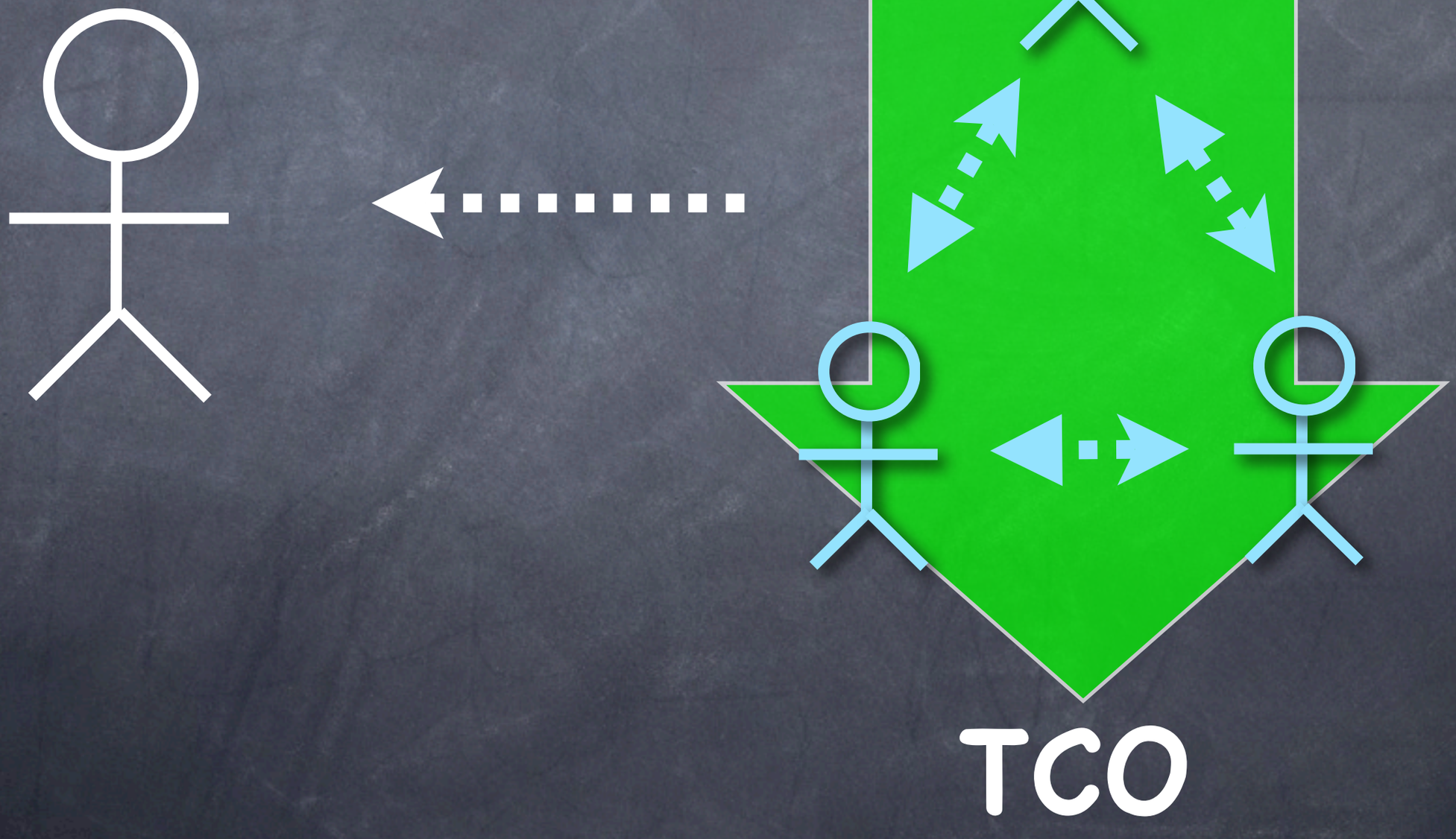
Second Source

Certainty


Ubiquity
Certainty



Easy Switching



TCO

Unix

Linux

TCO

Unix

Linux

TCO

Windows

Exit Cost

Exit Cost

Exit Cost

Increases

Exit Cost

Increases

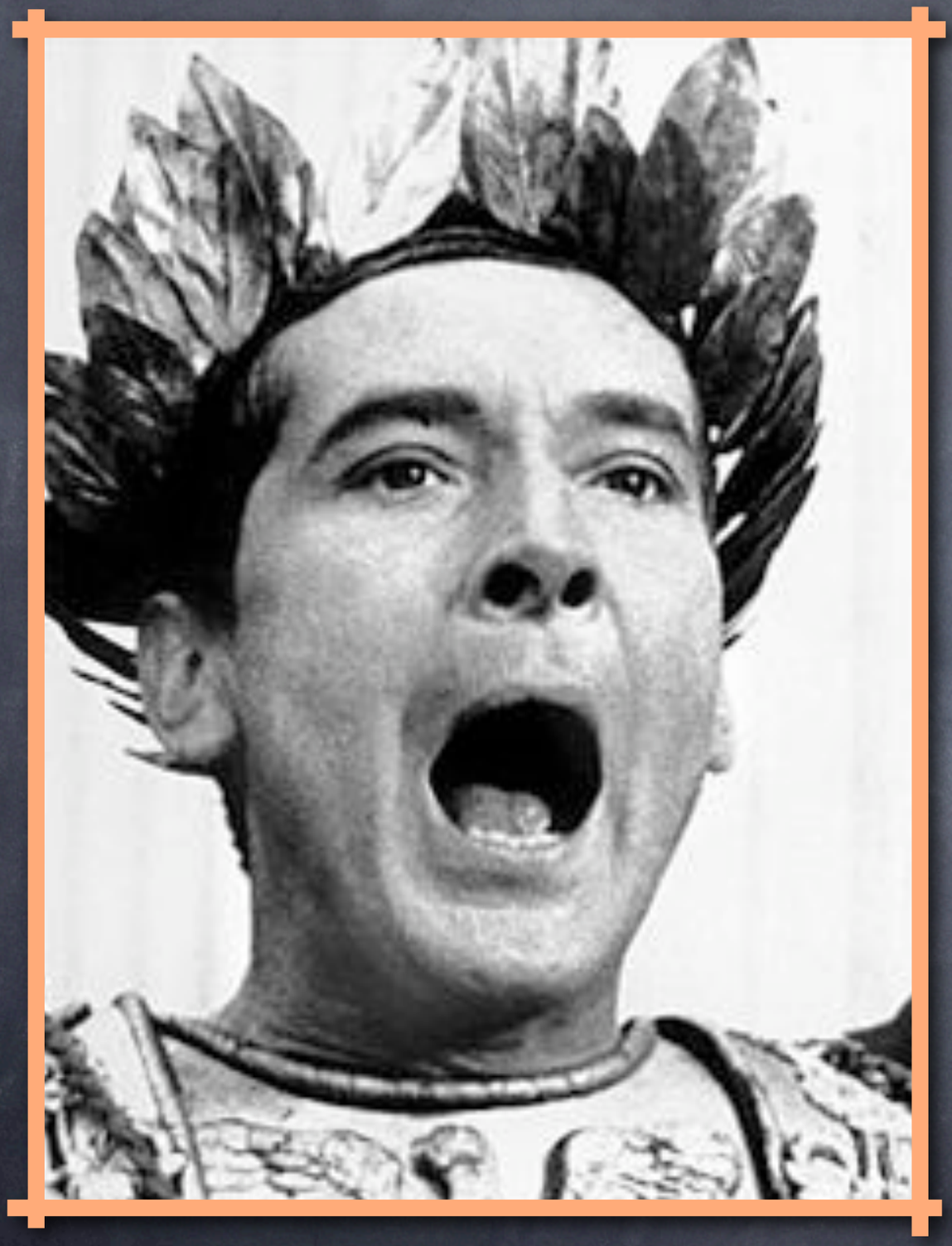
Migration

Exit Cost

Increases

Migration

Political



"We need to spend to get us out of our previous investment"

Provision
of network

IPX / SPX
Banyan Vines
AppleTalk
SNA
Decnet
TCP / IP

Provision
of network

IPX / SPX

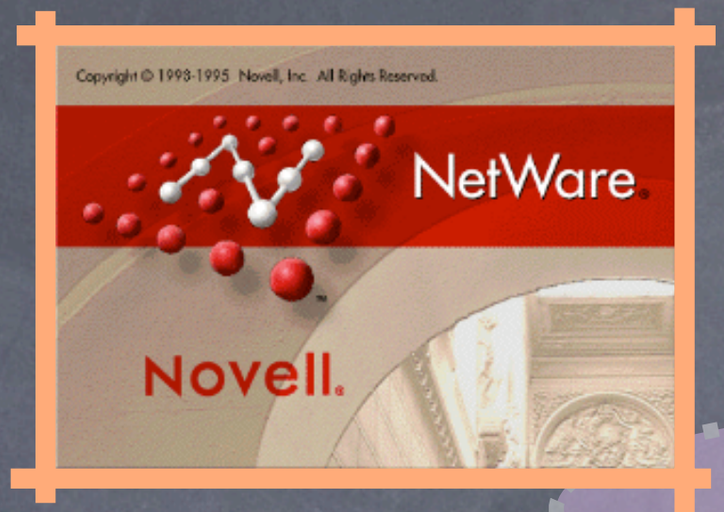
Banyan Vines

AppleTalk

SNA

Decnet

TCP / IP



IPX / SPX

Banyan Vines

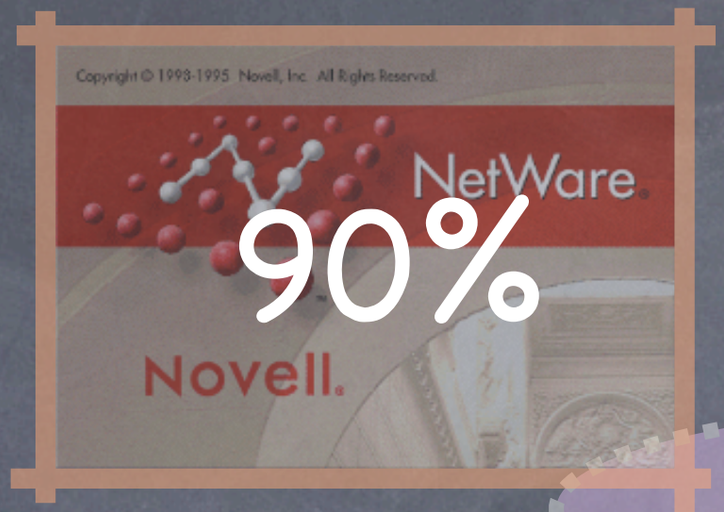
AppleTalk

SNA

Decnet

TCP / IP

Provision of network



90%

IPX / SPX

Banyan Vines

AppleTalk

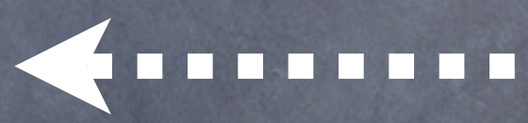
SNA

Decnet

TCP / IP

Provision of network

Provision
of network



IPX / SPX

Banyan Vines

AppleTalk

SNA

Decnet

TCP / IP

Provision of network

IPX / SPX

Banyan Vines

AppleTalk

SNA

Decnet

TCP / IP

"We're invested in Netware"

TCP / IP

IPX / SPX

Banyan Vines

AppleTalk

SNA

Decnet

TCP / IP

IPX / SPX

Banyan Vines

AppleTalk

SNA

Decnet

TCP / IP

Migration

Ubiquity

Software

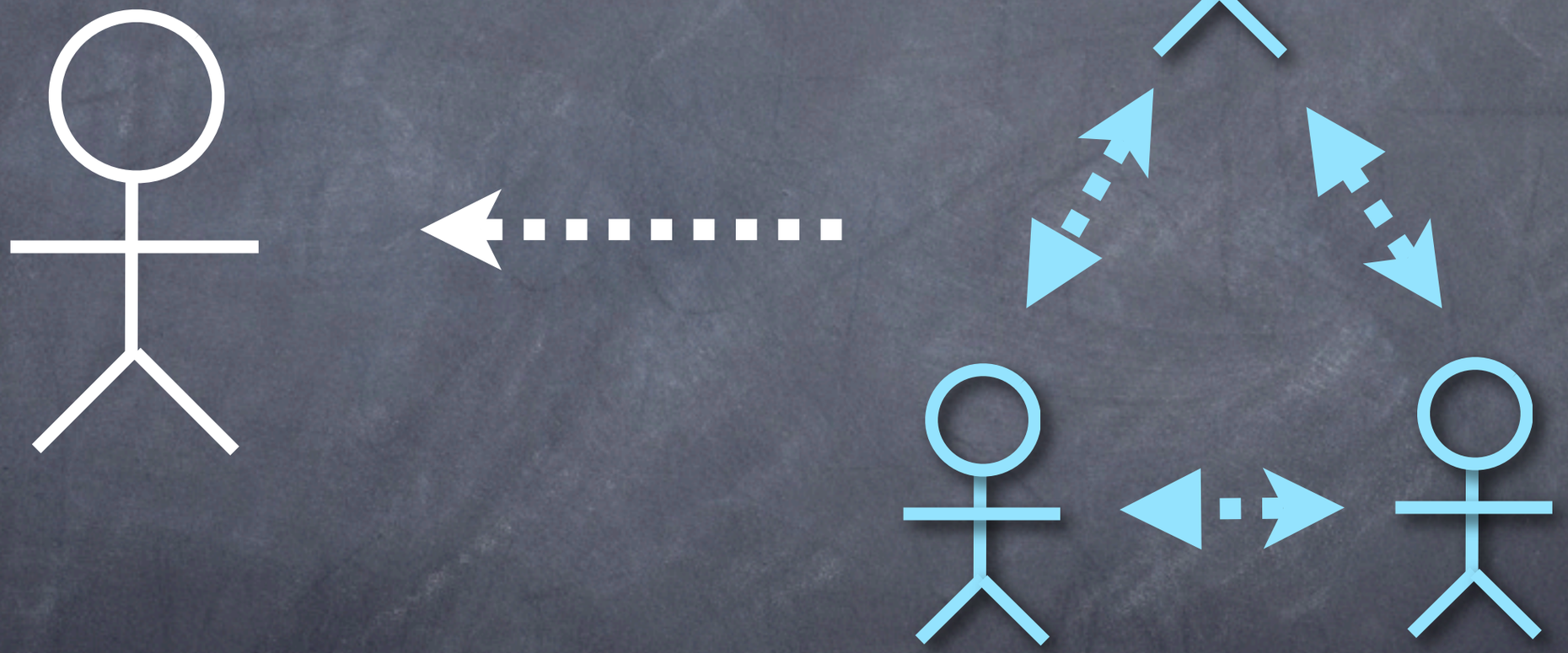
Platform

Infrastructure

… as a **Service**

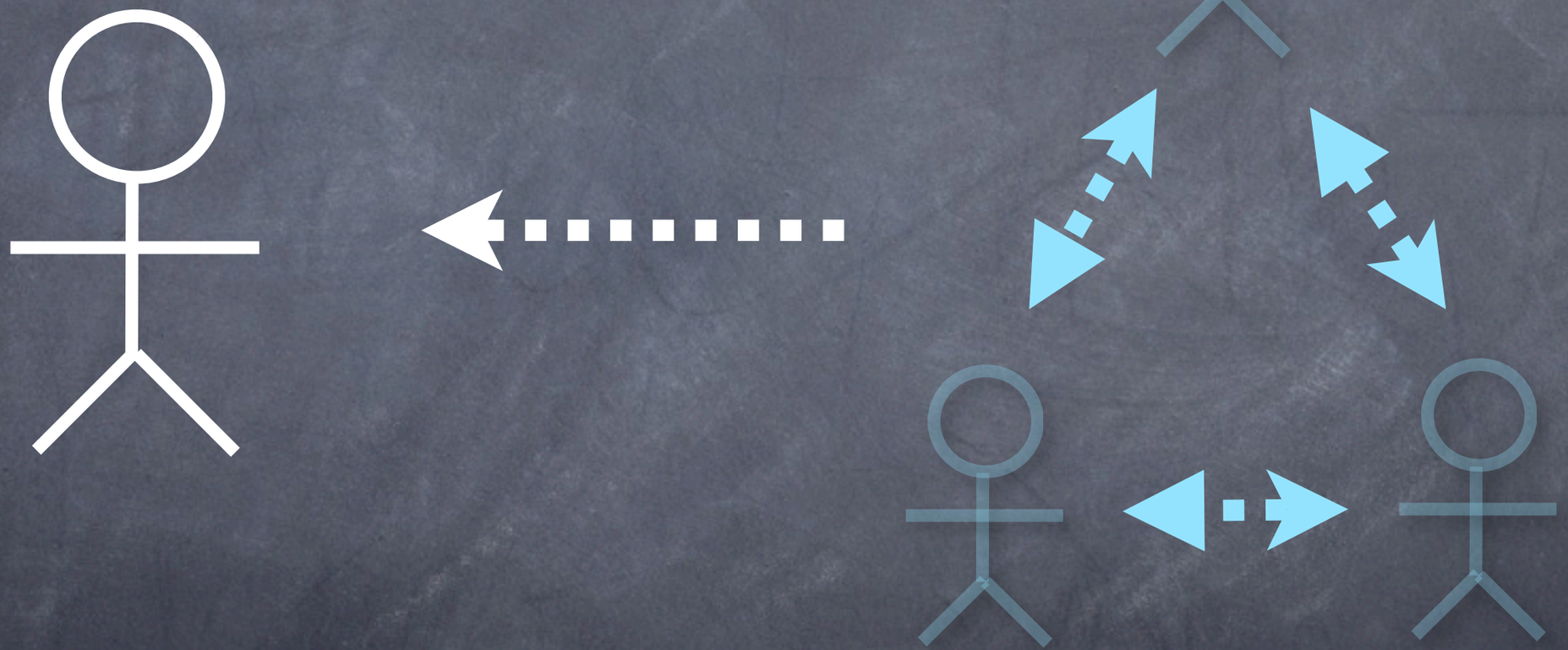
… as a **Product**

Certainty

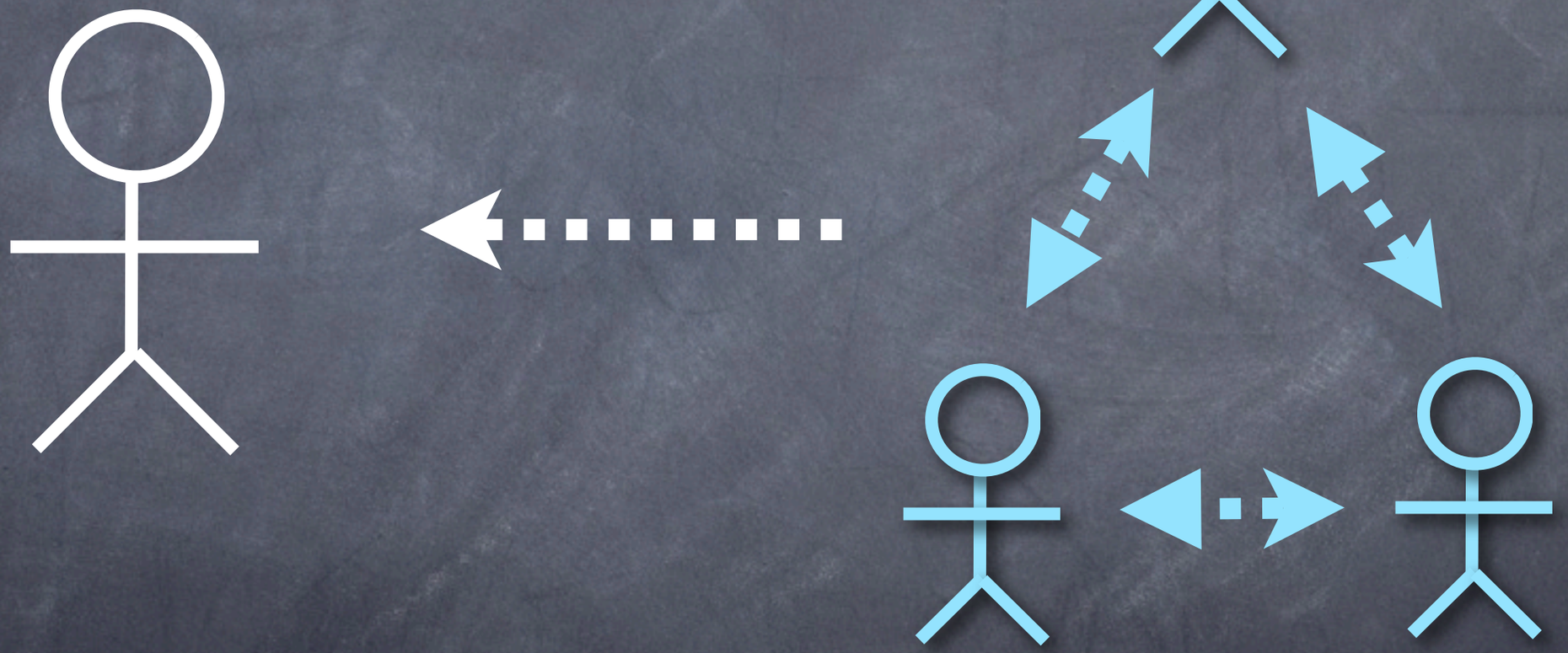


Low Exit

Alternatives

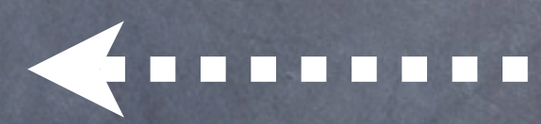


Access (API)



Interoperability

Provision of compute resources



Go Grid API
EC2 API
OCCI API
Sun Cloud API
Rackspace API
Delta Cloud API
LibCloud API
Flexiscale API
ElasticHosts API
vCloud API

Provision of compute resources

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EC2 API
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Provision of compute resources

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Provision of compute resources

Go Grid API
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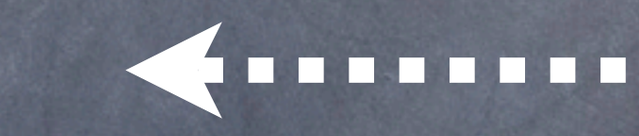
ElasticHosts API

90%

vCloud API

Provision of compute resources



Go Grid API

EC2 API

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vCloud API

Provision of compute resources

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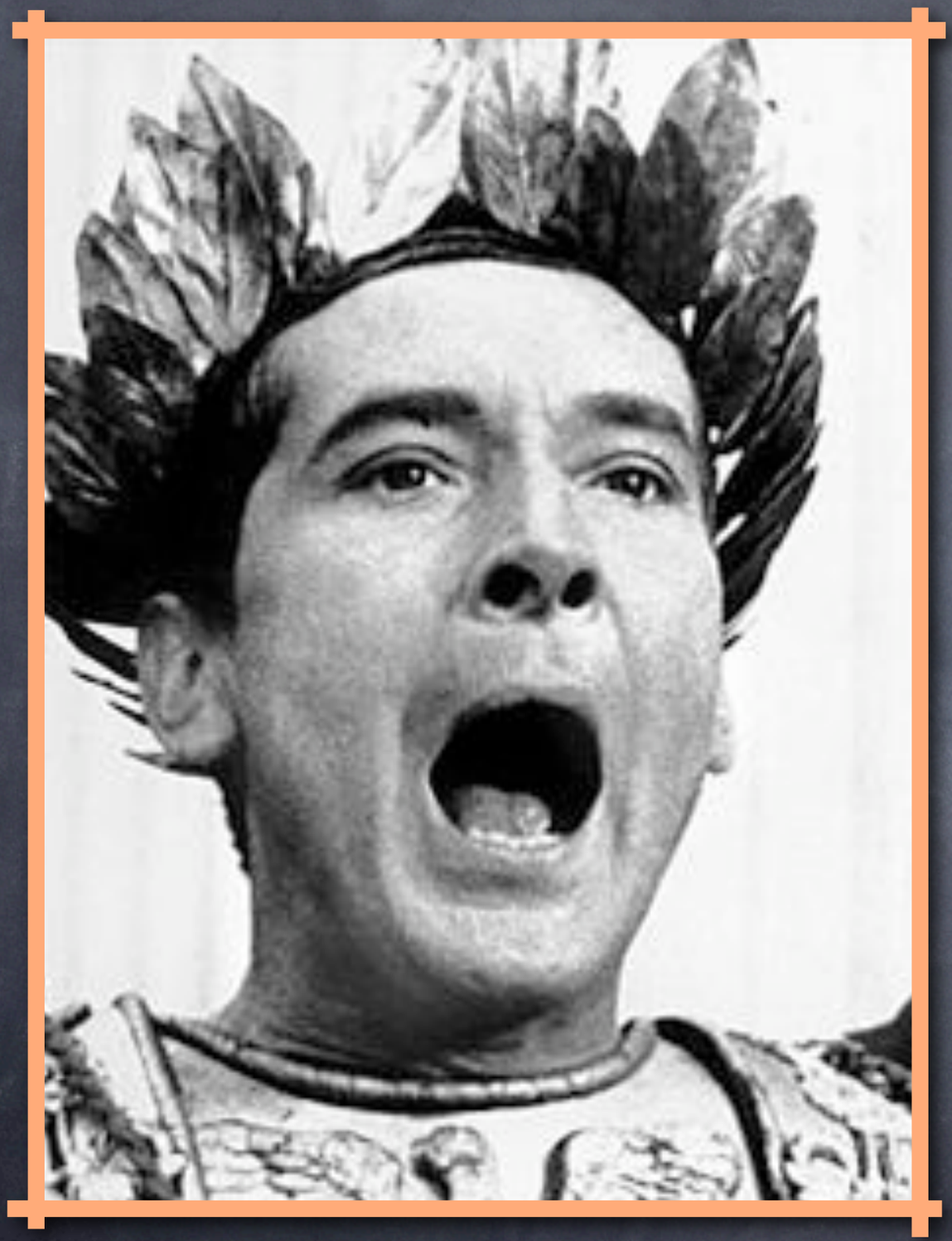
ElasticHosts API

vCloud API



"We're invested in VMWare"

EC2 API

Migration

Go Grid API

OCCI API

Sun Cloud API

Rackspace API

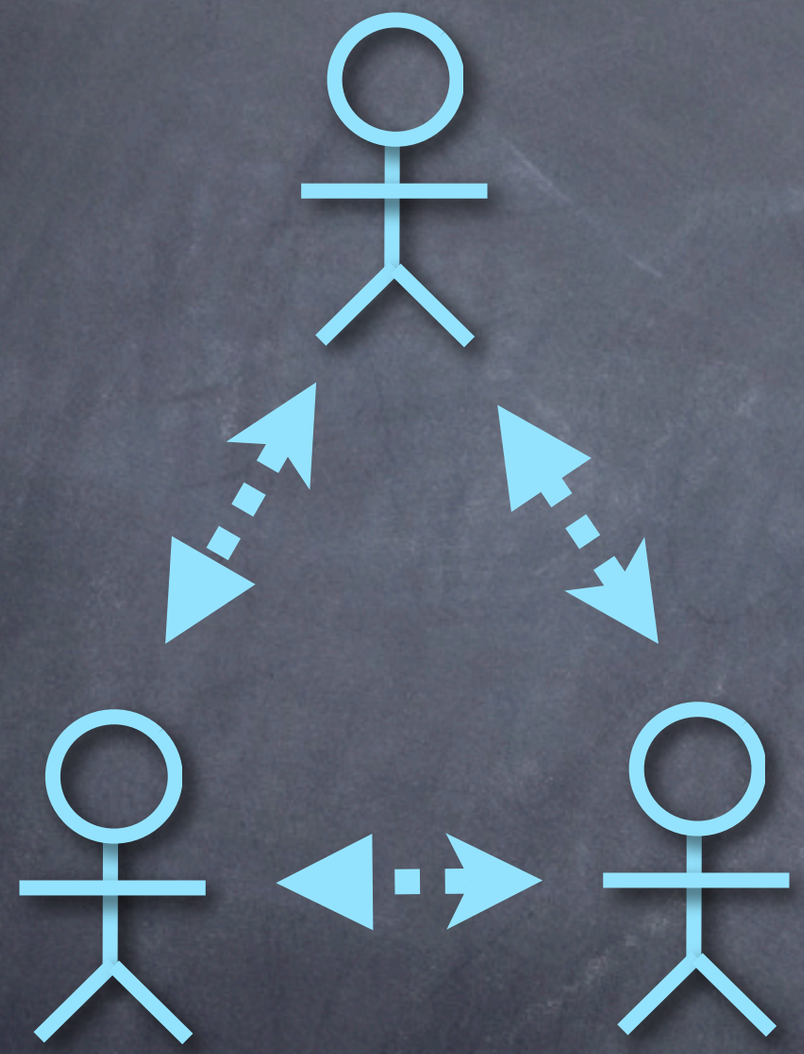
Delta Cloud API

LibCloud API

Flexiscale API

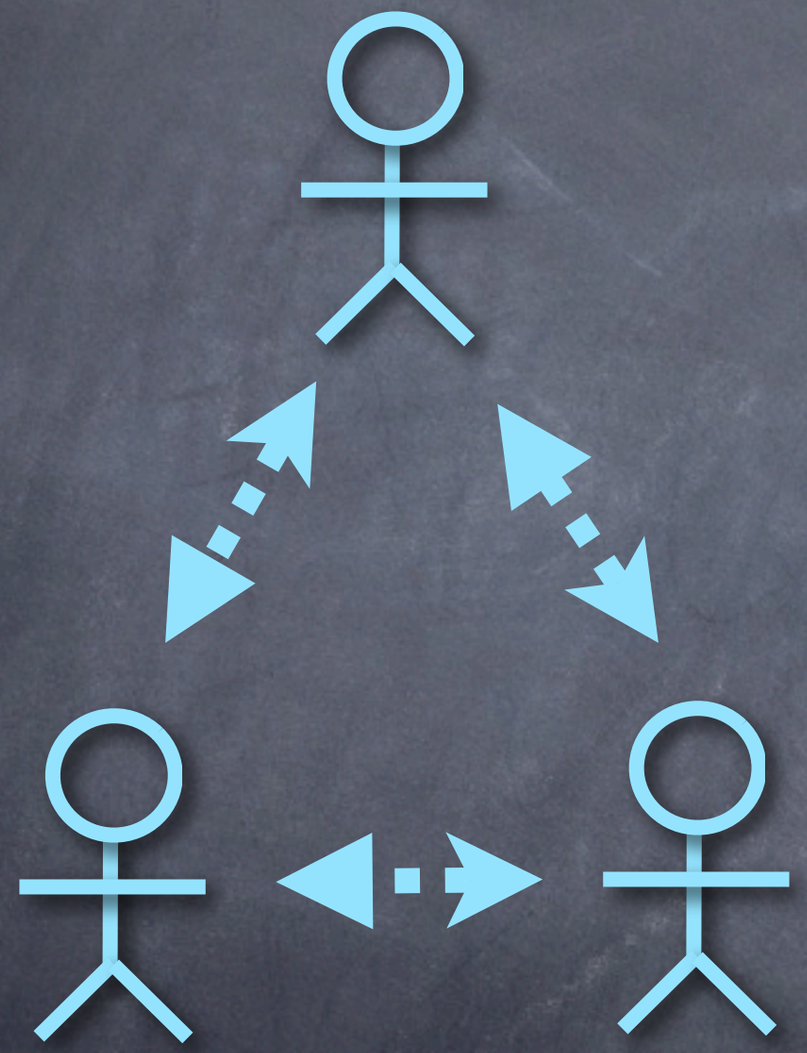
ElasticHosts API

vCloud API

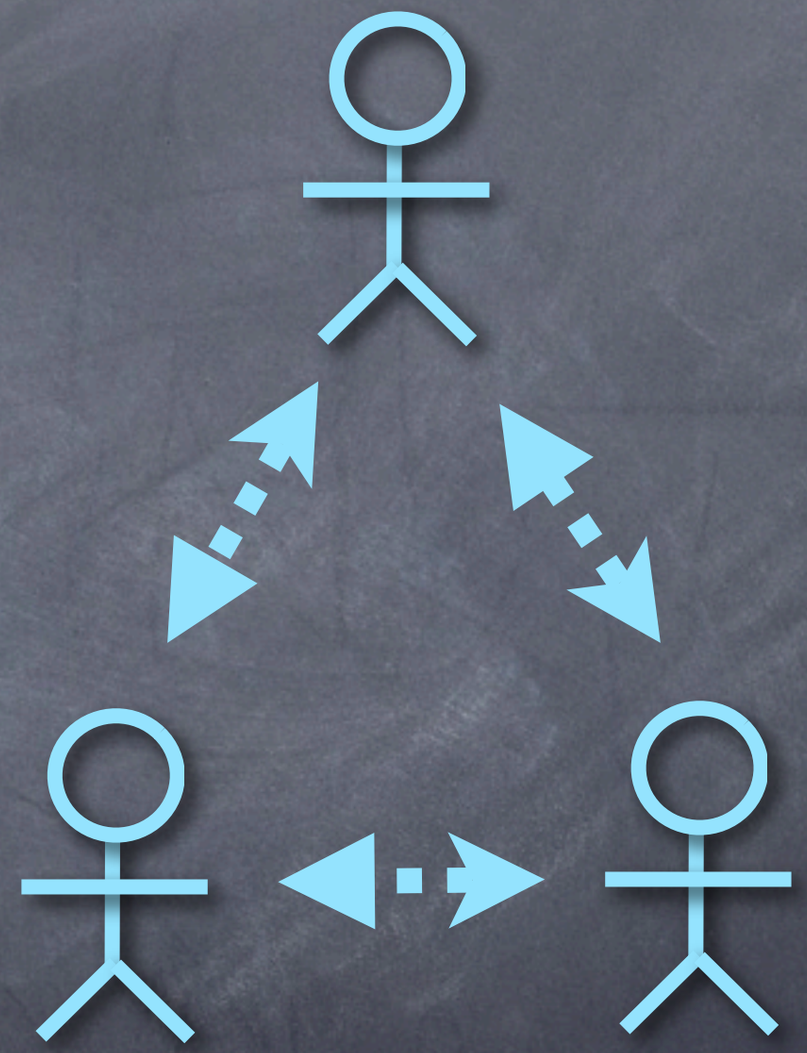


Reference
Model
(running code)

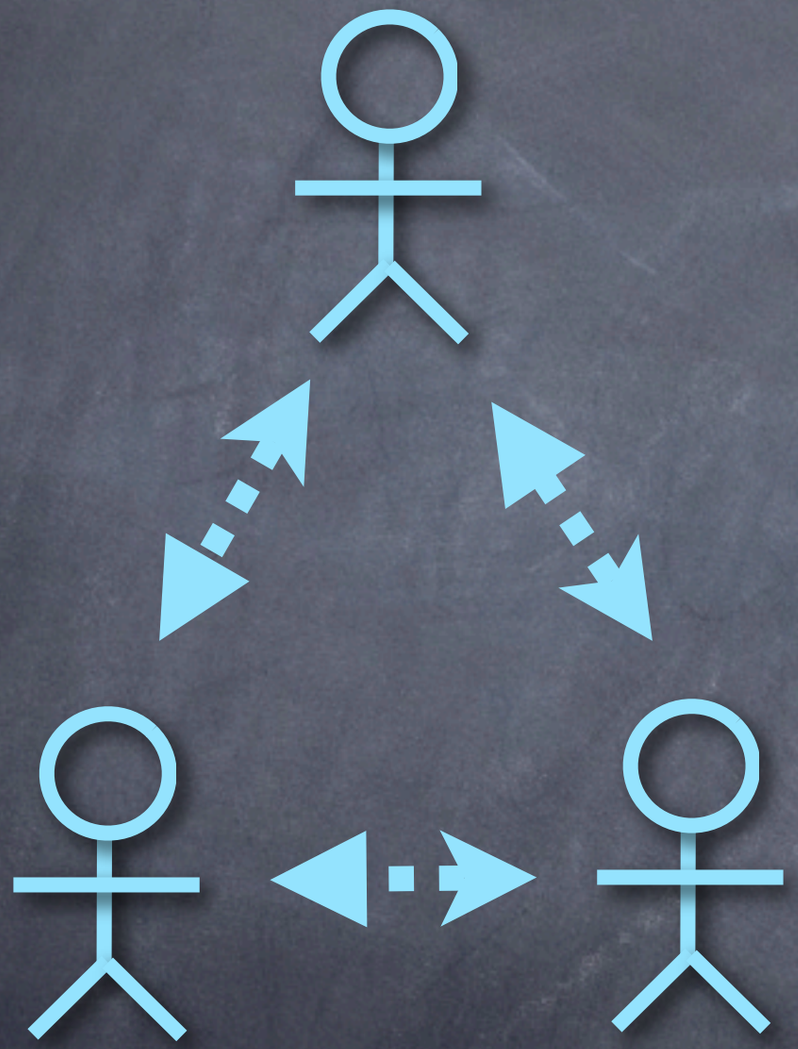
Interoperability



Proprietary



Open Source



Proprietary

Open Source

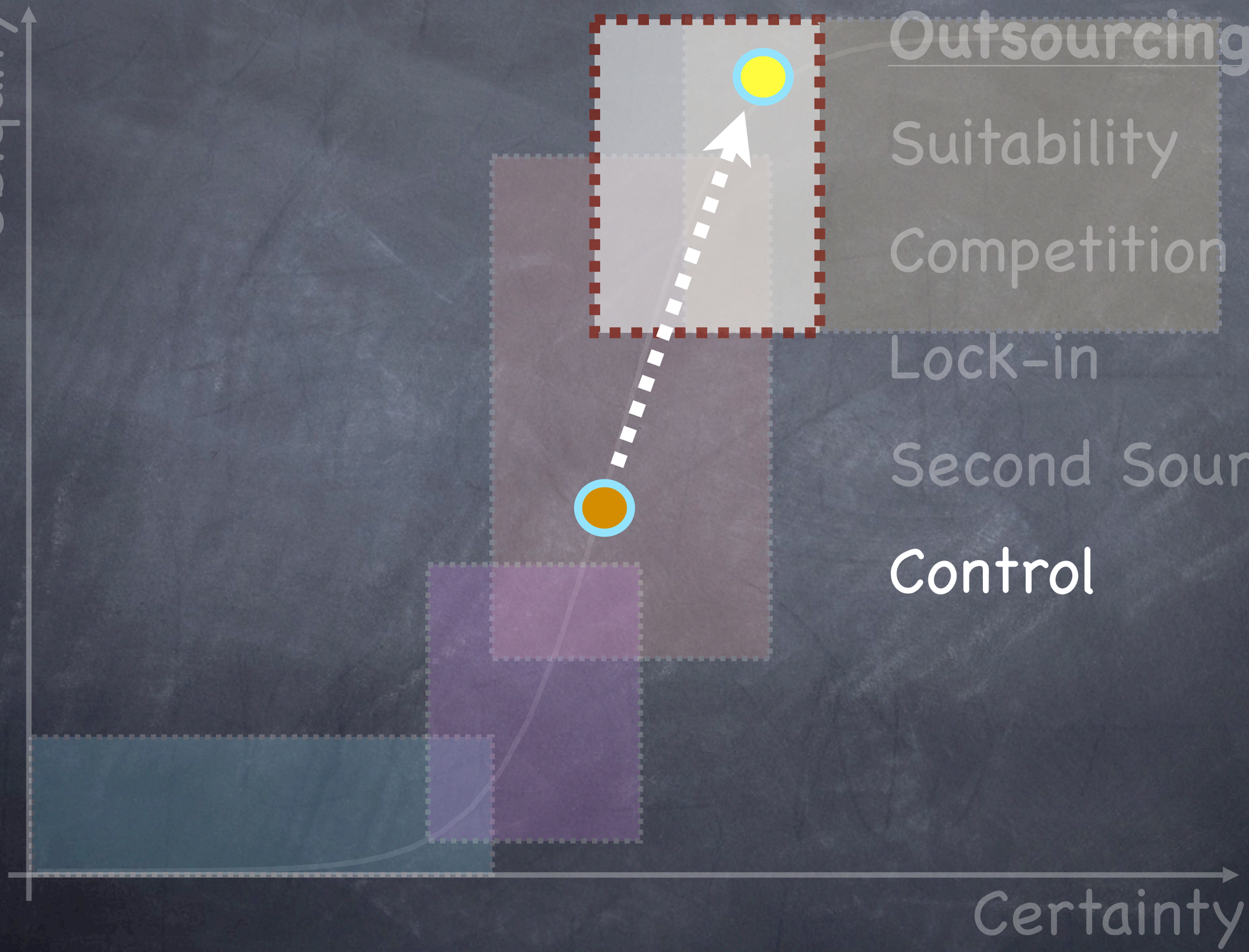
Proprietary

Open Source

Minimise Exit Cost

Adopt defacto public standard

open source implementation


Ubiquity
Certainty
Outsourcing
Suitability
Competition
Lock-in
Second Source
Control

Ubiquity

Transition

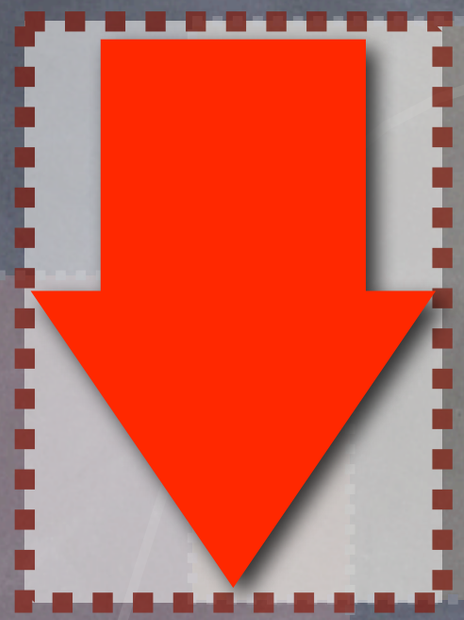
Confusion

Governance

Trust

Security

Transparency



Outsourcing

Suitability

Competition

Lock-in

Second Source

Control

Certainty

http://www.flickr.com/photos/rainbowproject/3928445074/

Ubiquity

Market.....

You .....

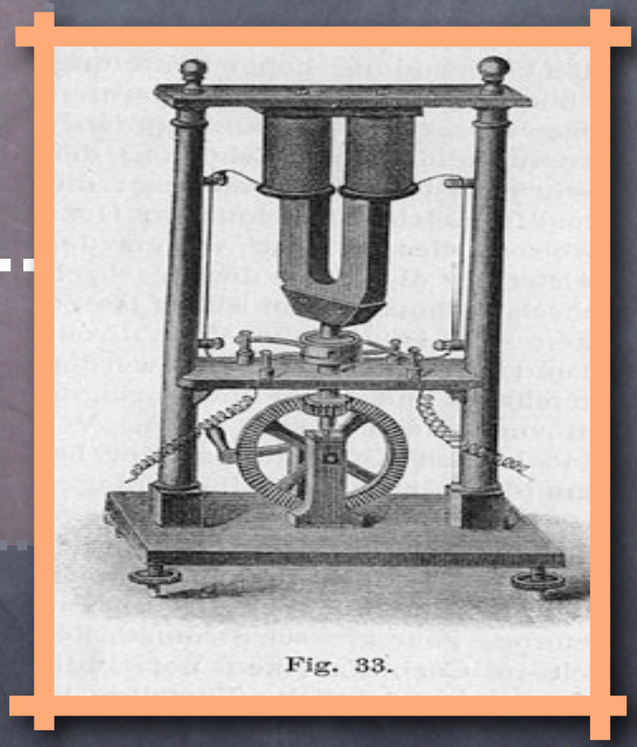
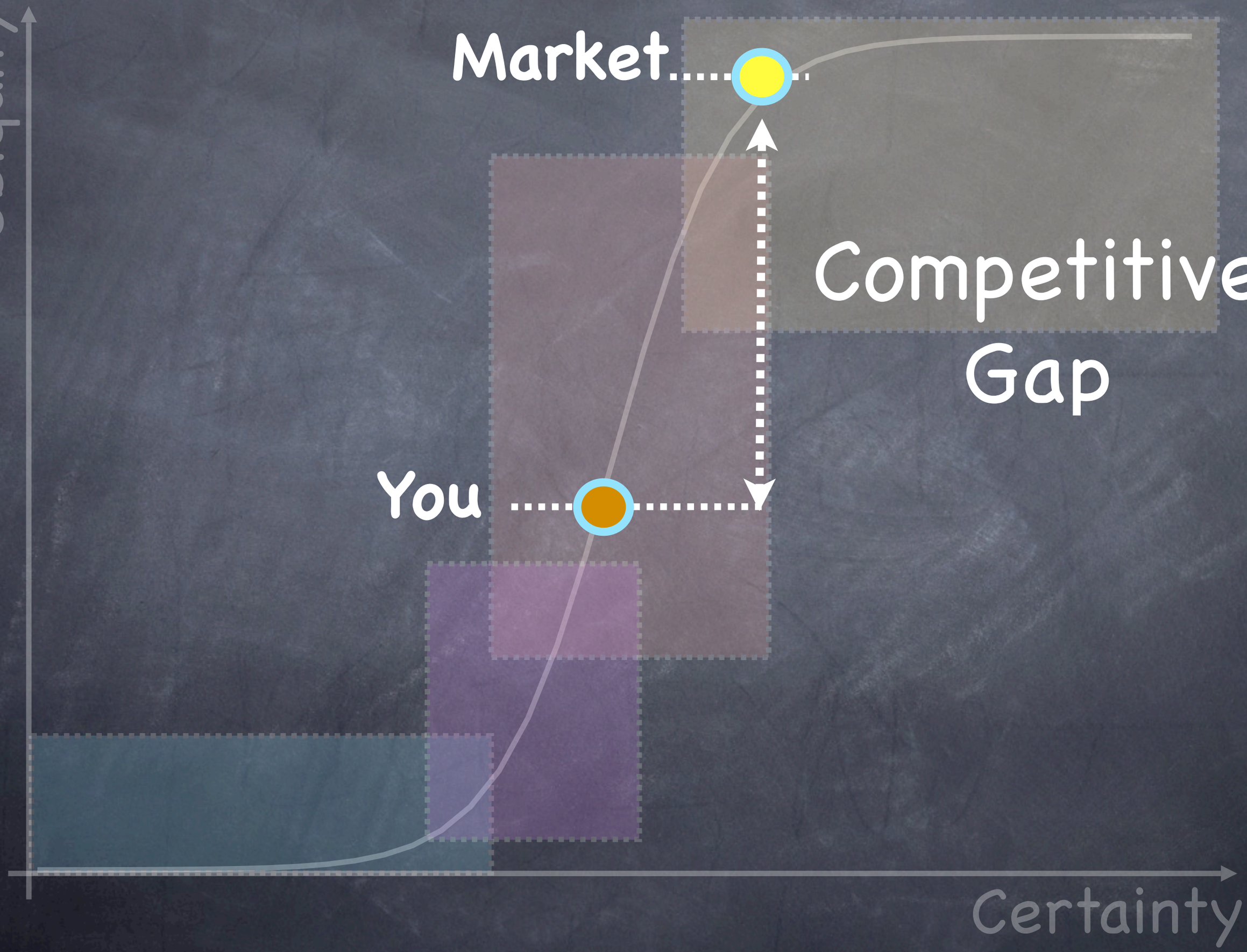


Fig. 33.

Certainty


Ubiquity
Market
Competitive
Gap
You
Certainty

Ubiquity

Market

You

Pay per use

Focus on core

Economies of scale

Speed to market

Accelerated innovation

Reduced cost

Certainty

http://www.flickr.com/photos/privatenobby

http://www.flickr.com/photos/billege

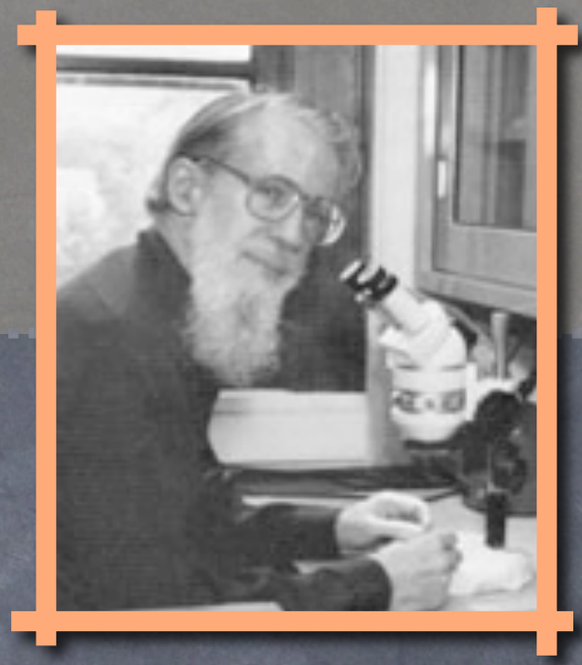
http://www.flickr.com/photos/giddygoose/

Ubiquity

Market

Pressure

You



Prof. Van Valen

"Red Queen Hypothesis"

Certainty

Benefits VS Risks

Recap

Ubiquity

Utility Services

Commodity

Product

Custom built

Innovation

Certainty

Ubiquity

Demand
(user competition)

Improvement
(supply competition)

Certainty

Ubiquity

Software

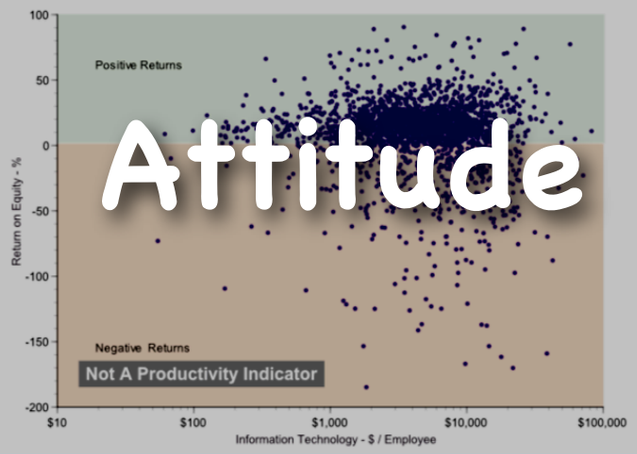
Platform

Infrastructure

… as a **Service**

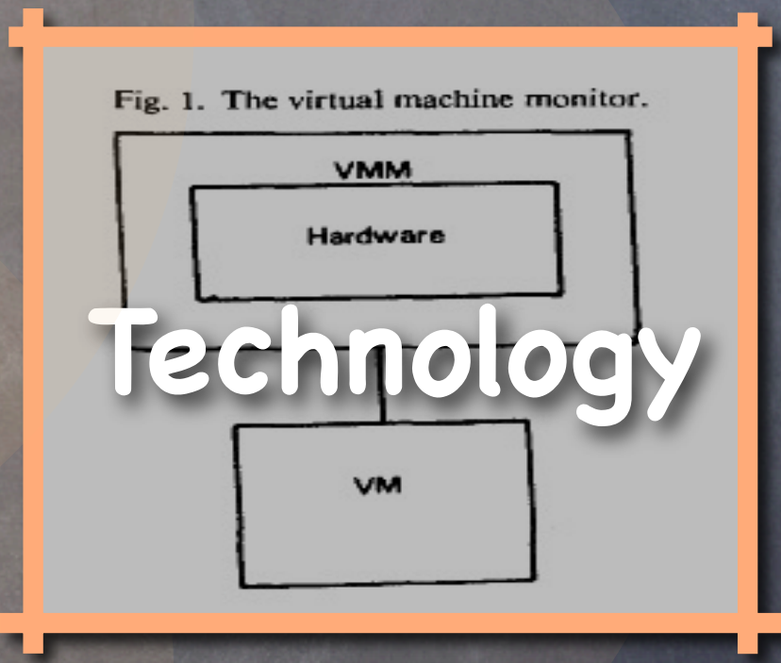
… as a **Product**

Certainty



Attitude

Concept



Technology

Suitability

Ubiquity

Economies of scale
(volume operations)

Focus on core
(outsource)

Pay per use
(utility)

Speed
(componentisation)

Certainty

Ubiquity

Accelerated Innovation

Reduced cost per unit

Greater consumption

Certainty

Ubiquity

Disruptive

… as a

Product

Certainty

Ubiquity

Transition

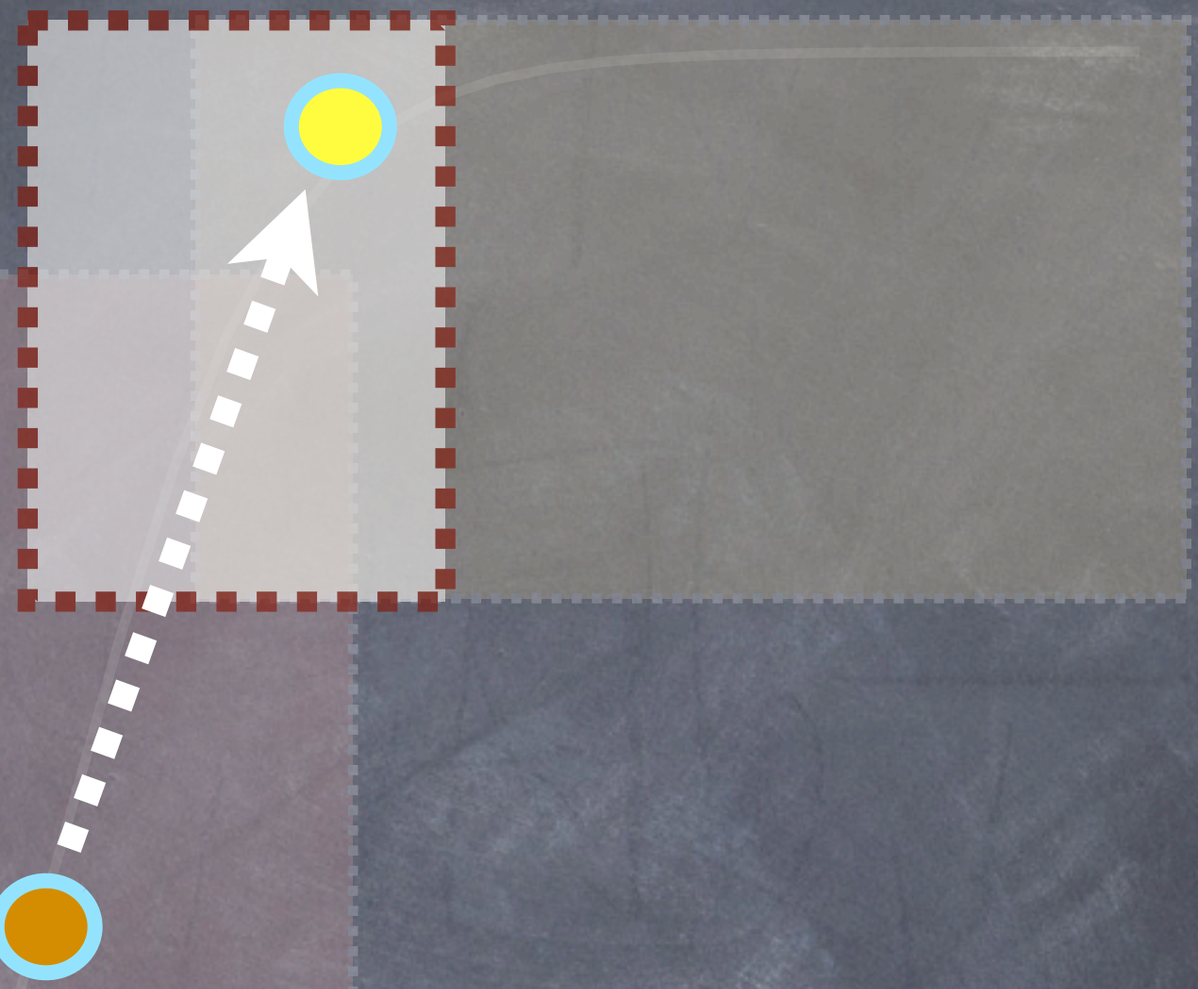
Confusion

Governance

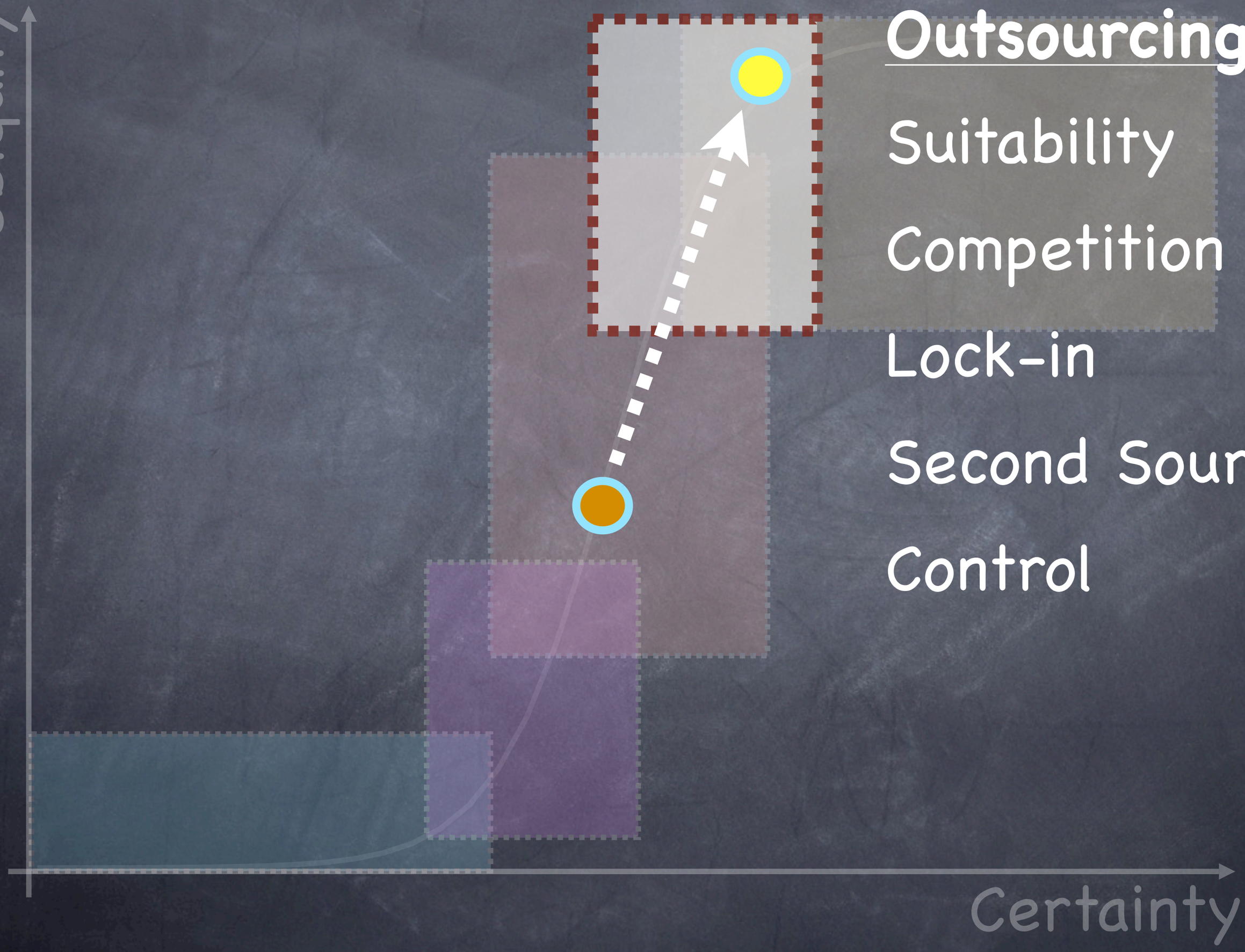
Trust

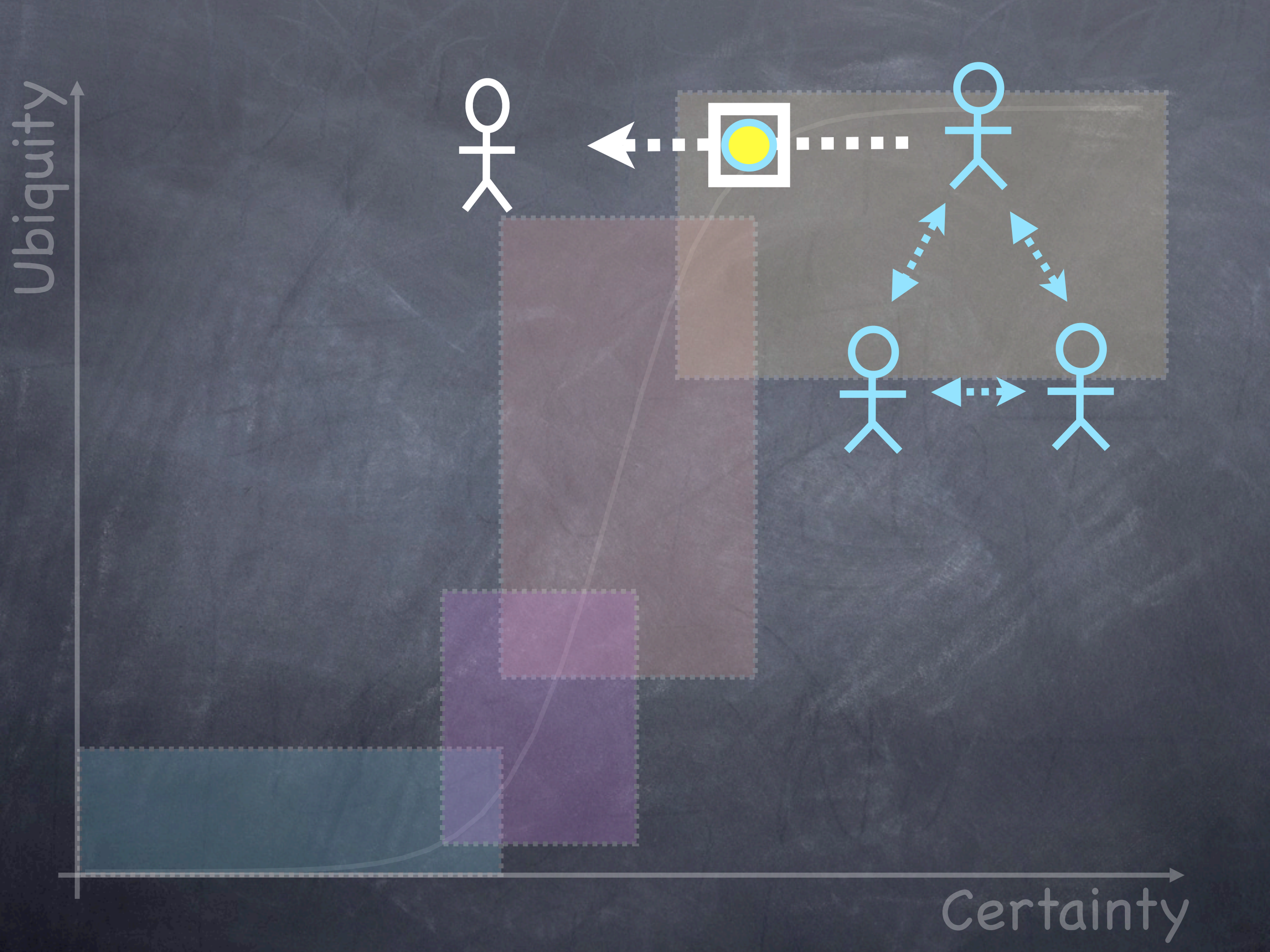
Security

Transparency



Certainty


Ubiquity
Certainty
Outsourcing
Suitability
Competition
Lock-in
Second Source
Control


Ubiquity
Certainty

Minimise Exit Cost

Adopt defacto public standard

open source implementation

Ubiquity

Transition

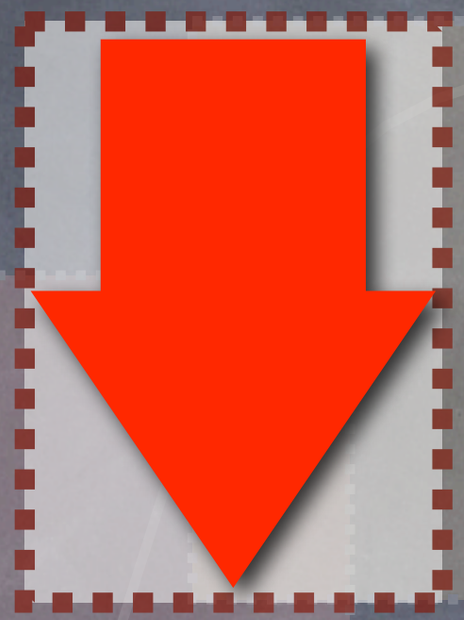
Confusion

Governance

Trust

Security

Transparency



Outsourcing

Suitability

Competition

Lock-in

Second Source

Control

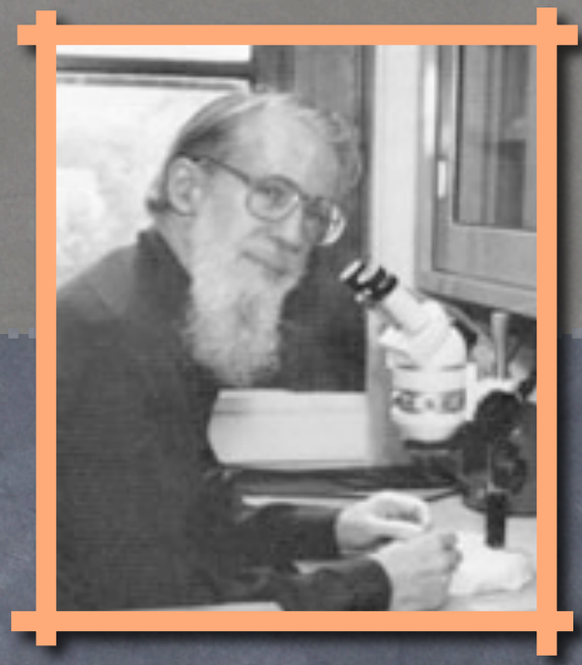
Certainty

Ubiquity

Market

Pressure

You



Prof. Van Valen

"Red Queen Hypothesis"

Certainty

Benefits VS Risks

http://www.flickr.com/photos/21734563@N04/2179722280/

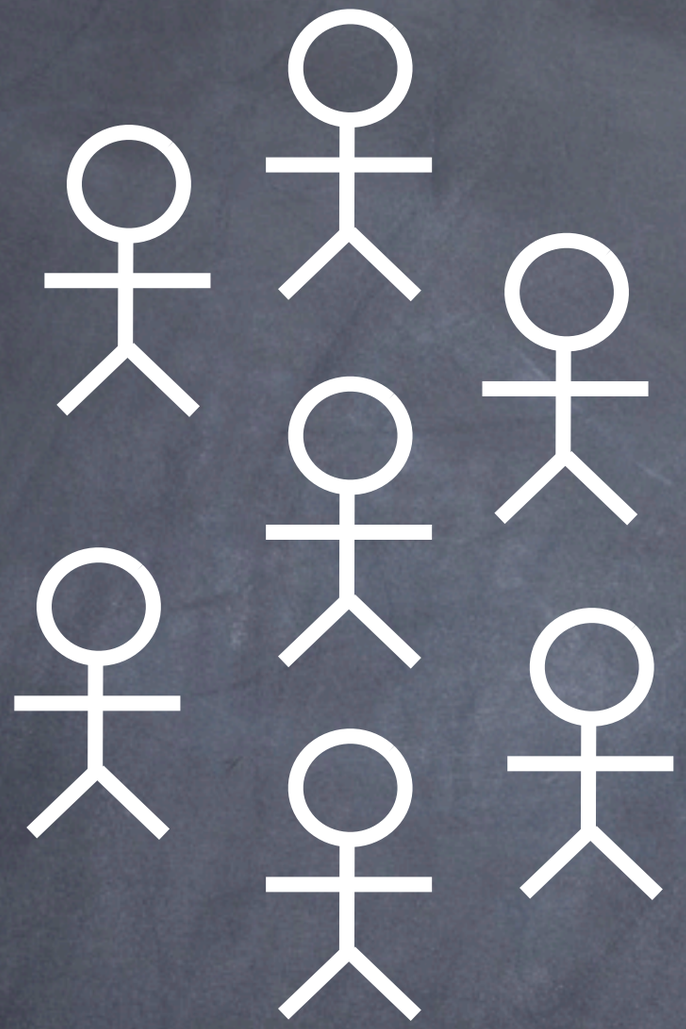
Economics

What is cloud?

Why now?

Benefits & Risks

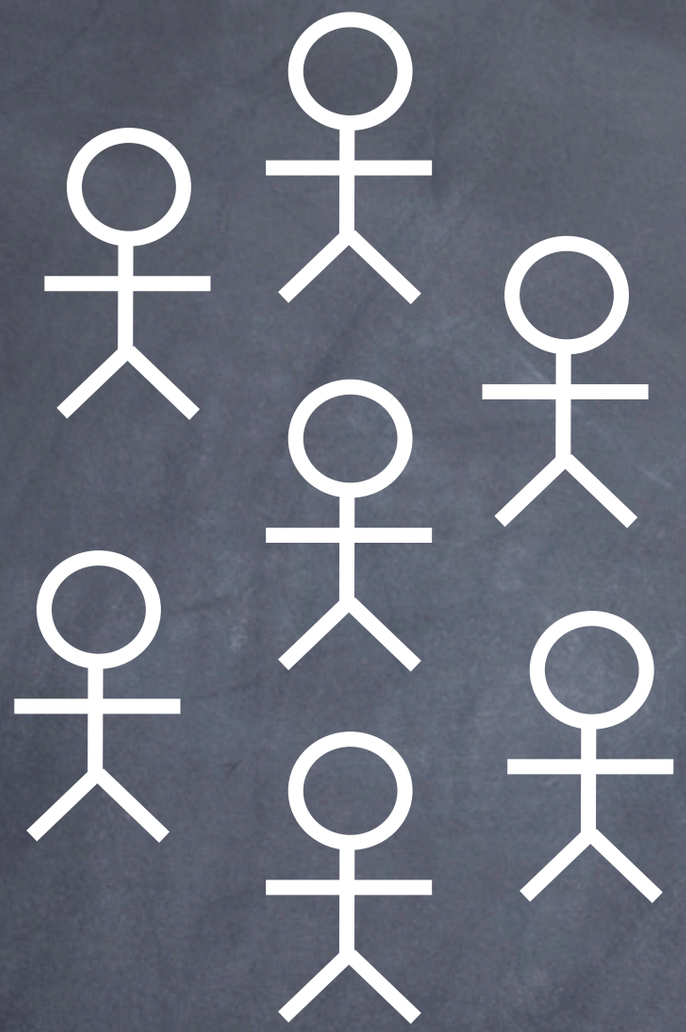
Private or Public?



Consumer

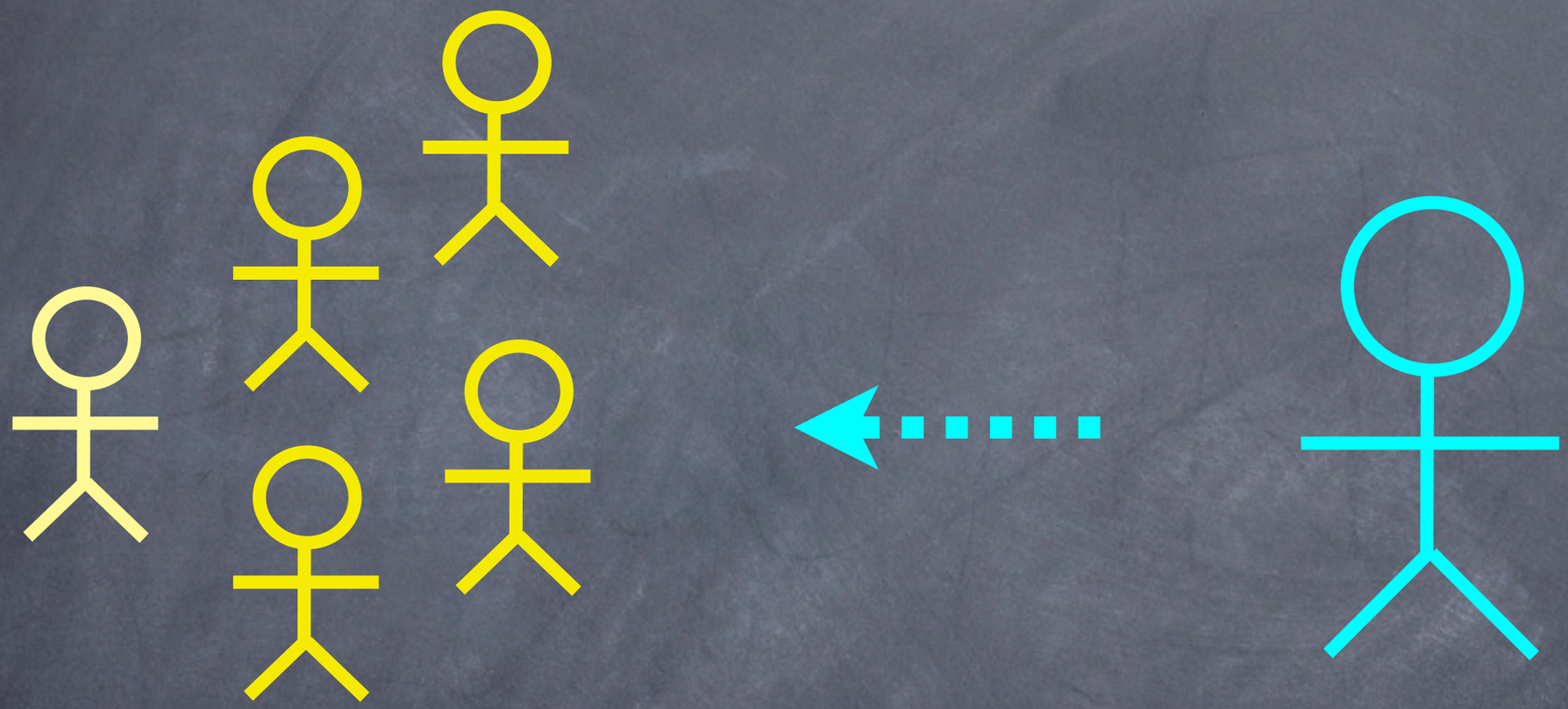
Provider

Public Cloud



Consumer

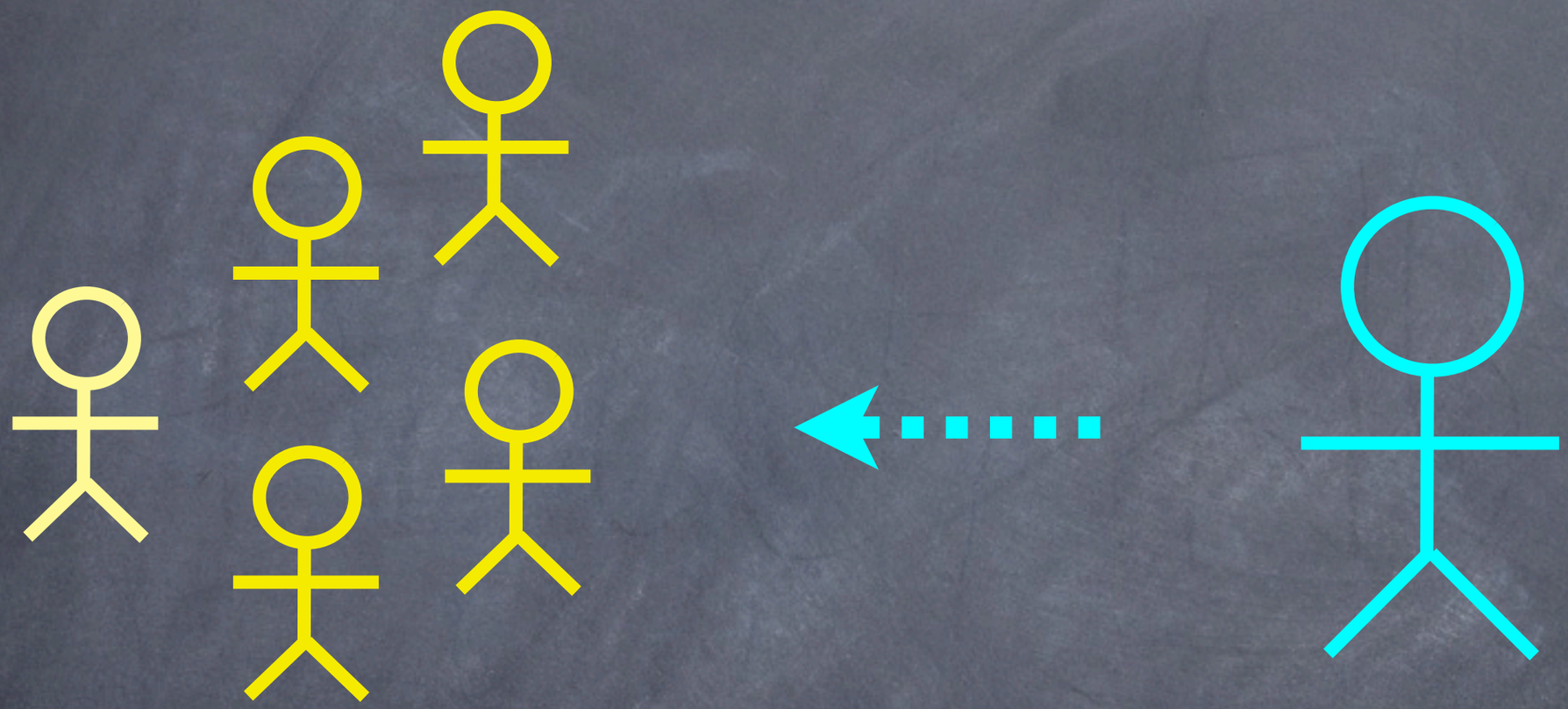
Provider



Consumer

Provider

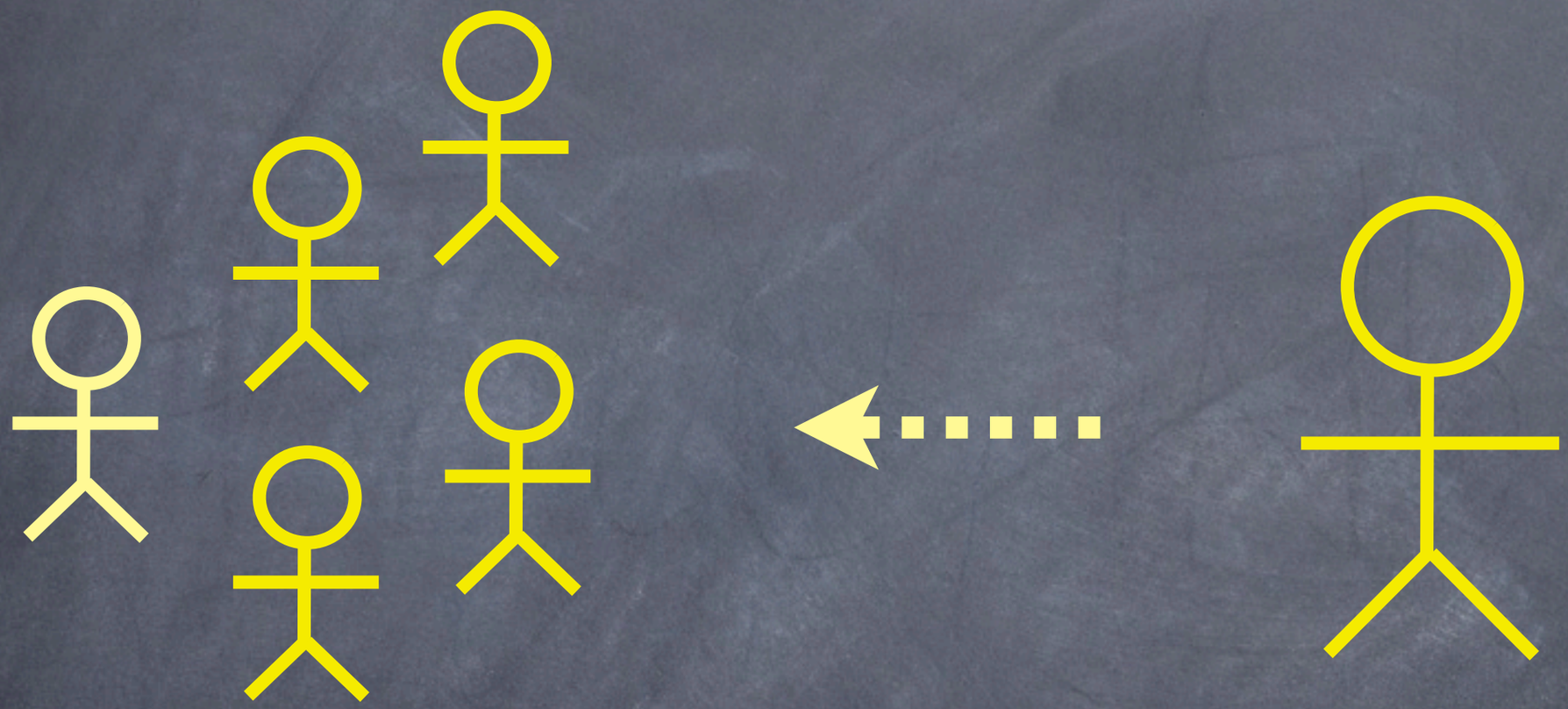
Private Cloud



Consumer

Provider

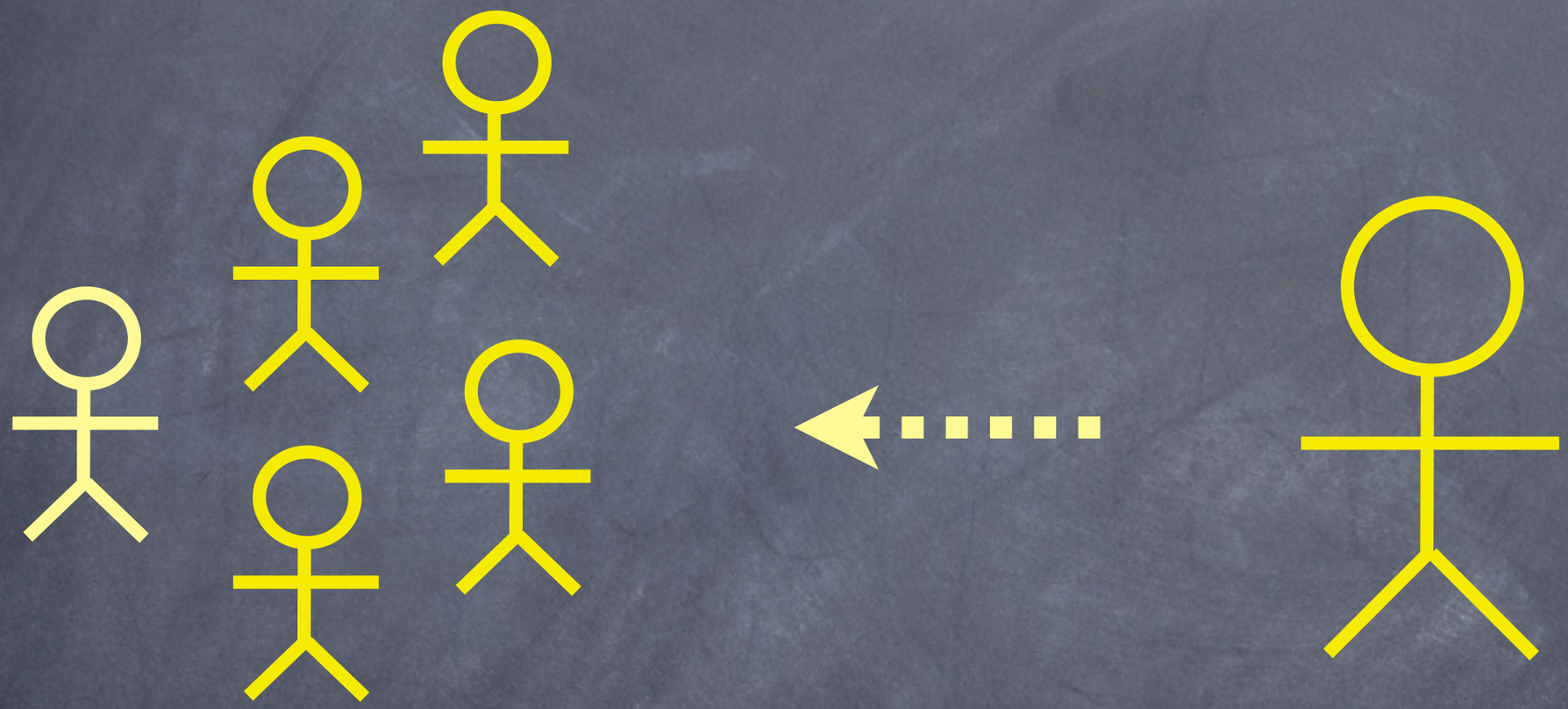
Private Cloud



Consumer

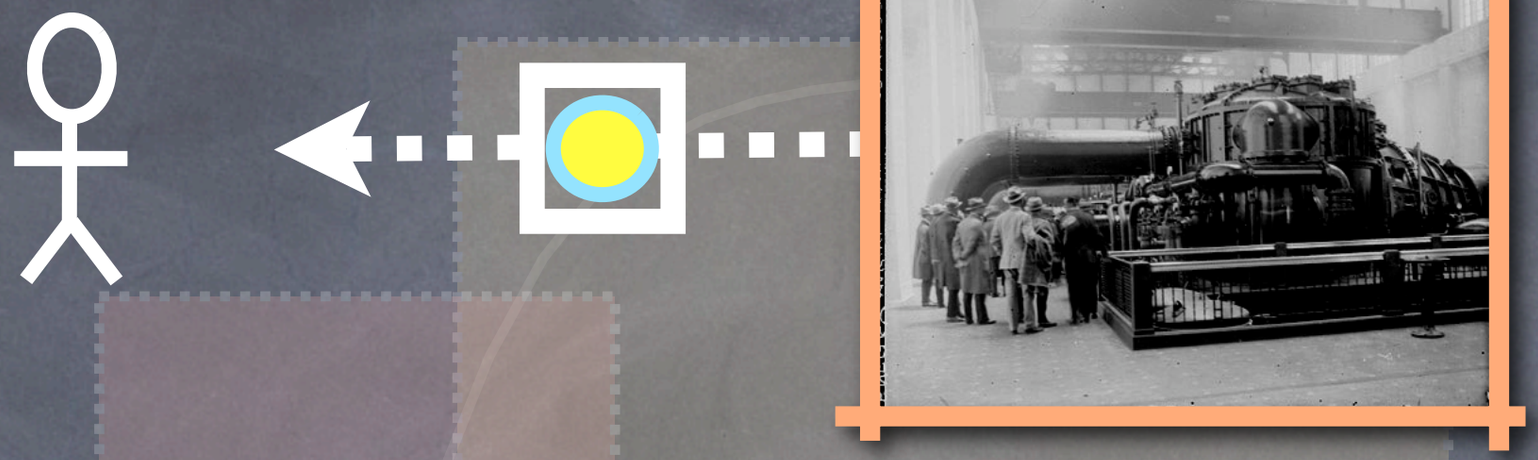
Provider

Private Cloud



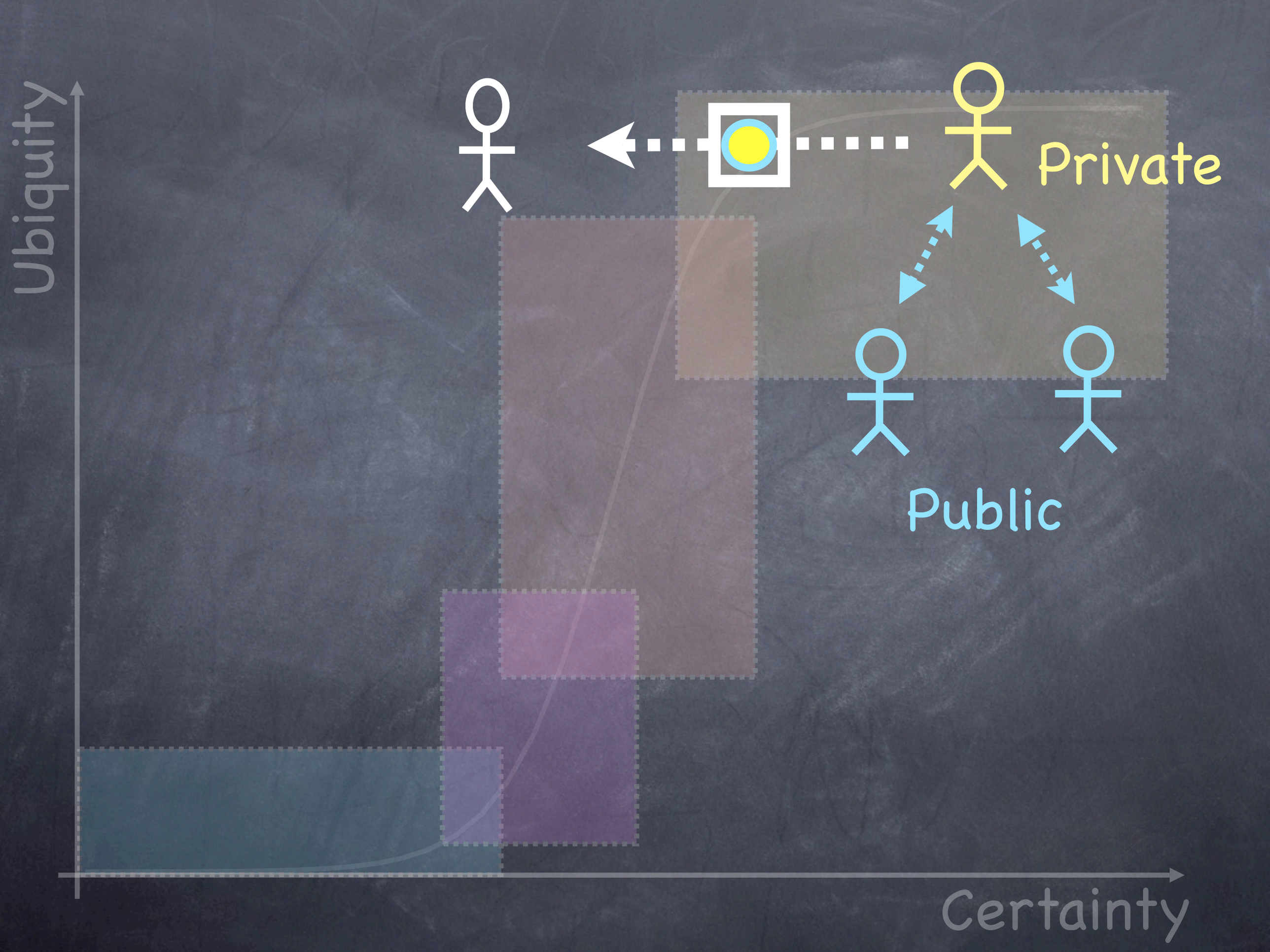
Business Units

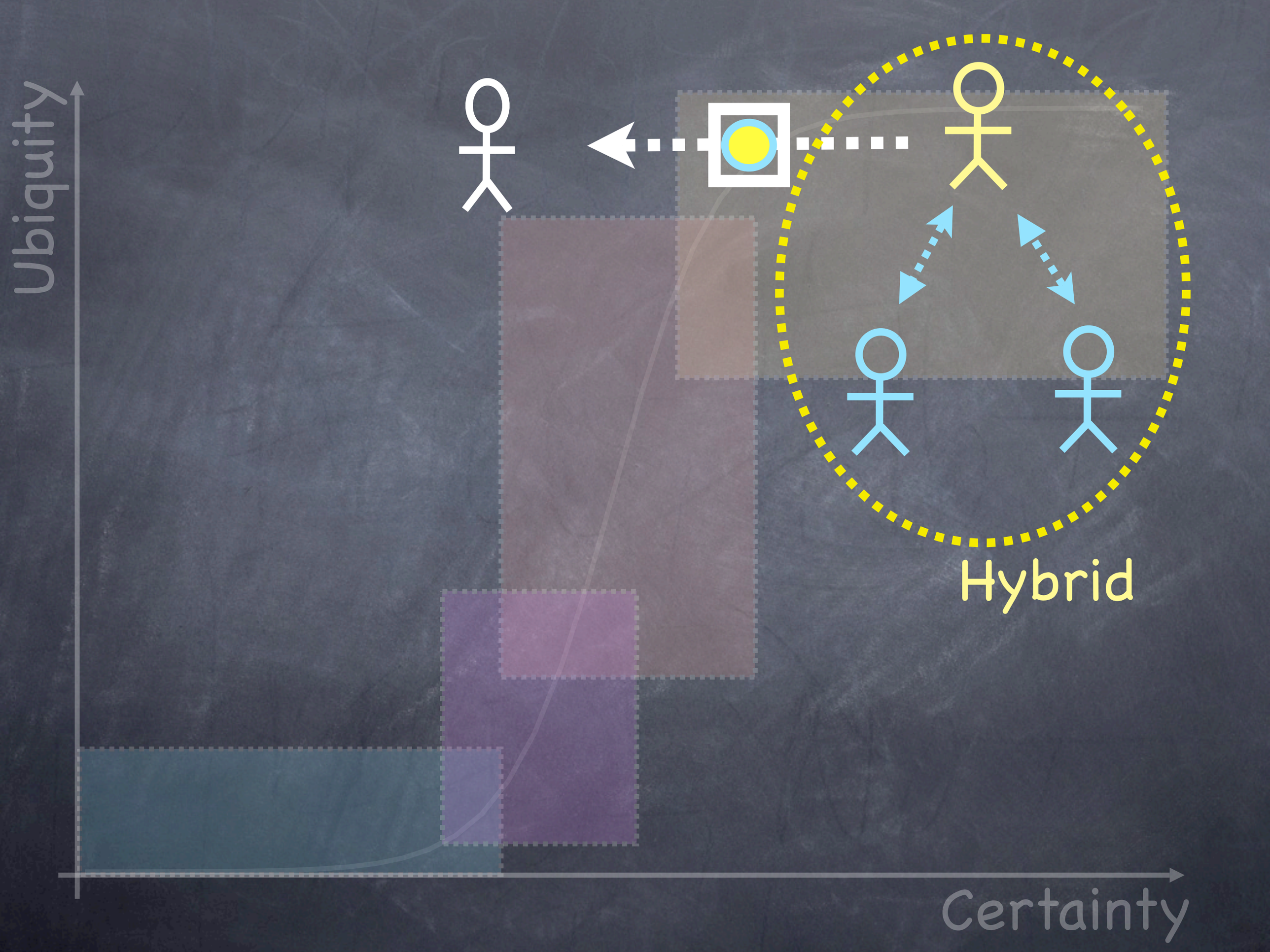
I.T. Dept



Ubiquity

Certainty


Ubiquity
Private
Public
Certainty


Ubiquity
Hybrid
Certainty

Ubiquity

Transition

Governance

Trust

Security

Hybrid

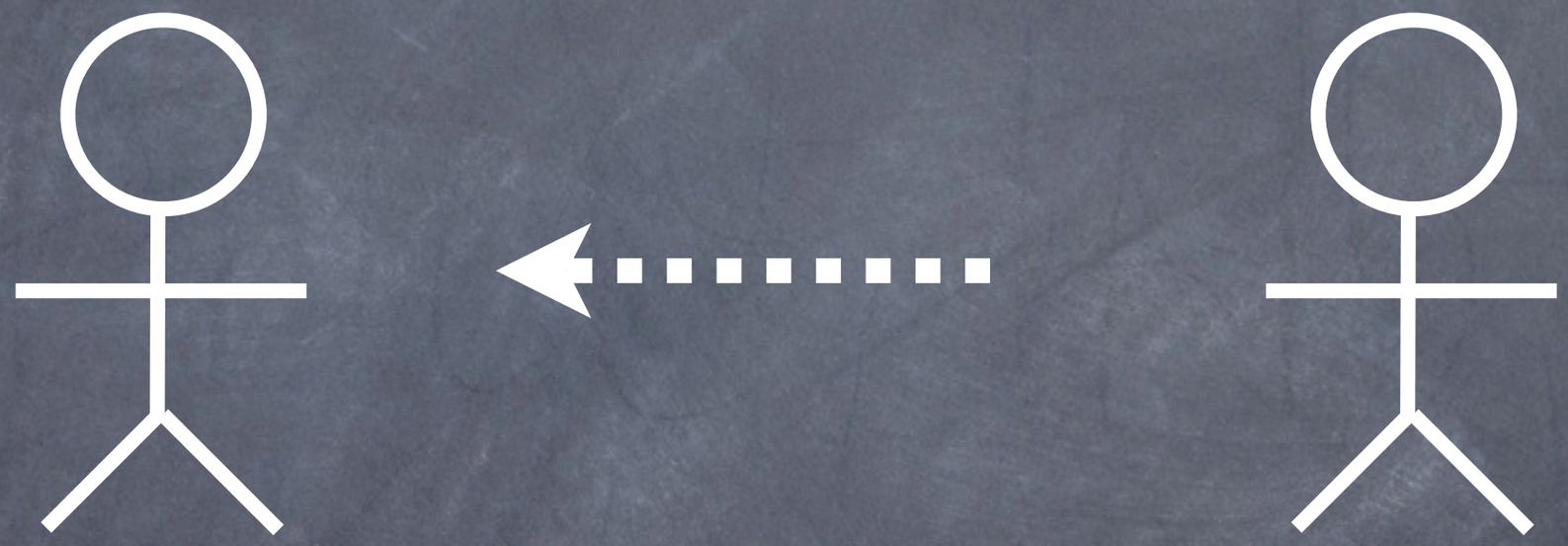
Certainty

"The challenge of the Computer Utility"

Douglas Parkhill

1966

variety of models



Consumer

Provider

Economics

What is cloud?

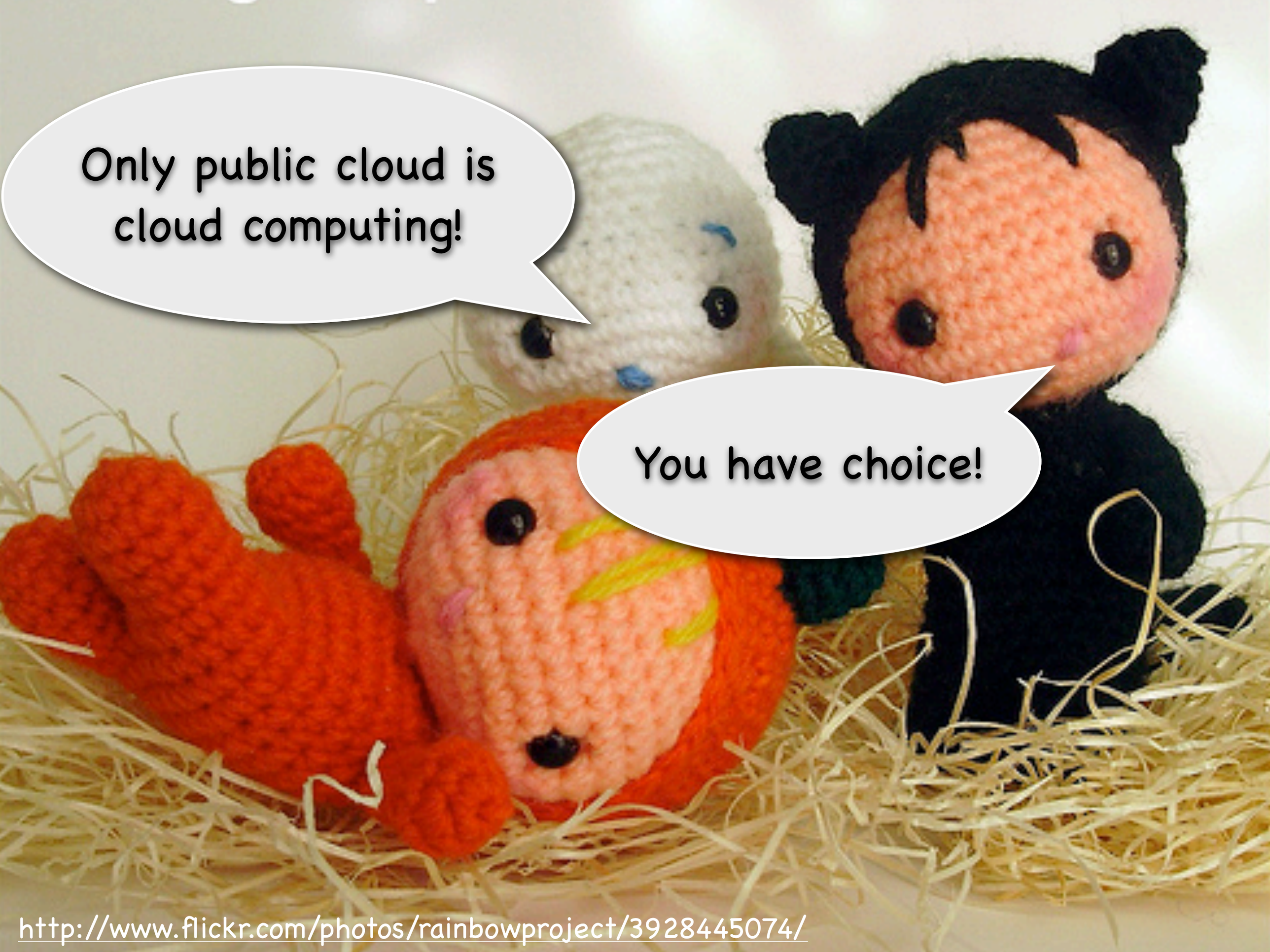
Why now?

Risks

Private or Public?

Myths

http://www.flickr.com/photos/rainbowproject/3928445074/



http://www.flickr.com/photos/rainbowproject/3928445074/

http://www.flickr.com/photos/rainbowproject/3928445074/

http://www.flickr.com/photos/rainbowproject/3928445074/

Ubiquity

Software

Platform

Infrastructure

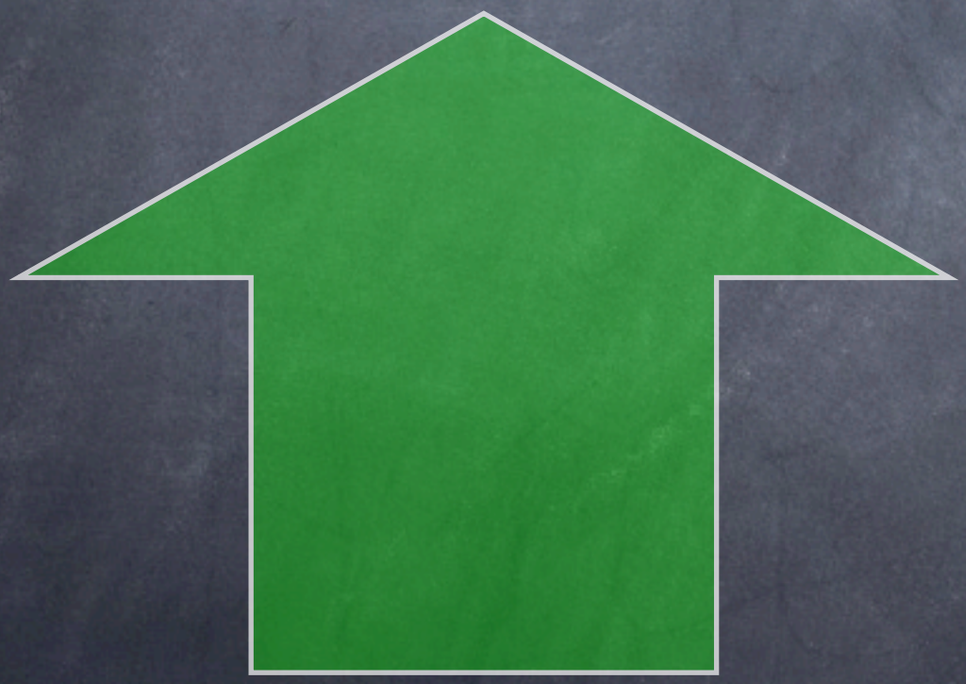
Reduced cost
(per unit)

Pay per use
(utility)

Economies of scale
(volume operations)

Certainty

efficiency



Ubiquity

Software

Platform

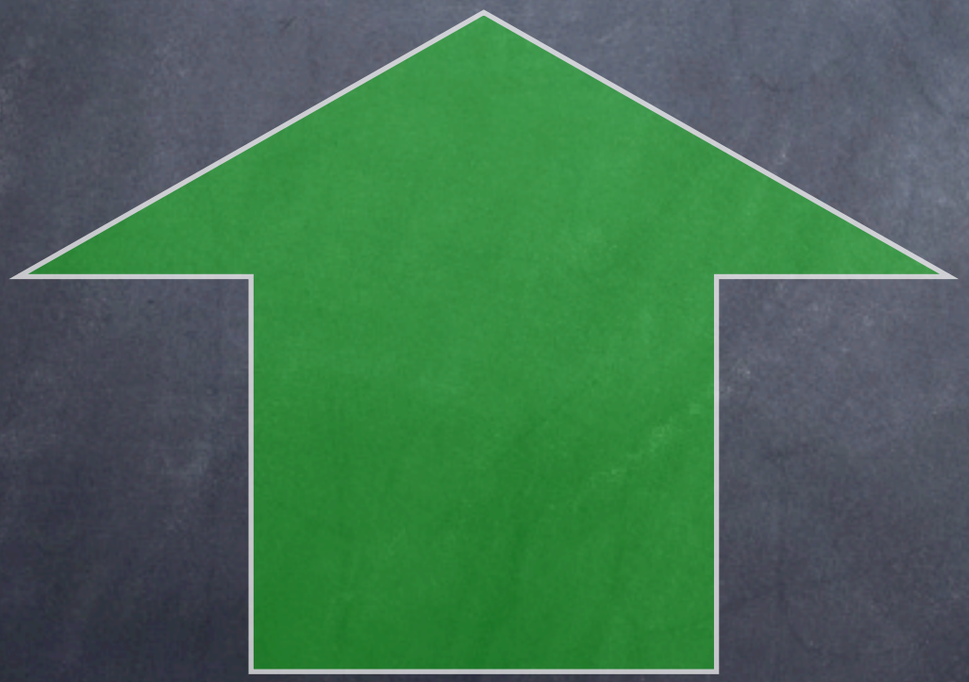
Infrastructure

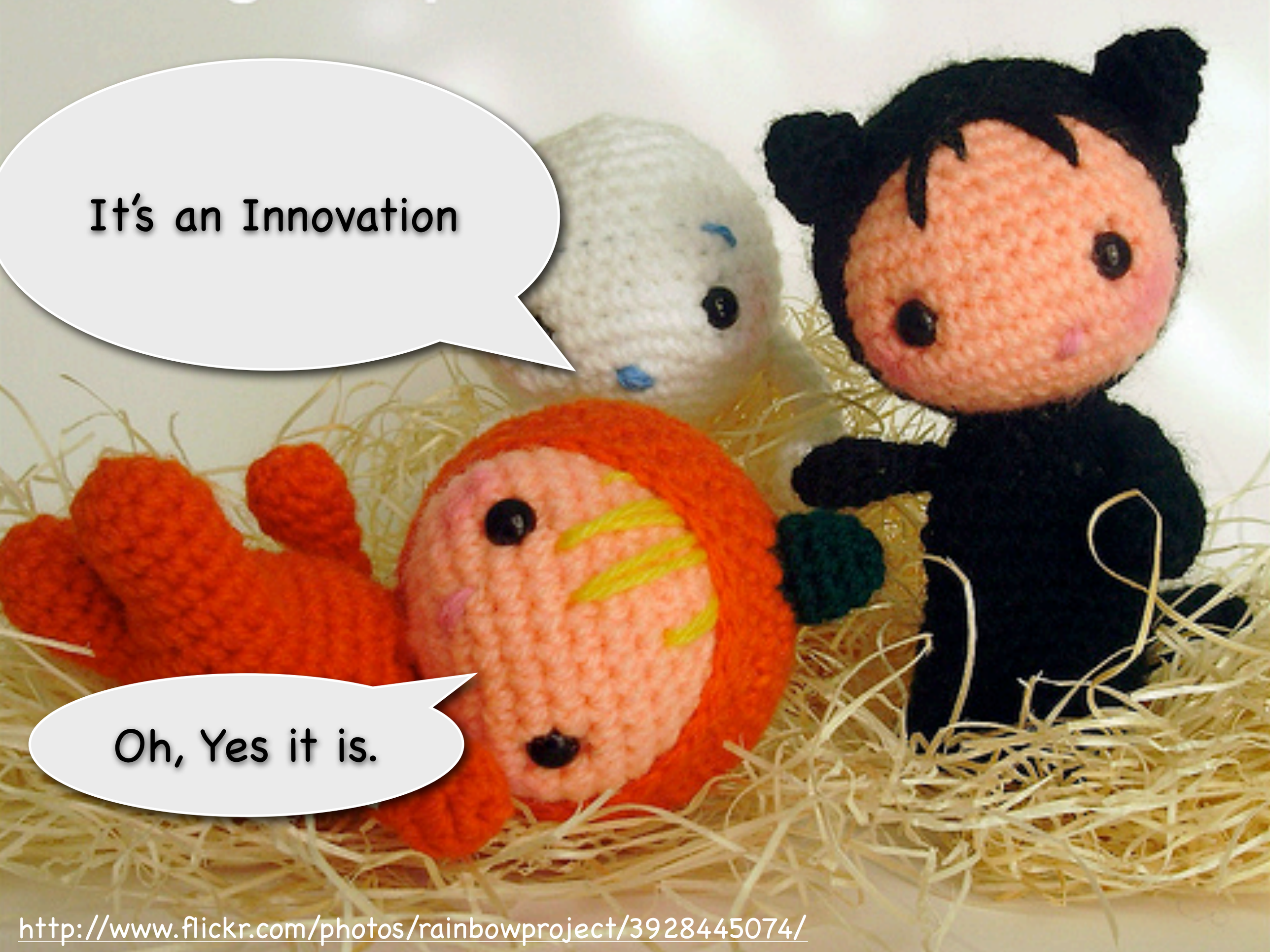
Accelerated Innovation

Certainty

consumption

efficiency





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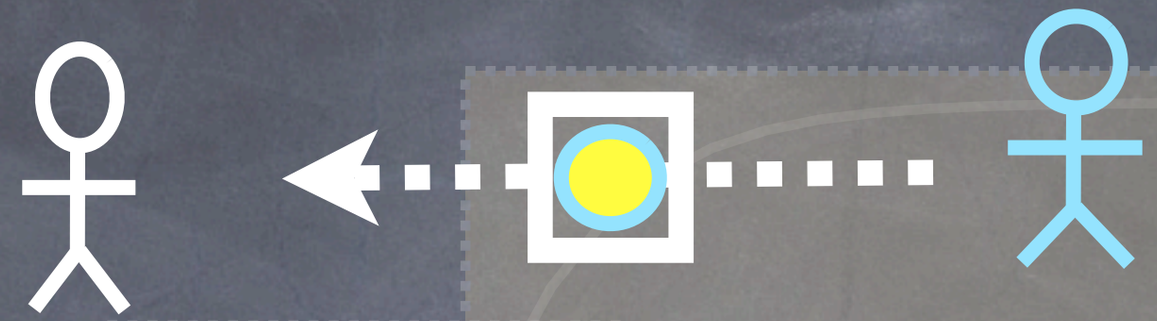


Standardised

Low Cost

High QoS

Ubiquity

Certainty

Innovation = $$$

Ubiquity

+ $$$

Innovation

Certainty

Ubiquity

Market

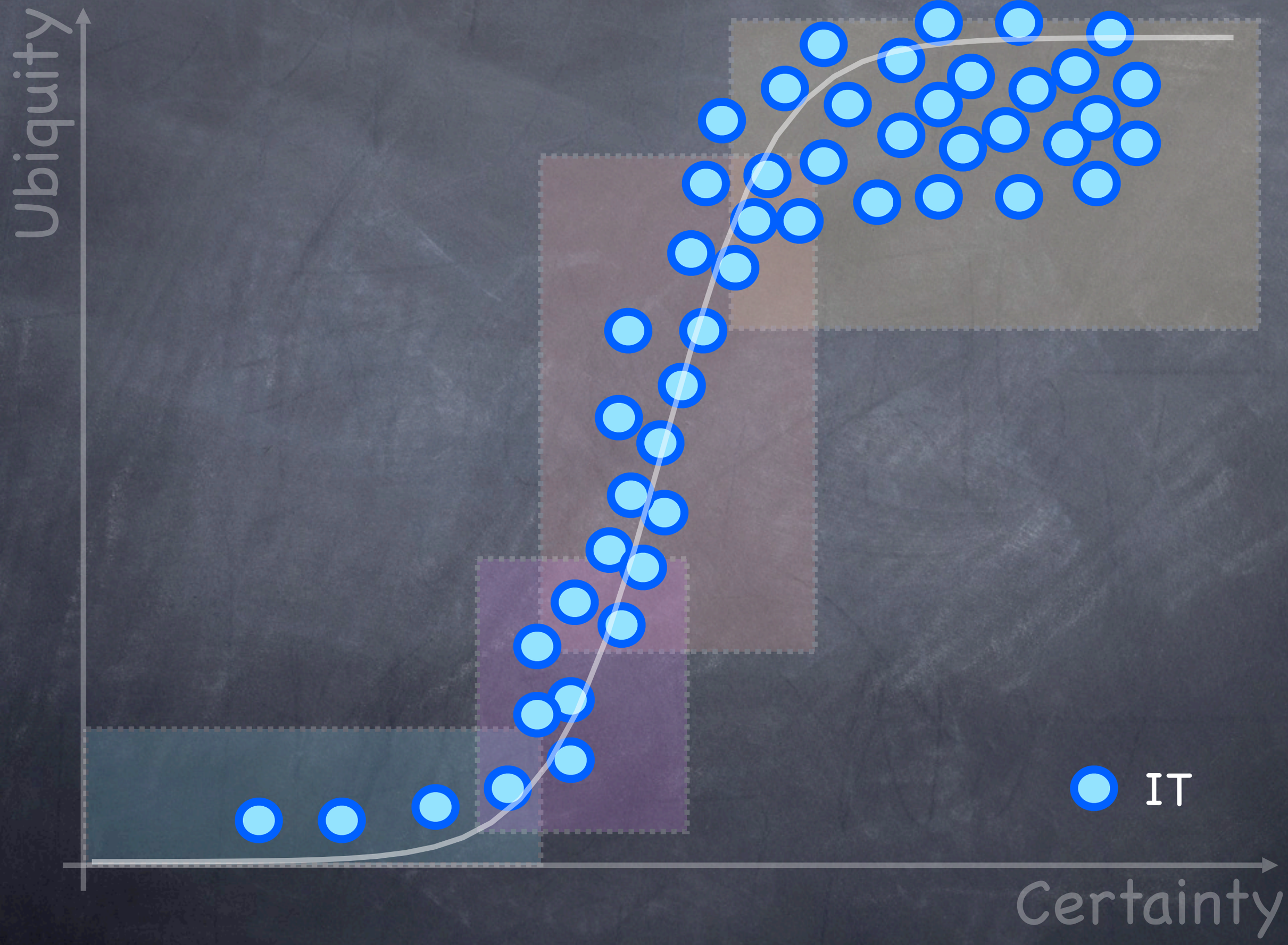
Competitive Gap

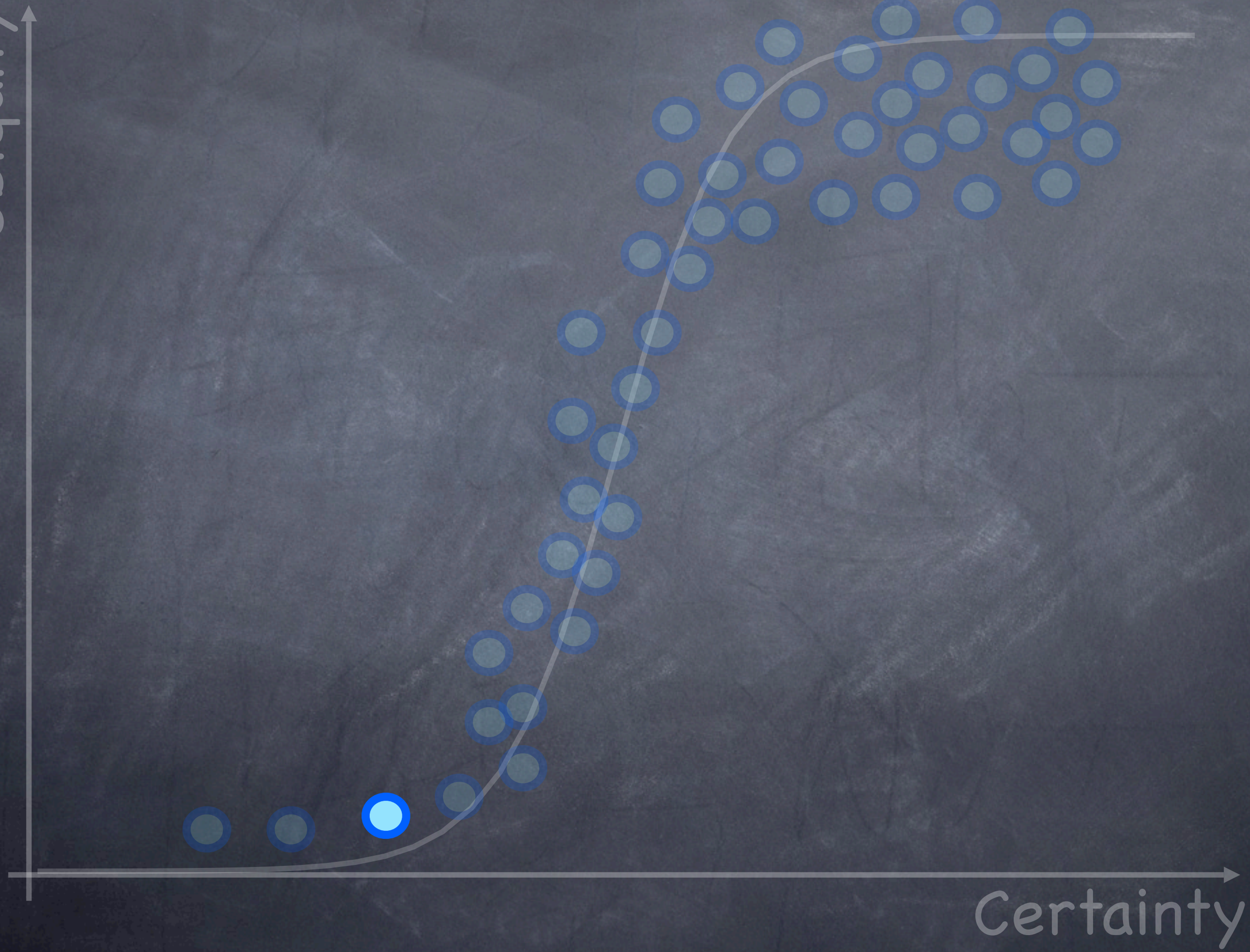
You

Certainty

All IT is the same!

http://www.flickr.com/photos/rainbowproject/3928445074/


Ubiquity
IT
Certainty


Ubiquity
Certainty

Ubiquity

Certainty

Ubiquity

Dynamic

Certainty

Ubiquity

Dynamic

Uncertain

Certainty

Ubiquity

Dynamic

Uncertain

Deviation

Certainty

Ubiquity

Dynamic

Uncertain

Deviation

Differential

Certainty

Ubiquity

Dynamic

Uncertain

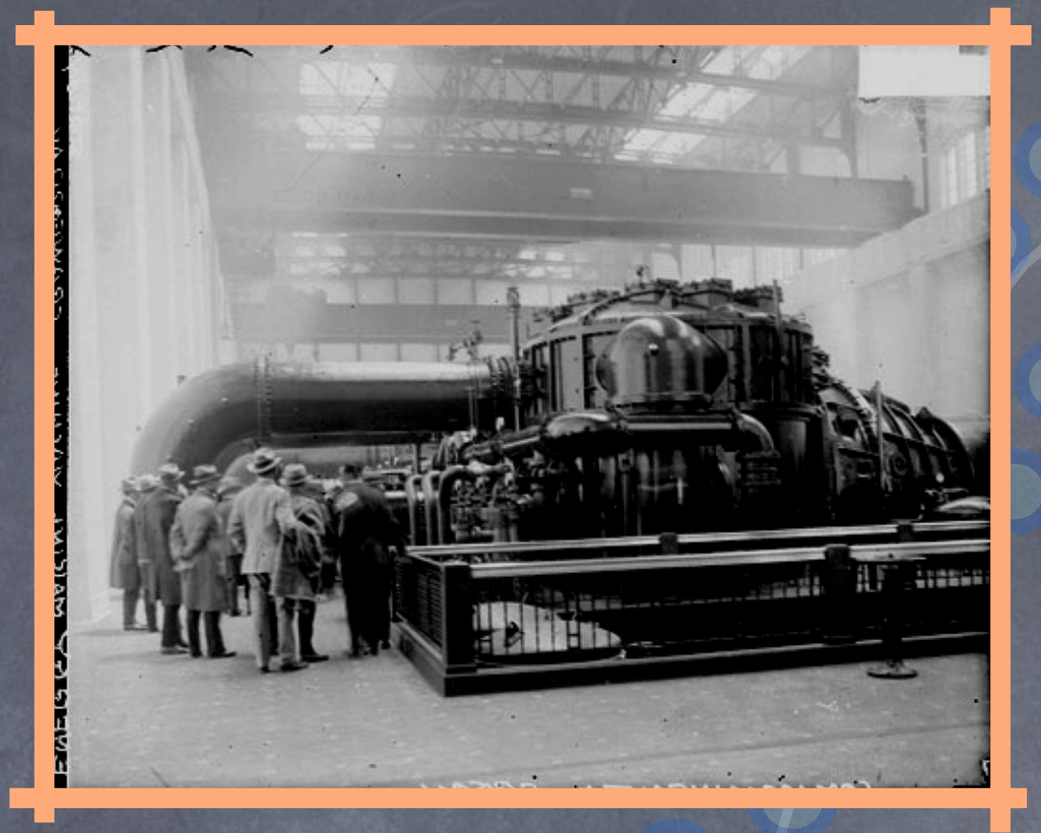
Deviation

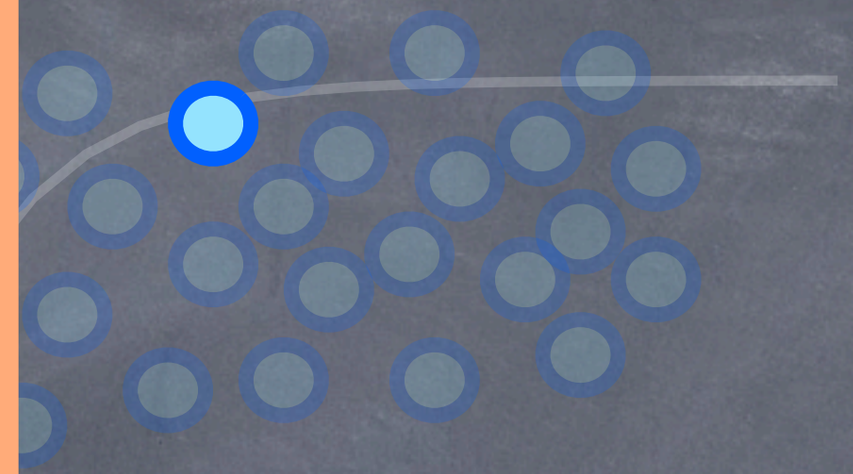
Differential

Worth

Certainty

Ubiquity





Certainty

Ubiquity

Static

Certainty

Ubiquity

Static

Defined

Certainty

Ubiquity

Static

Defined

No Deviation

Certainty

Ubiquity

Static

Defined

No Deviation

Standard

Certainty

Ubiquity

Static

Defined

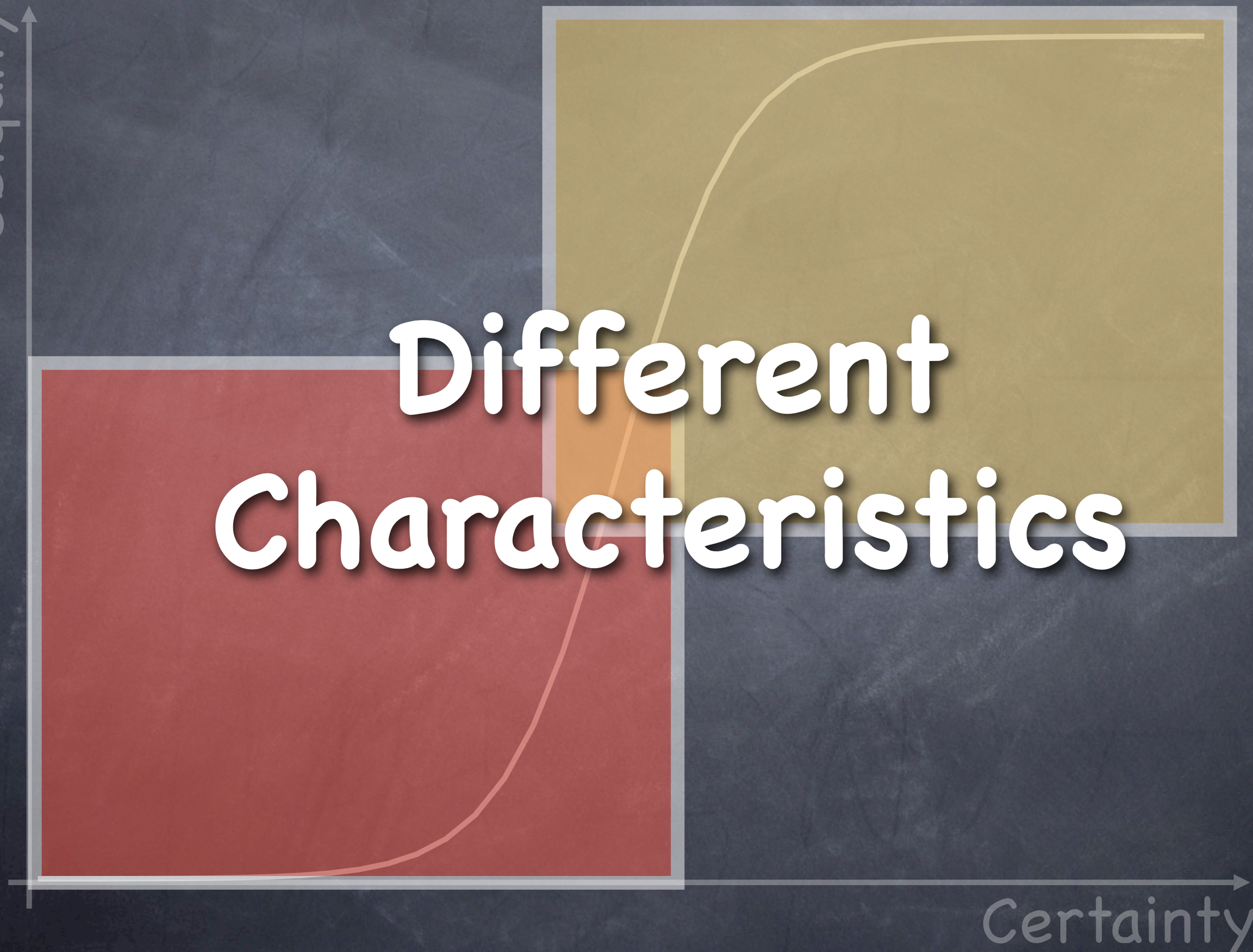
No Deviation

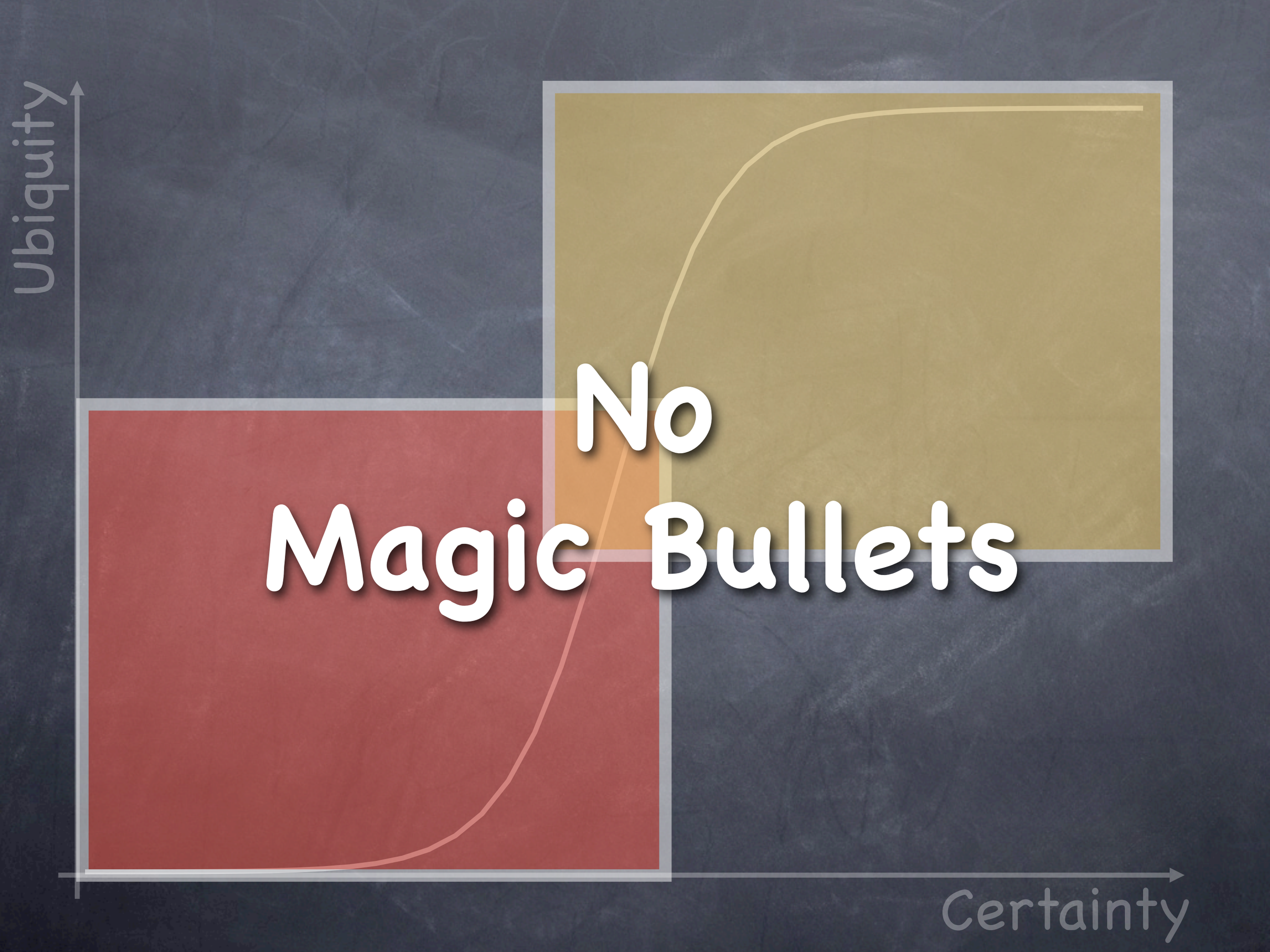
Standard

Cost

Certainty

Different Characteristics





No Magic Bullets

Ubiquity

Six Sigma

Agile

Certainty

Ubiquity

Six Sigma

Certainty

Ubiquity

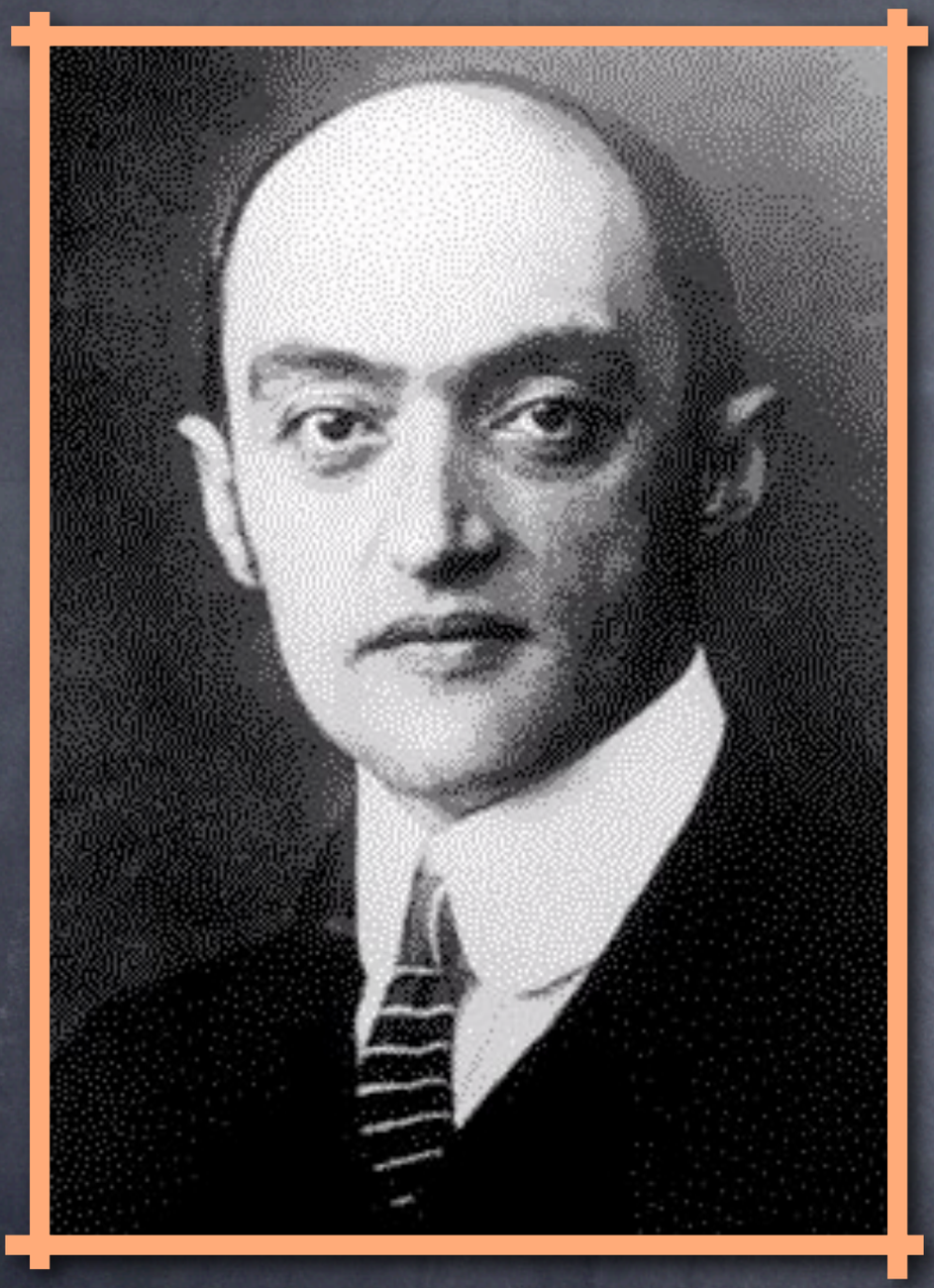
Six Sigma

Certainty

Ubiquity

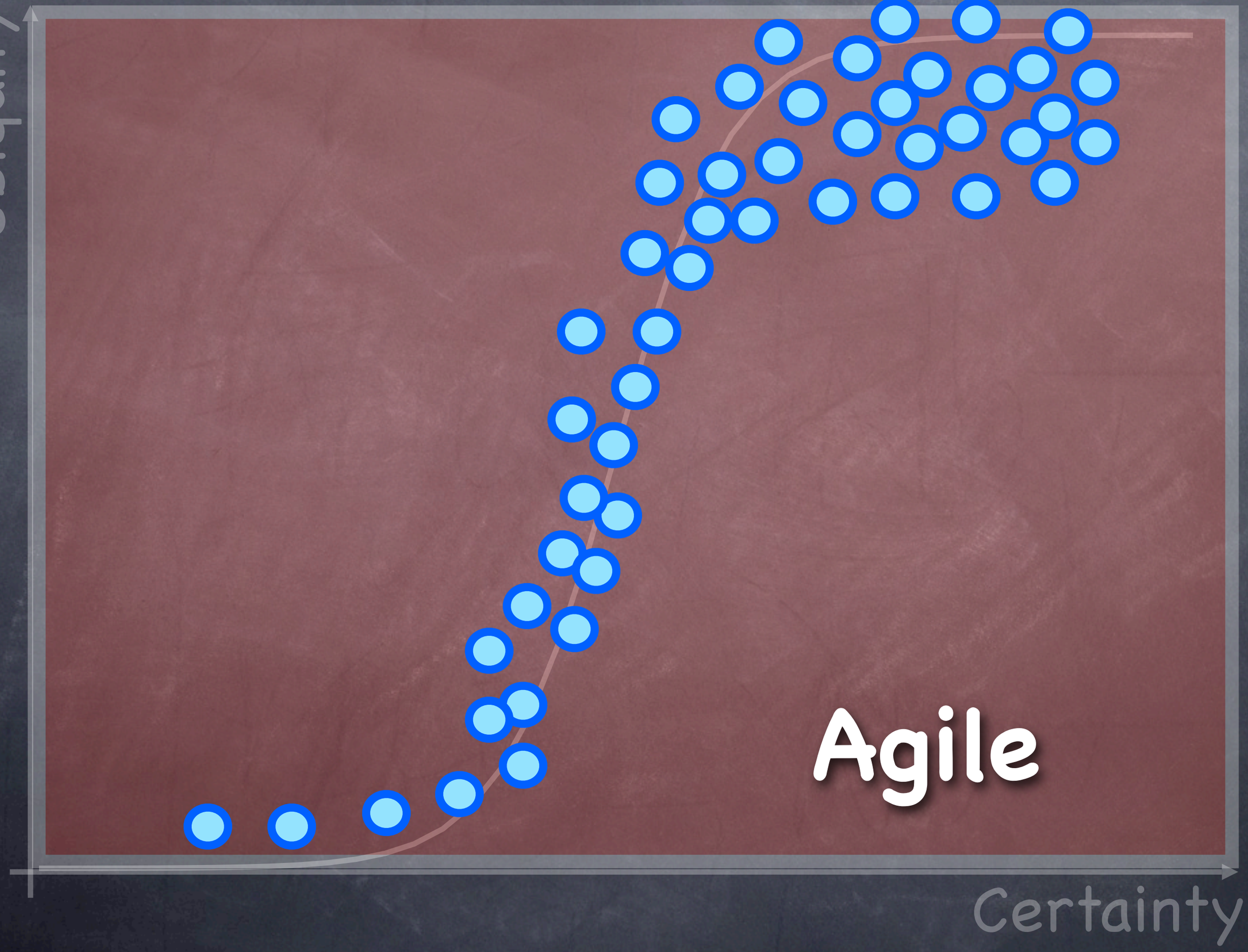
Six Sigma

Certainty



Joseph A. Schumpeter
(1883 - 1950)

The fundamental impulse that sets and keeps the capitalist engine in motion comes from the **new** consumers, goods, the **new** methods of production or transportation, the **new** markets, the **new** forms of industrial organization that capitalist enterprise creates.


Ubiquity
Agile
Certainty

Ubiquity

Agile

Certainty

Ubiquity

Agile

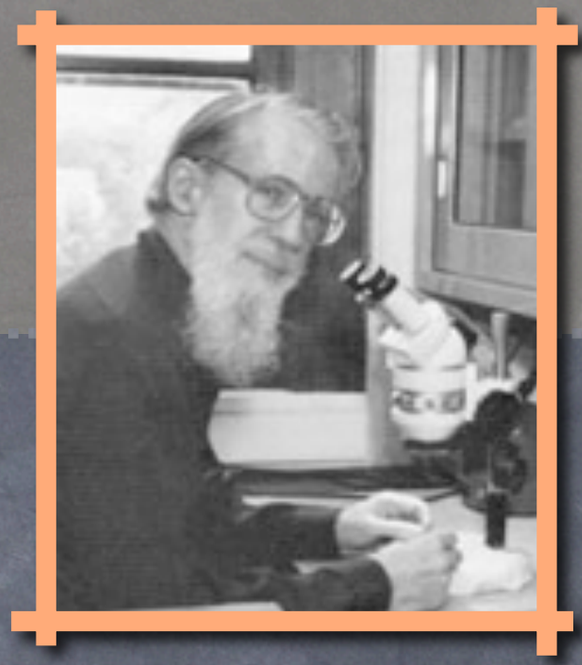
Certainty

Ubiquity

Market

Pressure

You



Prof. Van Valen

"Red Queen Hypothesis"

Certainty

Ubiquity

"one size fits all"

Certainty

Ubiquity

Competitive Efficiency

(Survival Today)

Future Wealth

(Survival Tomorrow)

Certainty

Innovation Paradox

Survival today requires 'coherence, coordination and stability'.

Survival tomorrow requires the replacement of these erstwhile virtues.

Salaman & Storey

Software

Platform

Infrastructure

Ubiquity (how commonplace)

Certainty (level of definition / standardisation)

Ubiquity

Software

Platform

Infrastructure

Accelerated Innovation

Certainty

Ubiquity

Competitive Efficiency

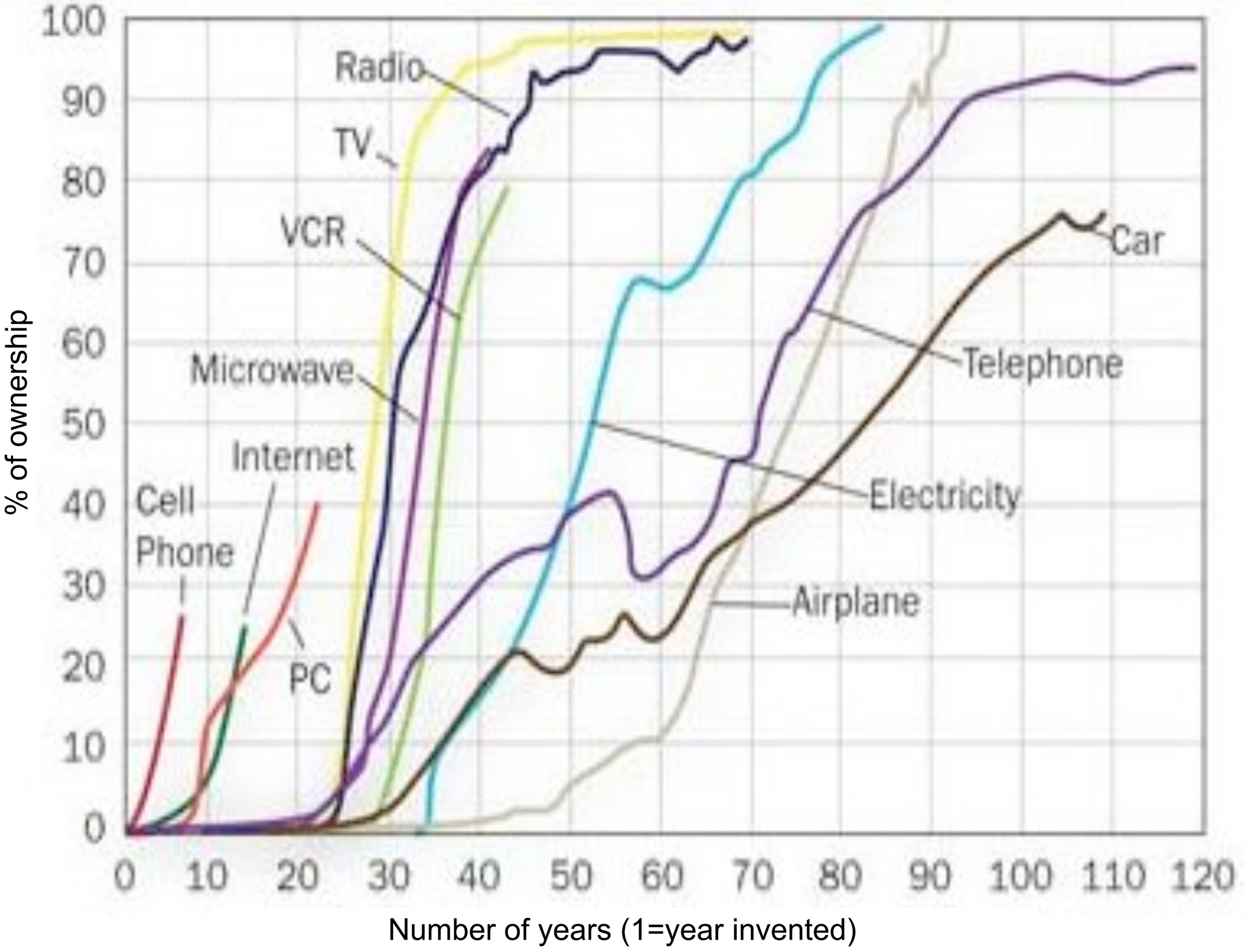
(Survival Today)

Future Wealth

(Survival Tomorrow)

Certainty

Recap


% of ownership
100
90
80
70
60
50
40
30
20
10
0
0
10
20
30
40
50
60
70
80
90
100
110
120
Number of years (1=year invented)
Radio
TV
VCR
Microwave
Internet
Cell Phone
PC
Car
Telephone
Electricity
Airplane

Ubiquity

Utility Services

Commodity

Product

Custom built

Innovation

Certainty

Ubiquity

Software

Platform

Infrastructure

… as a **Service**

… as a **Product**

Certainty

Ubiquity

Economies of scale
(volume operations)

Focus on core
(outsource)

Pay per use
(utility)

Speed
(componentisation)

Certainty

Ubiquity

Accelerated Innovation

Reduced cost per unit

Greater consumption

Certainty

Ubiquity

Disruptive

… as a

Product

Certainty

Ubiquity

Transition

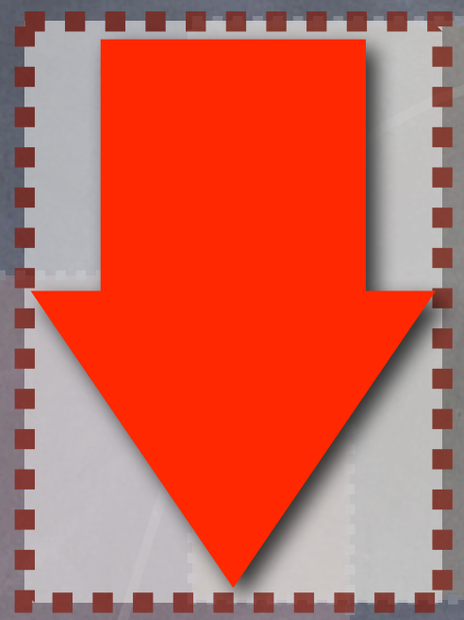
Confusion

Governance

Trust

Security

Transparency



Outsourcing

Suitability

Competition

Lock-in

Second Source

Control

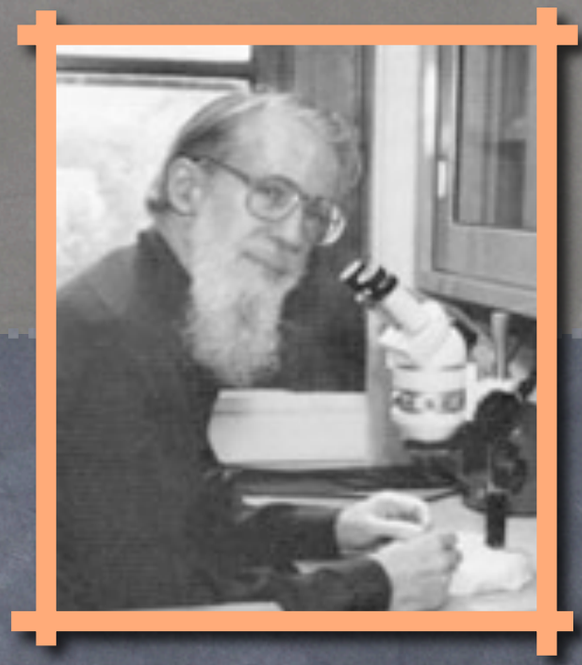
Certainty

Ubiquity

Market

Pressure

You

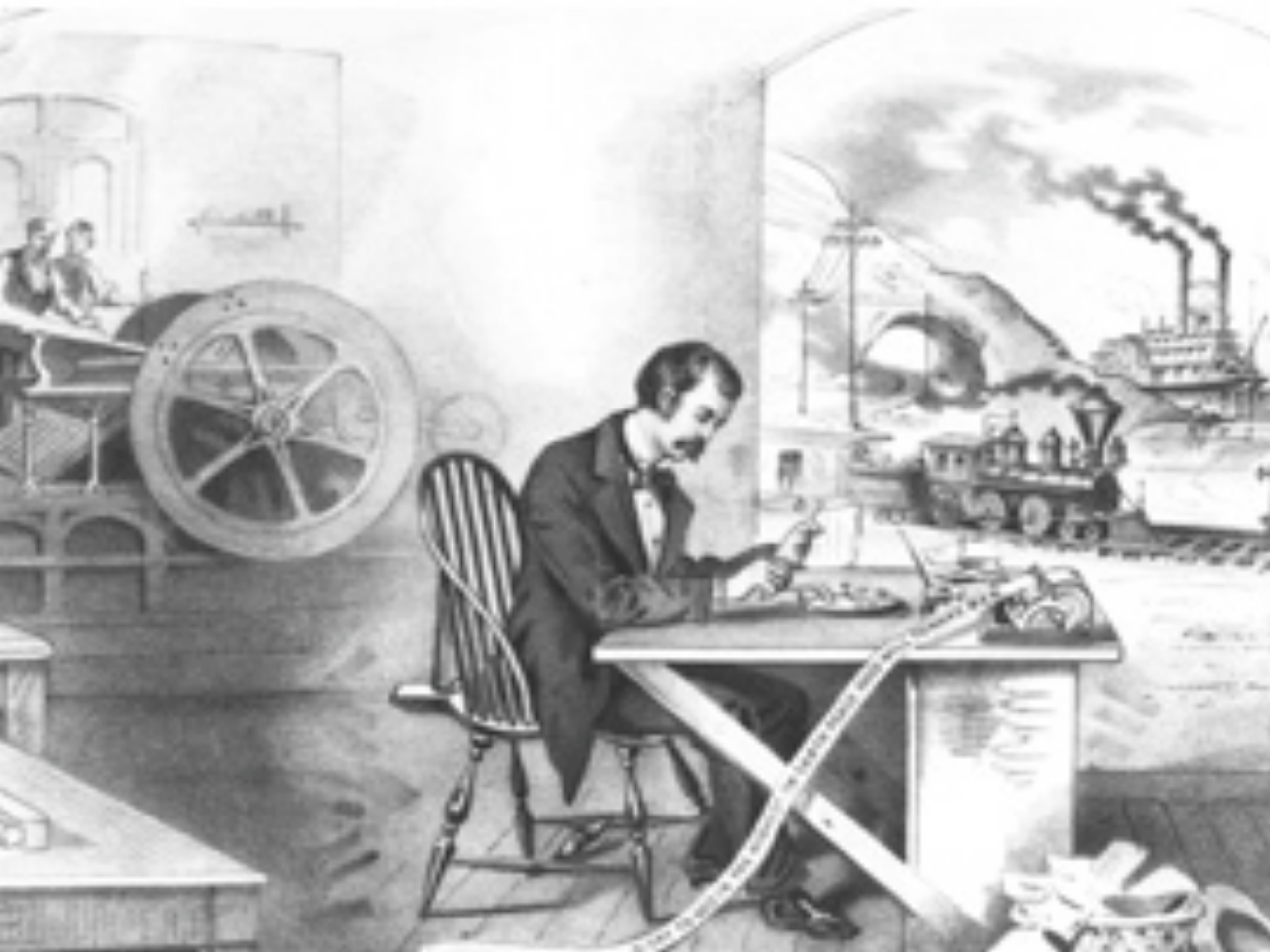


Prof. Van Valen

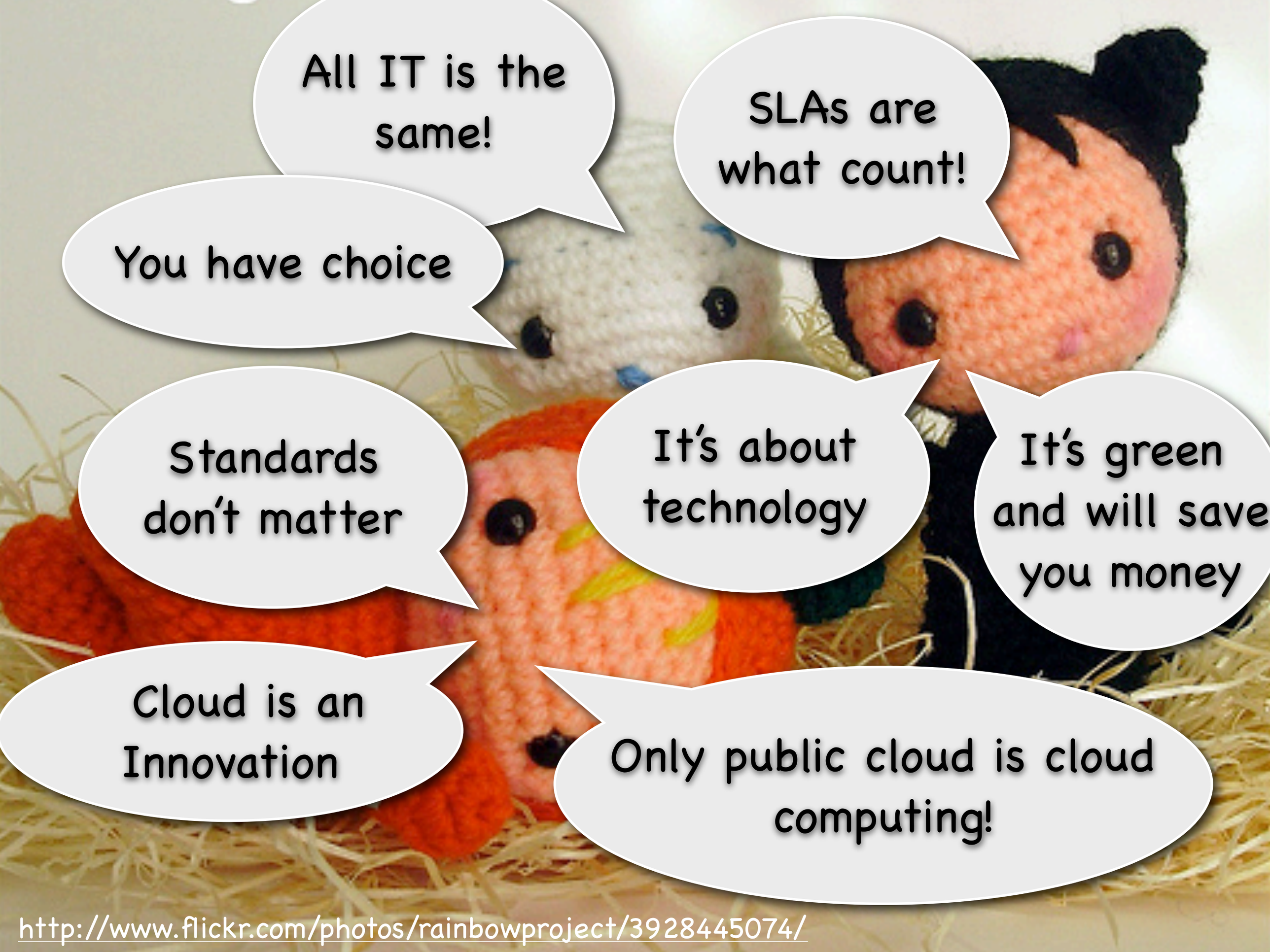
"Red Queen Hypothesis"

Certainty

http://www.flickr.com/photos/21734563@N04/2179722280/



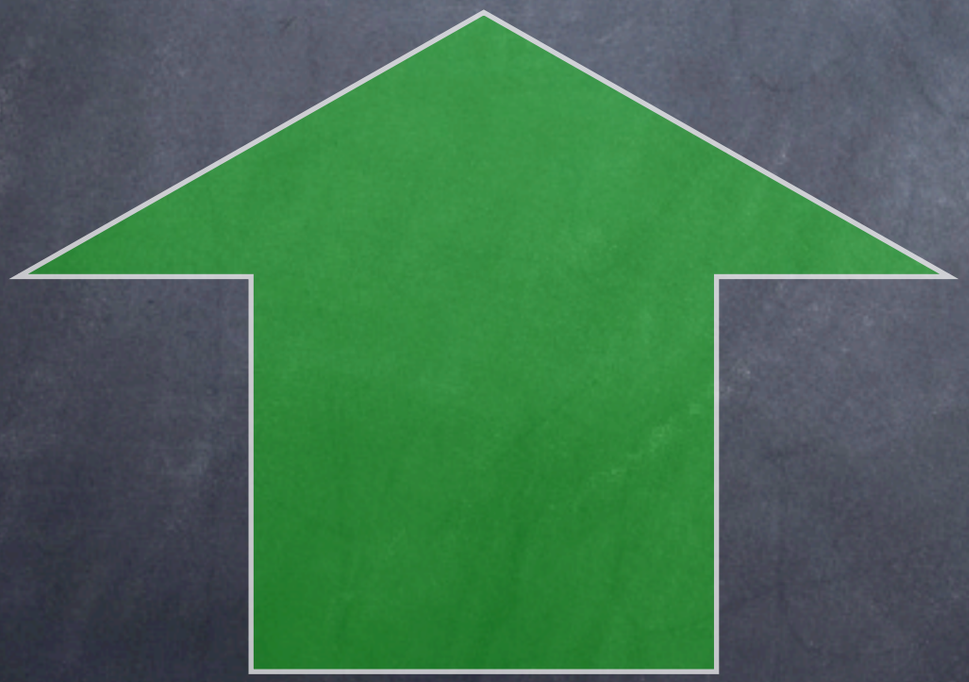
Benefits VS Risks



http://www.flickr.com/photos/rainbowproject/3928445074/

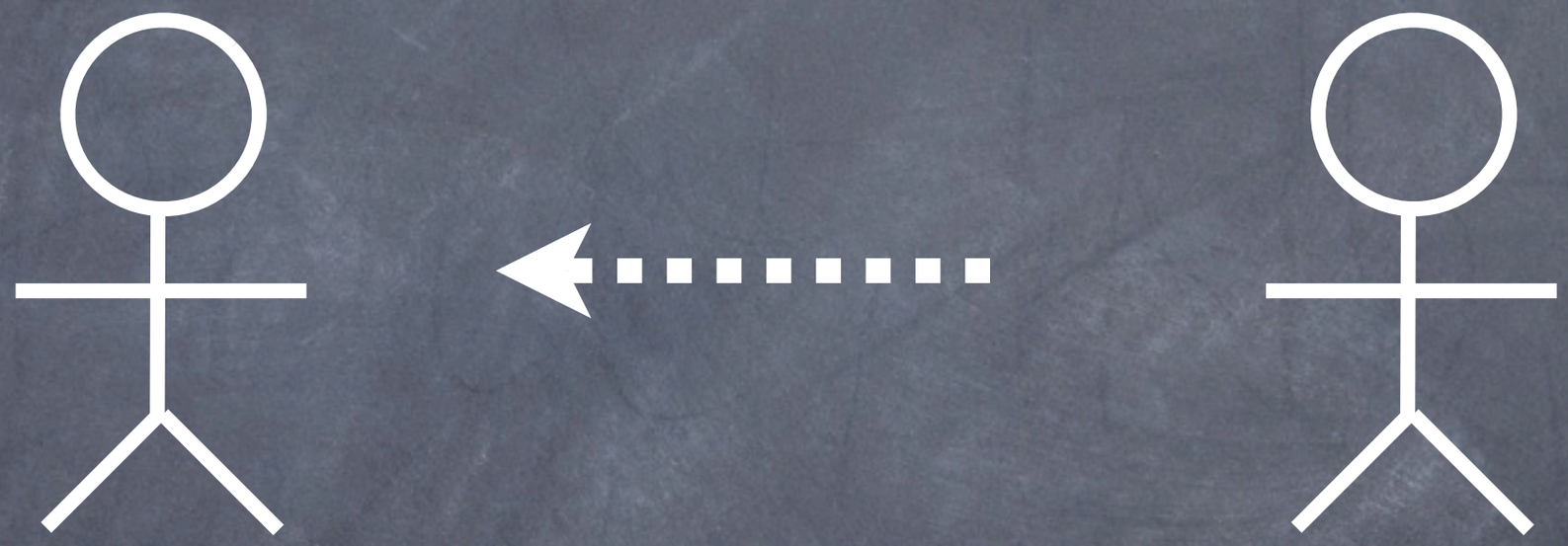
consumption

efficiency



Innovation = $$$

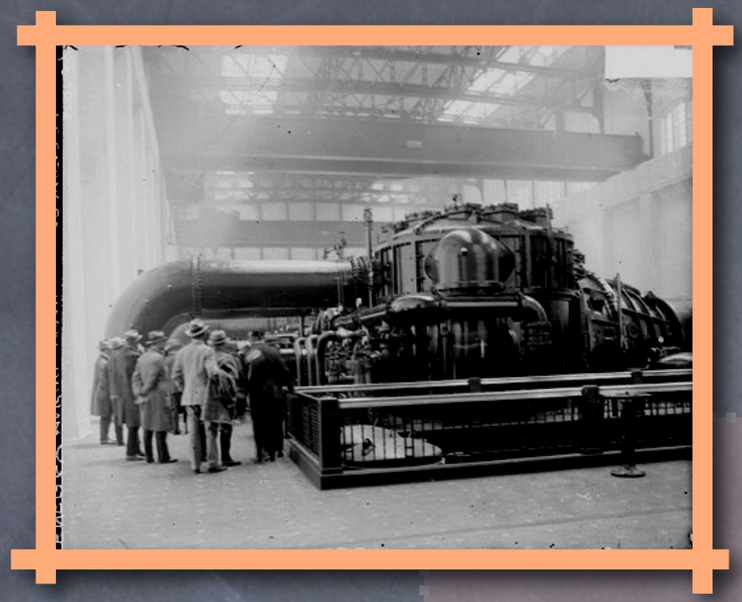
variety of models



Consumer

Provider

Ubiquity



Early **Utility**
Westinghouse,
1890s

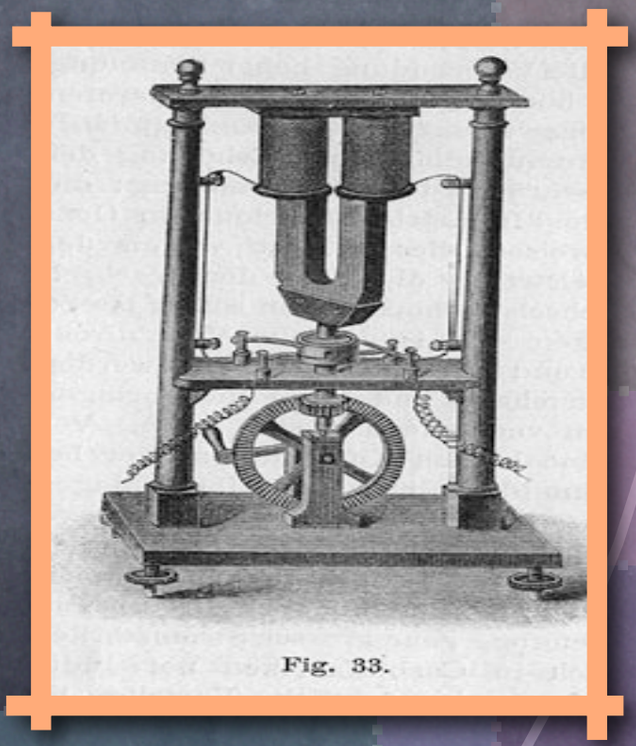


Fig. 33.

Product
Hippolyte Pixii,
1830s

Certainty

Ubiquity

Software

Platform

Infrastructure

Accelerated Innovation

Certainty

process engineering
secure
Web 2.0
adaptable
show ROI
Outsource
flexible
innovate
Six Sigma
Open source
align to the
SOA
Agile
SAAS
business
Enterprise 2.0
Cloud
cost efficient
REST
Offshore
good governance
Organic
ITIL
focus on core
KPIs
Demand management

Ubiquity

"one size fits all"

Certainty

Ubiquity

Competitive Efficiency

(Survival Today)

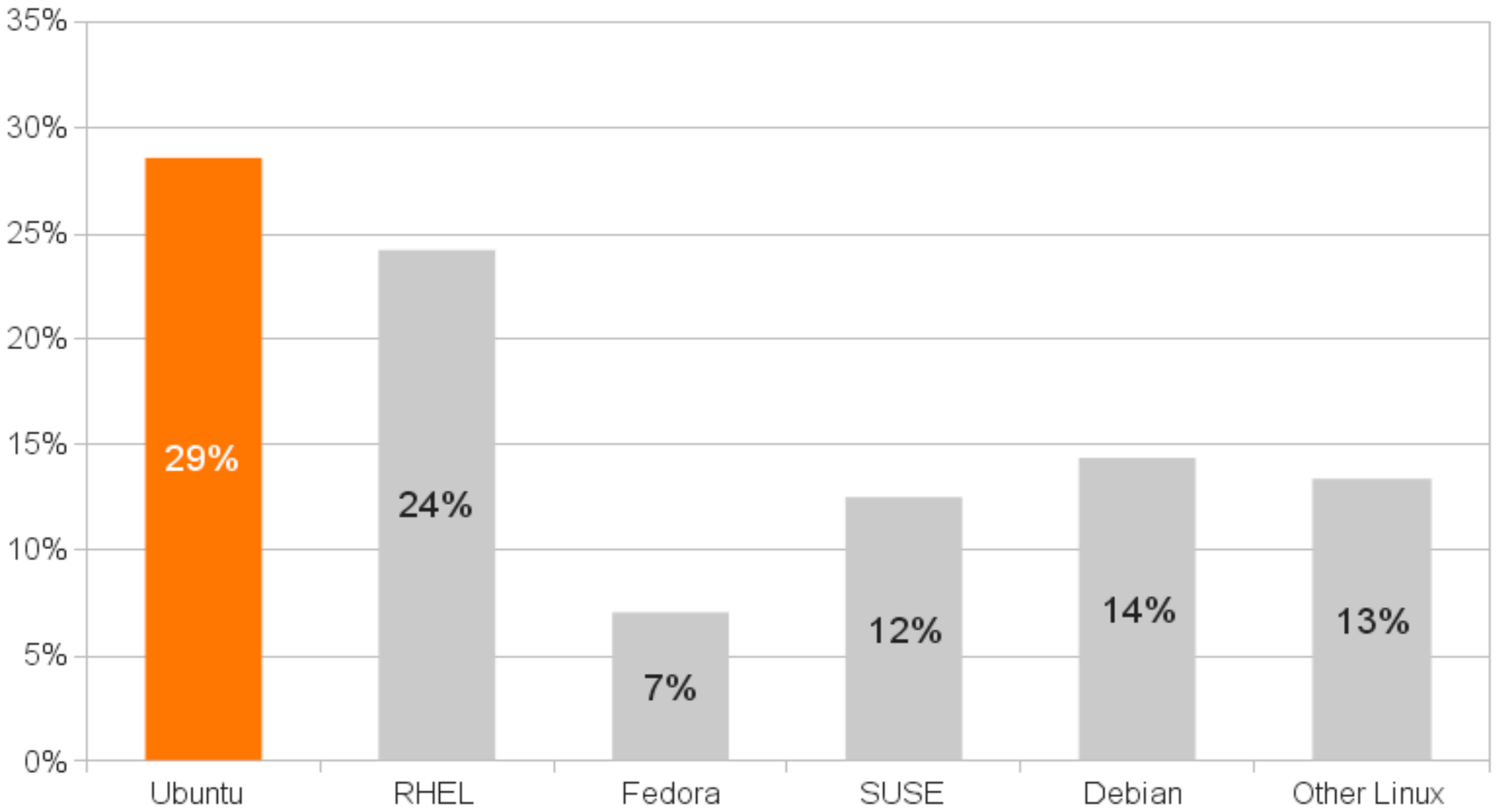
Future Wealth

(Survival Tomorrow)

Certainty

ubuntu®

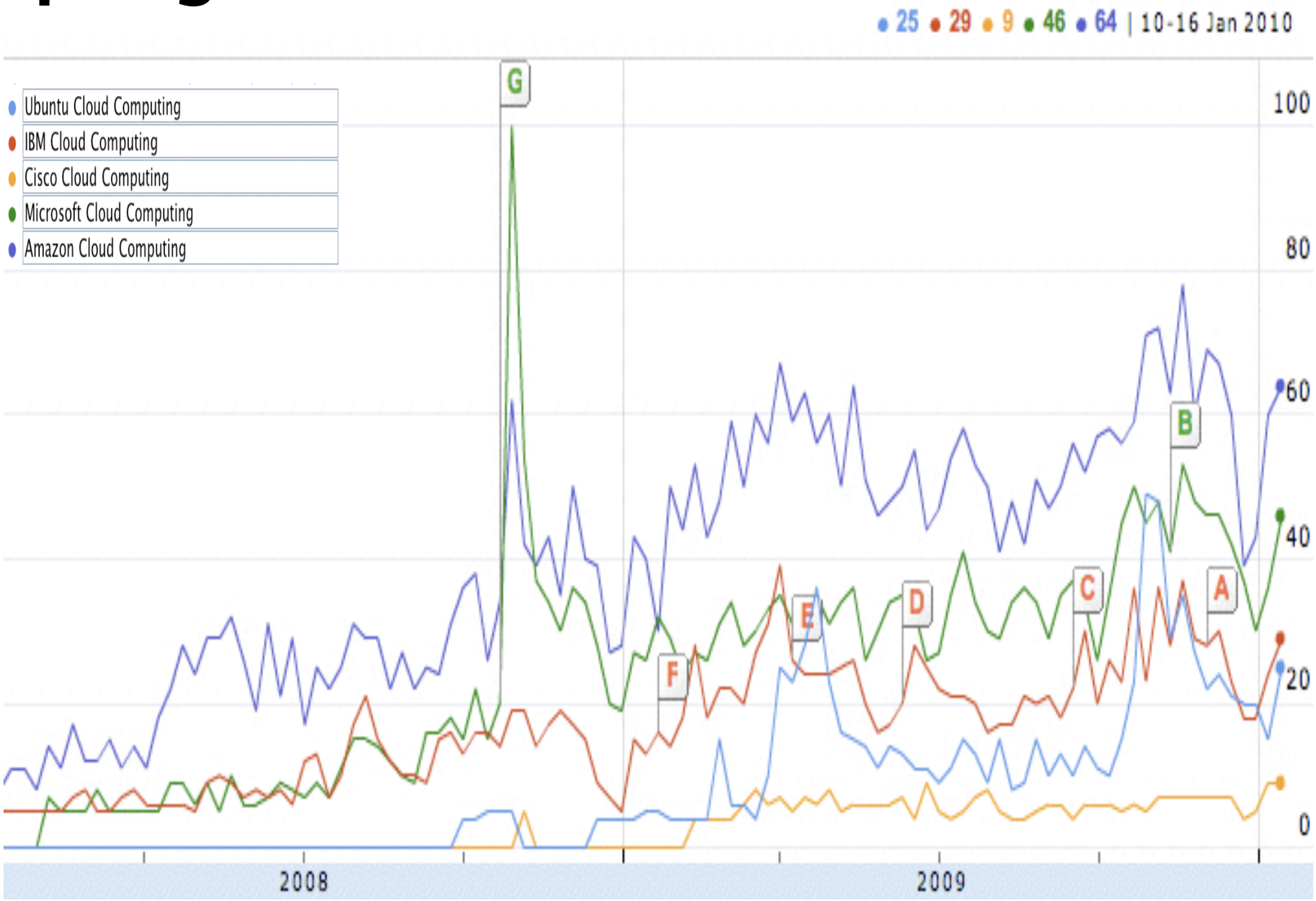
Emerging leader in deployment



Source : 2009 Eclipse Community Open Source Developer Report (Sample size 570)

CANONICAL

Rapid growth on cloud



CANONICAL

Provision of compute resources

Go Grid API
EC2 API
OCCI API
Sun Cloud API
Rackspace API
Delta Cloud API
LibCloud API
Flexiscale API
ElasticHosts API
vCloud API

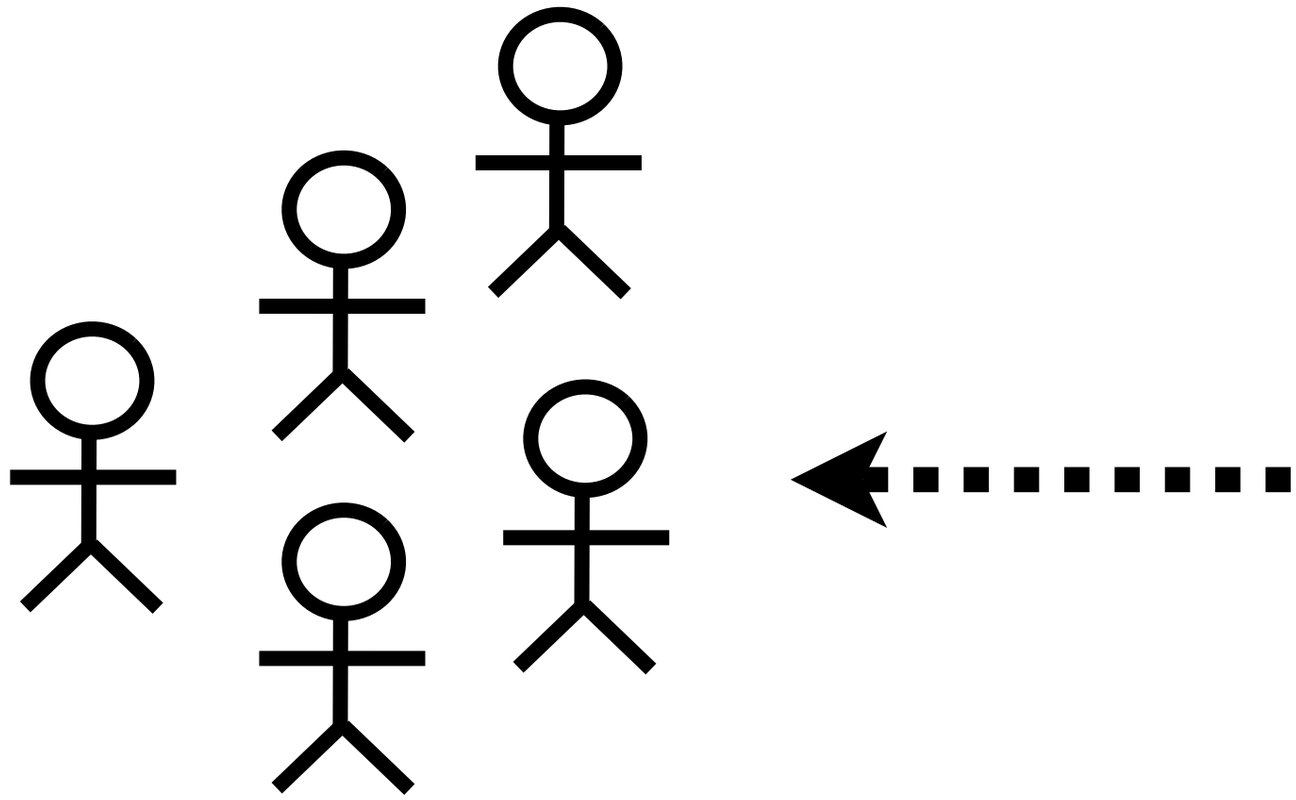
CANONICAL

Ubuntu on EC2

(April'09)

CANONICAL

Private Cloud



Business Unit

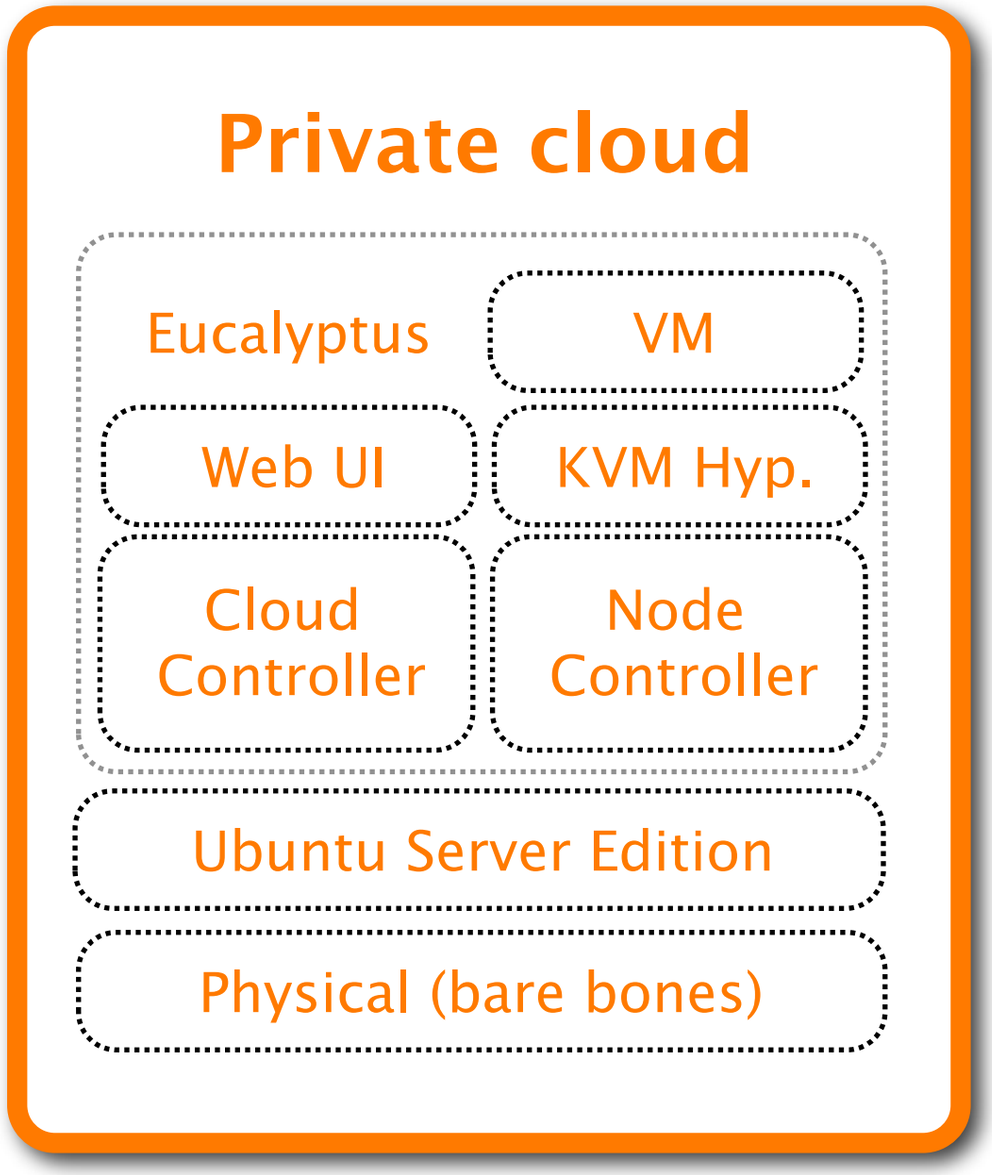
I.T. Dept.

CANONICAL

Eucalyptus Systems

CANONICAL

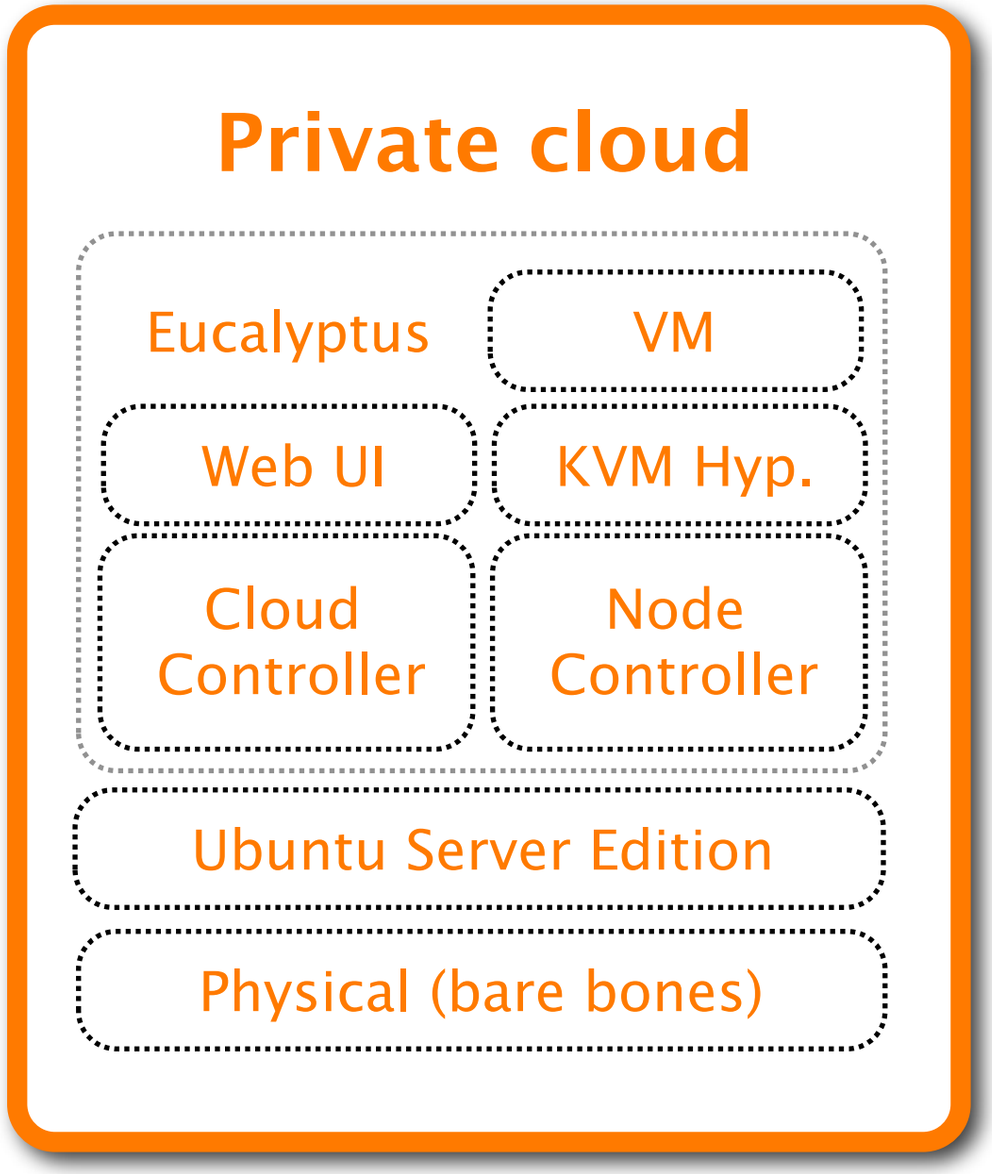
Rapid Deployment.



CANONICAL

Rapid Deployment.

On premise.

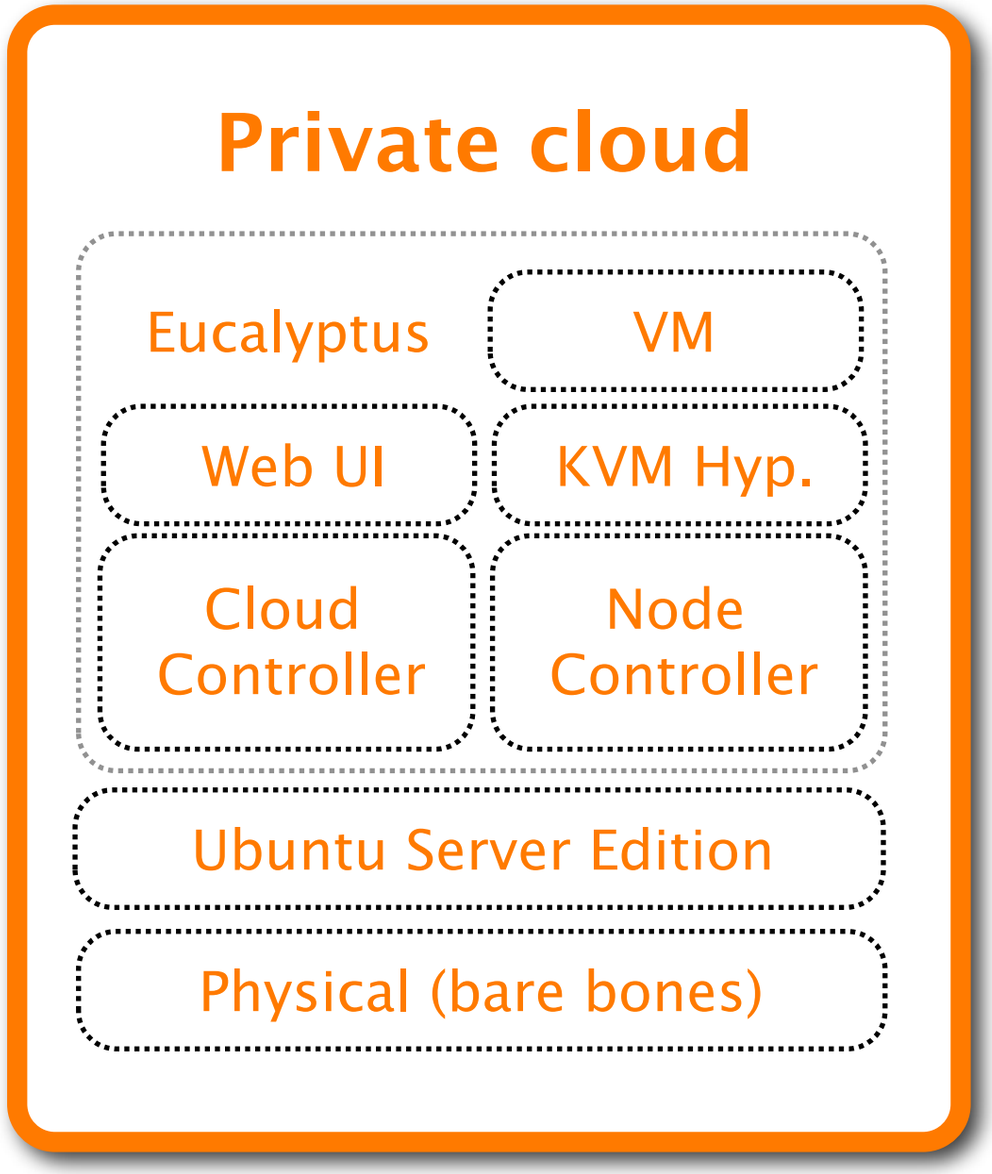


CANONICAL

Rapid Deployment.

On premise.

Self Service IT.



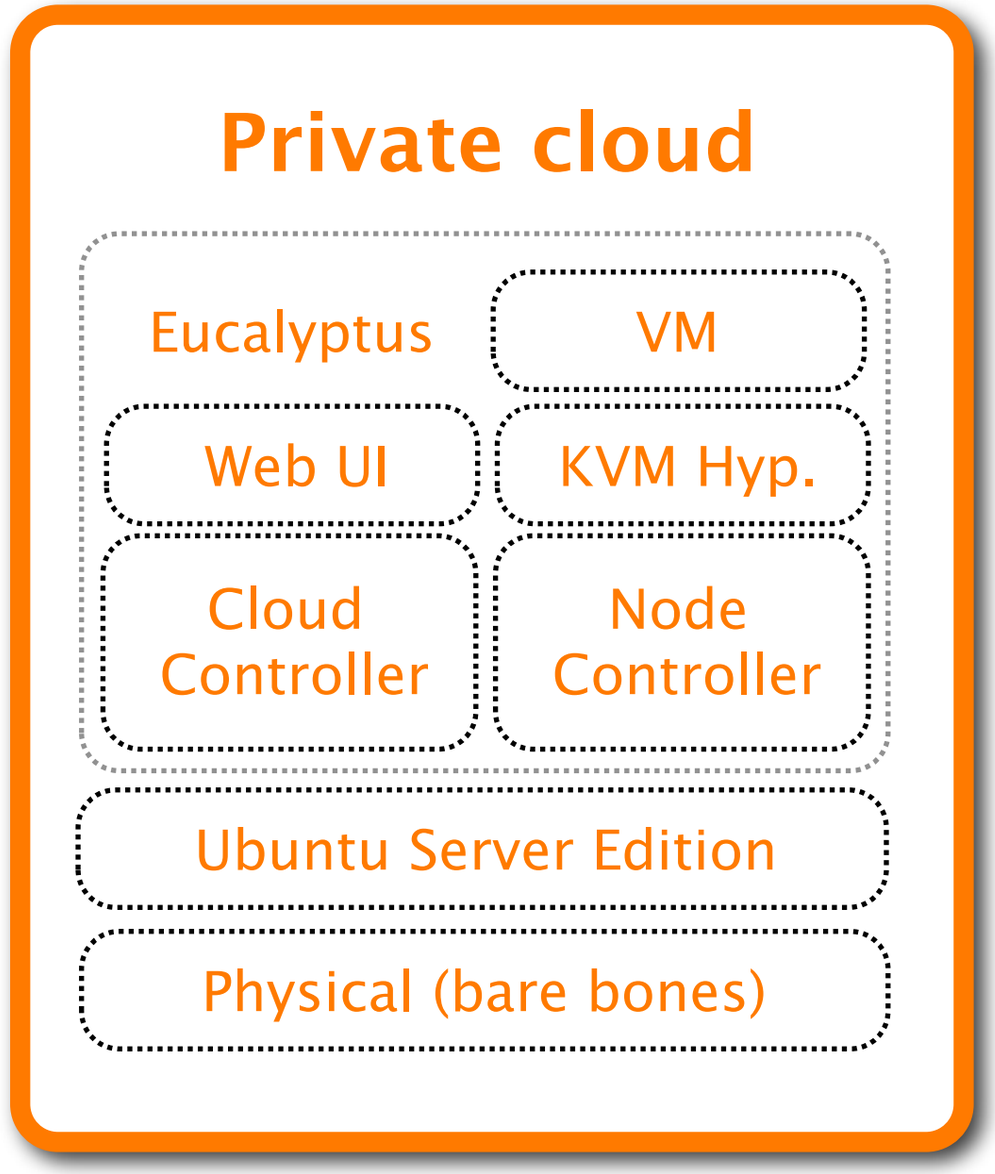
CANONICAL

Rapid Deployment.

On premise.

Self Service IT.

Track EC2 / S3.



CANONICAL

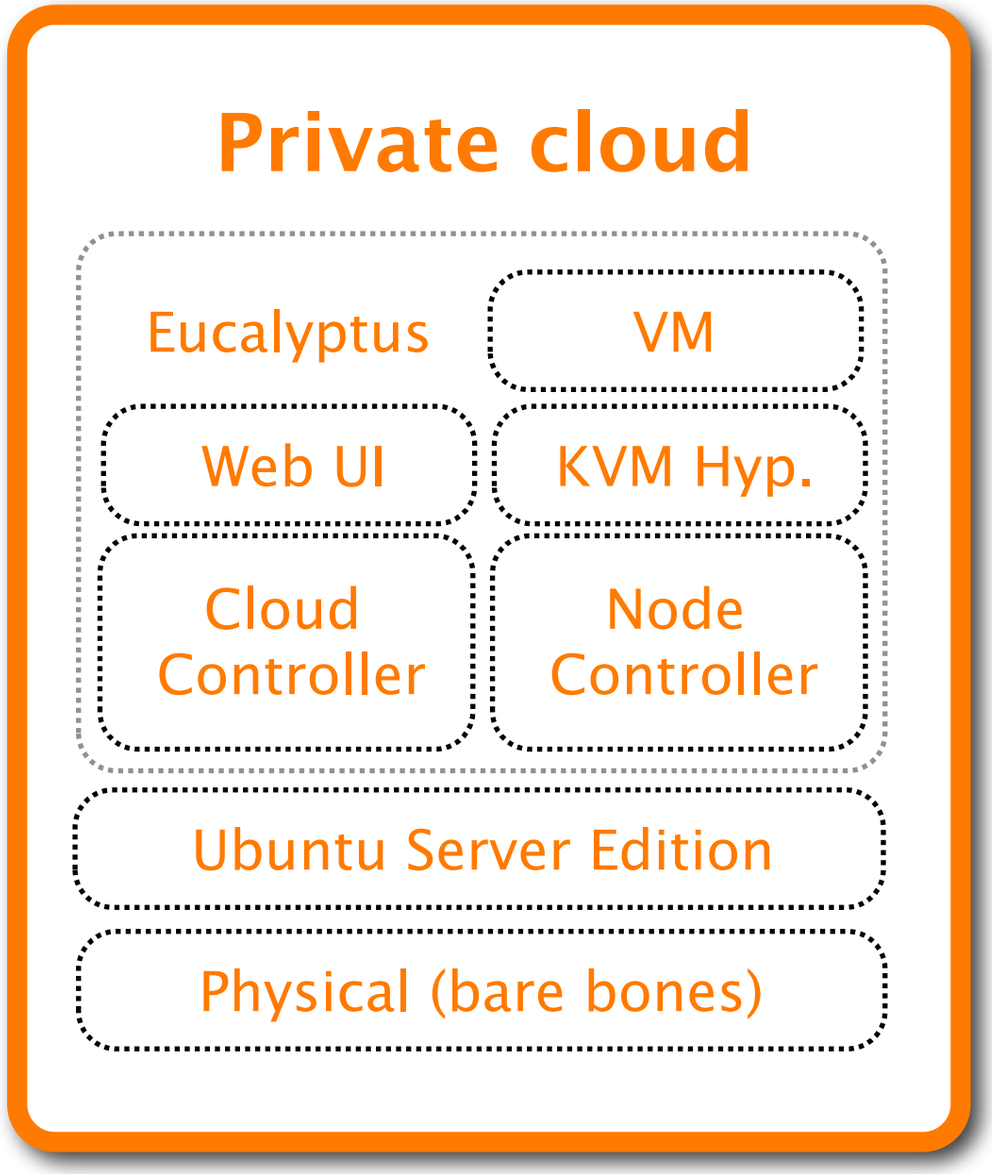
Rapid Deployment.

On premise.

Self Service IT.

Track EC2 / S3.

Best of Breed.

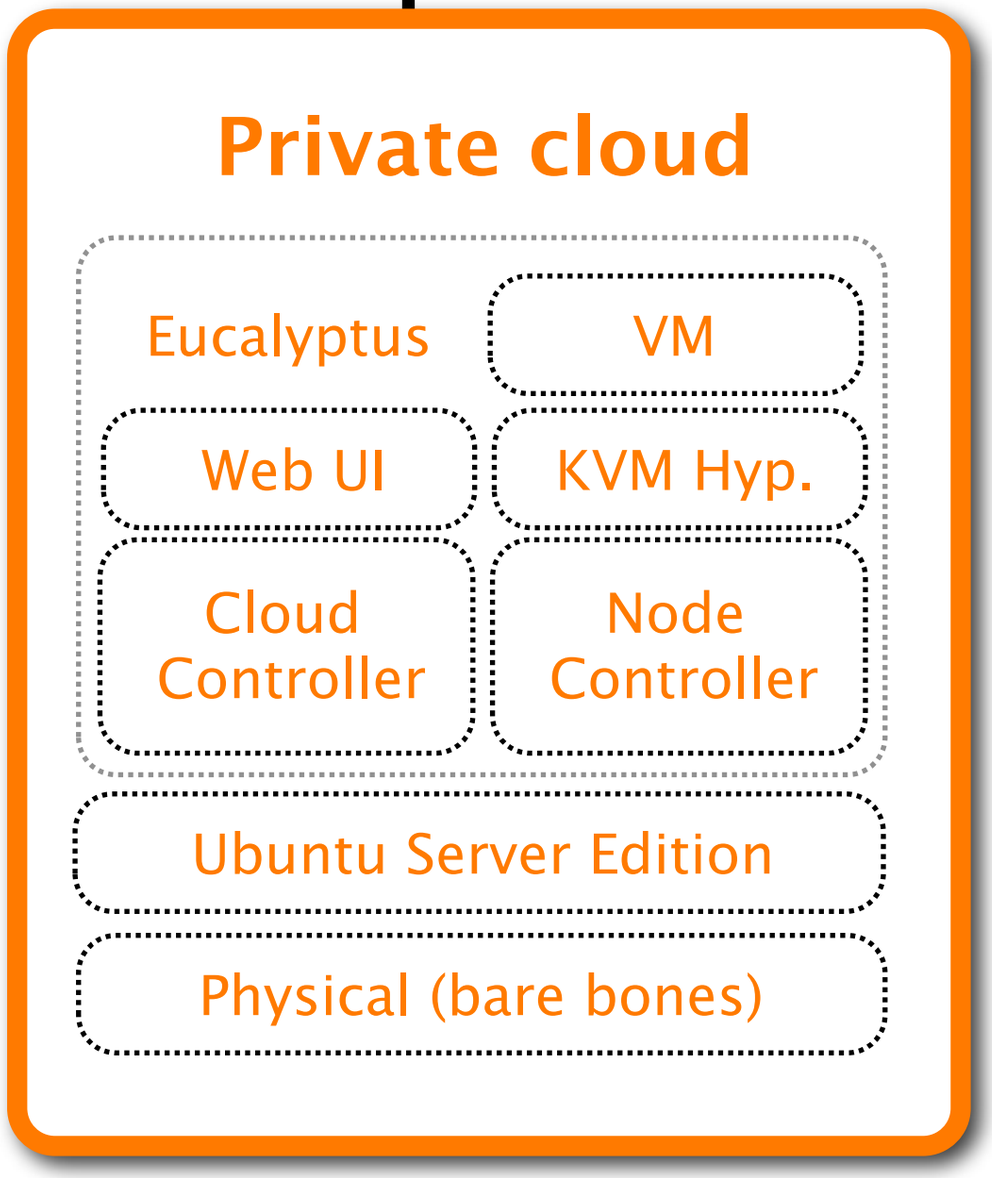


CANONICAL

ubuntu

Ubuntu Enterprise Cloud

(April '09)



CANONICAL

ubuntu

Public cloud

Amazon EC2

Private cloud

Eucalyptus

VM

Web UI

KVM Hyp.

Cloud Controller

Node Controller

Ubuntu Server Edition

Physical (bare bones)

CANONICAL

ubuntu

Public cloud

Amazon EC2

Private cloud

Eucalyptus

VM

Web UI

KVM Hyp.

ud
ller

Node
Controller

tu Server Edition

hysical (bare bones)

EC2 & S3 API

CANONICAL

ubuntu

Public cloud

Amazon EC2

Private cloud

Eucalyptus

VM

Web UI

KVM Hyp.

ud
ller

Node
Controller

tu Server Edition

hysical (bare bones)

Common
Management Tools

CANONICAL

ubuntu

Public cloud

Amazon EC2

Private cloud

Eucalyptus

VM

Web UI

KVM Hyp.

ud
ller

Node
Controller

tu Server Edition

hysical (bare bones)

Common
Machine Images

CANONICAL

ubuntu

Public cloud

Amazon EC2

Private cloud

Eucalyptus

VM

Web UI

KVM Hyp.

ud
ller

Node
Controller

tu Server Edition

hysical (bare bones)

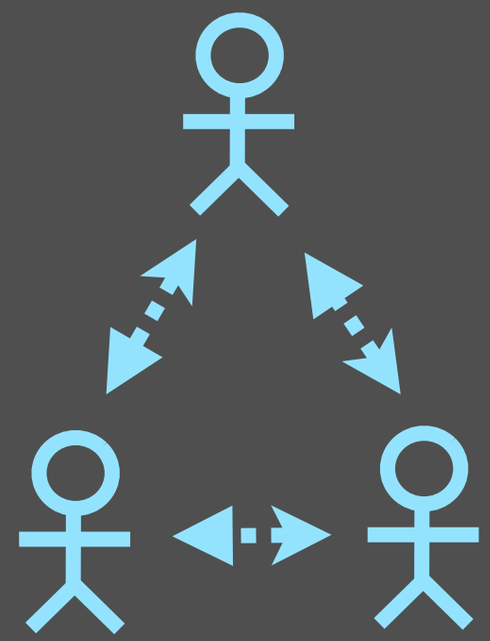
Bursting Easier

CANONICAL

ubuntu

Public cloud

Amazon EC2



Private cloud

Eucalyptus

VM

Web UI

KVM Hyp.

Cloud Controller

Node Controller

Ubuntu Server Edition

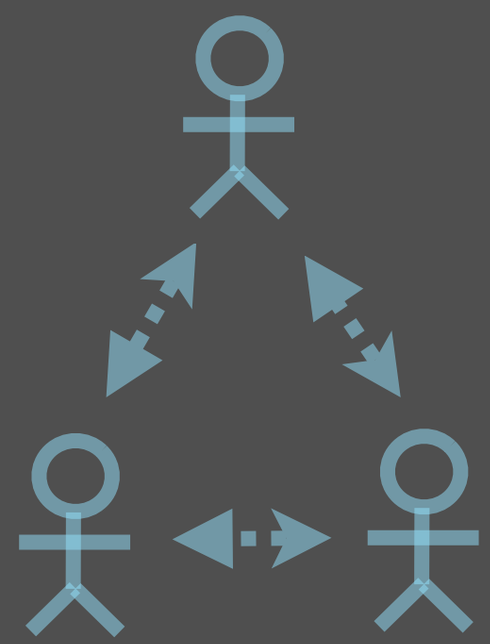
Physical (bare bones)

CANONICAL

ubuntu

Public cloud

Amazon EC2



Private cloud

Eucalyptus

VM

Web UI

KVM Hyp.

Cloud Controller

Node Controller

Ubuntu Server Edition

Physical (bare bones)

Reference model

CANONICAL

> 8,000 private clouds based on UEC

CANONICAL

ubuntu.com/cloud

24x7 Support
Training
Professional Services
JumpStart

Economics

What is cloud?

Why now?

Risks

Private or Public?

Myths

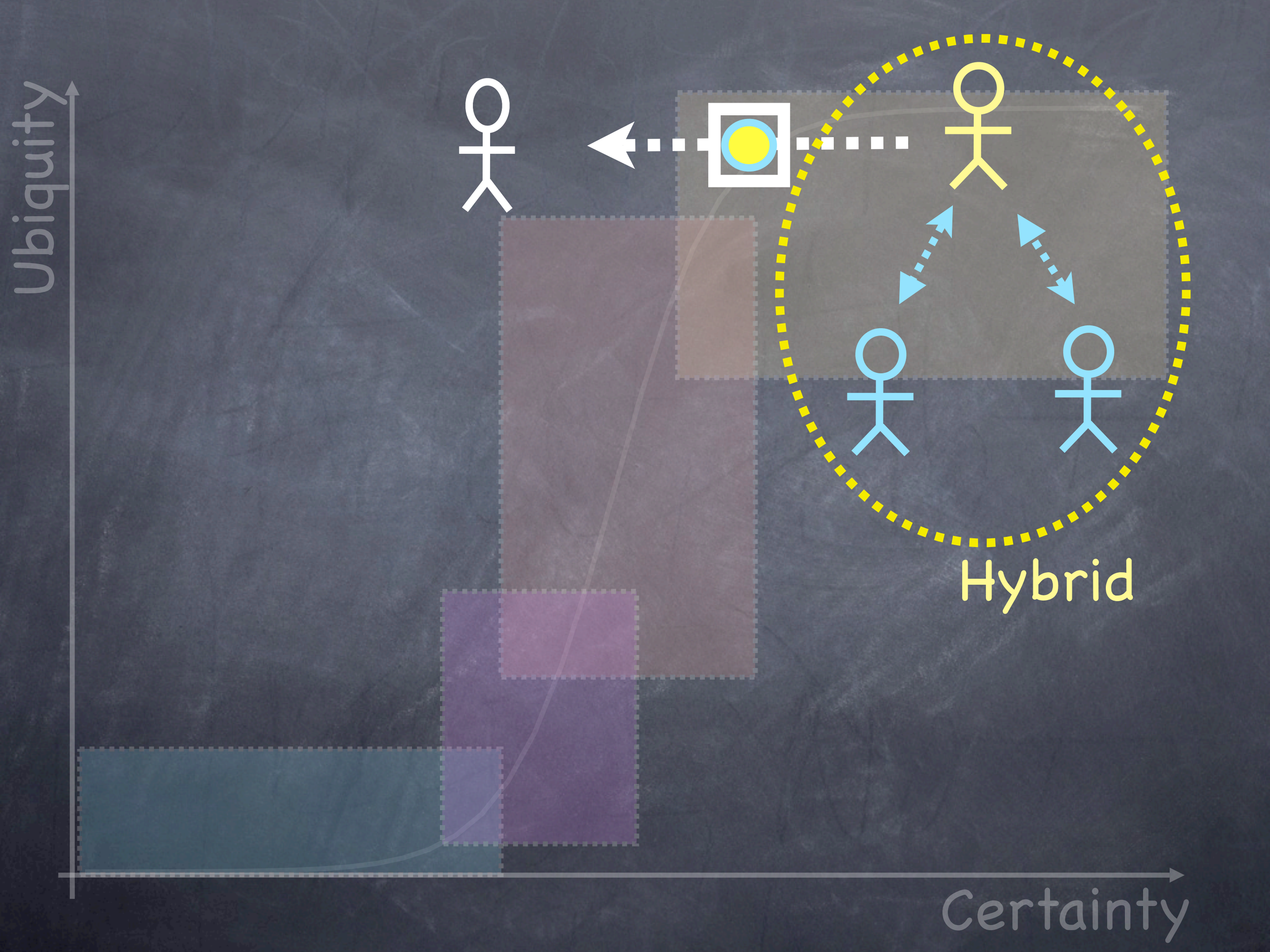
Ubuntu

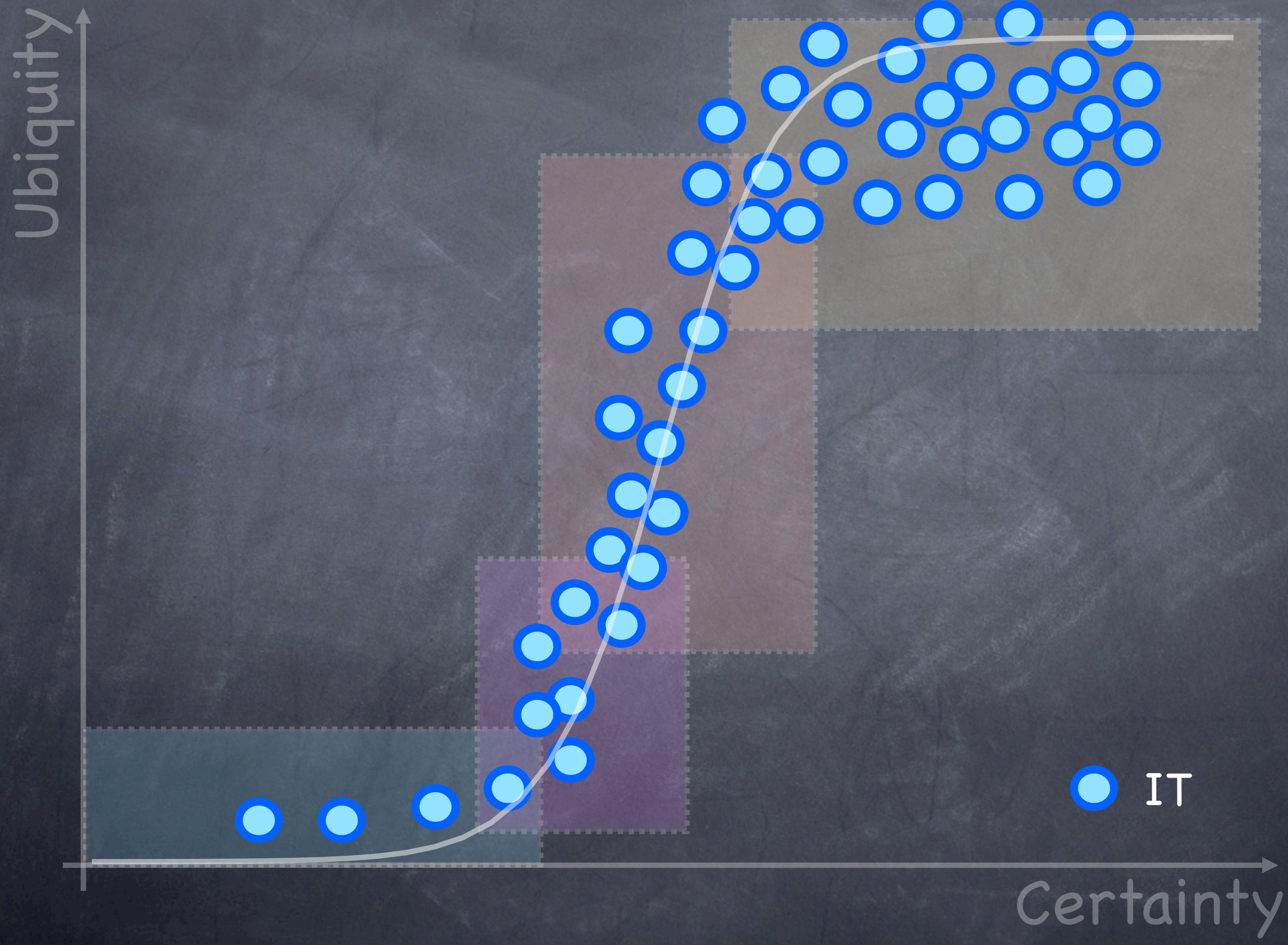
Where to start?

Sccott Beale/Laughing Squid : http://www.flickr.com/photos/laughingsquid/

Test & Development

Sccott Beale/Laughing Squid : http://www.flickr.com/photos/laughingsquid/


Ubiquity
Hybrid
Certainty


Ubiquity
IT
Certainty

Strategic Value?

Ubiquity

Software

Platform

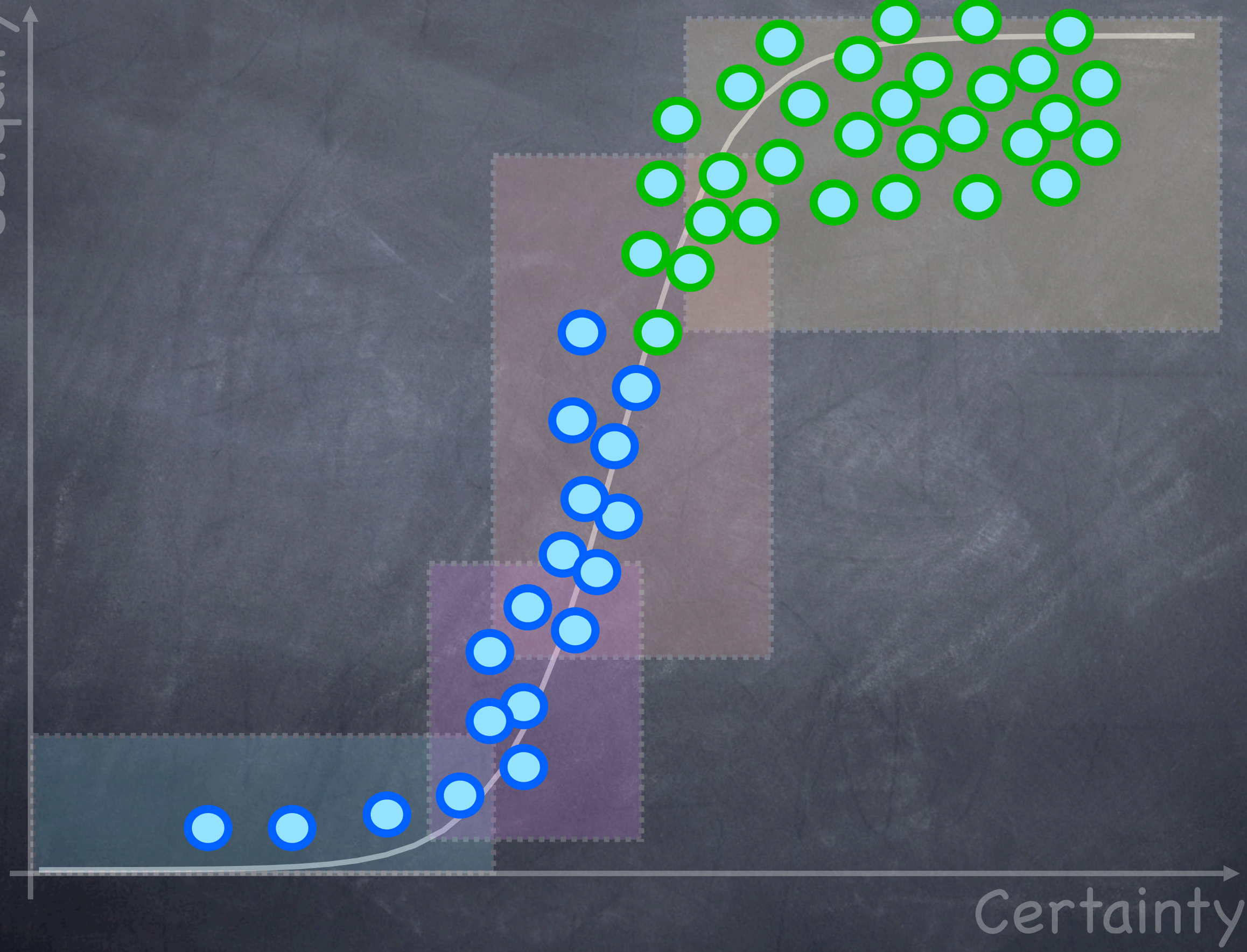
Infrastructure

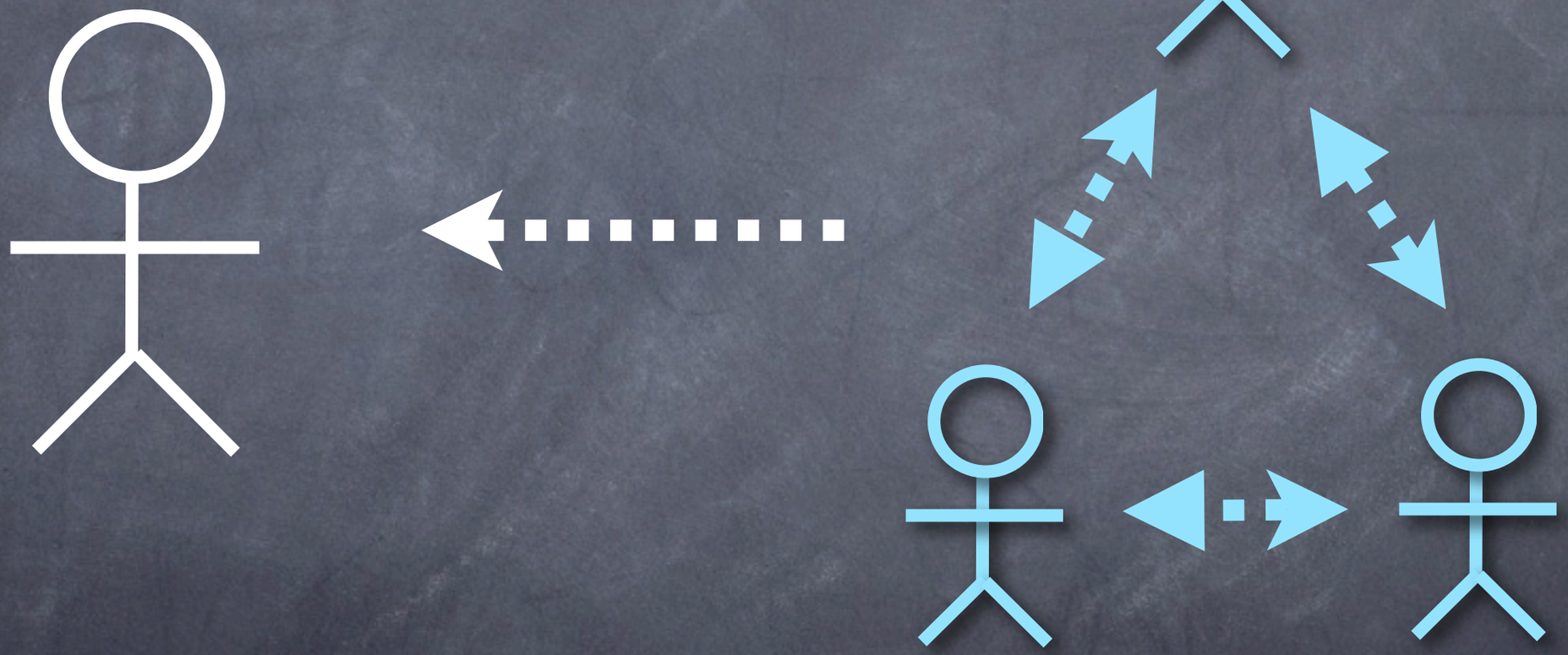
… as a **Service**

… as a **Product**

Certainty

Consolidate & Standardise


Ubiquity
Certainty



Easy Switching

Minimise Exit

Adopt defacto public standard

open source implementation

Ubiquity

Accelerated
Innovation

Certainty

Ubiquity

Competitive Efficiency

(Survival Today)

Future Wealth

(Survival Tomorrow)

Certainty

Start experimenting

Start experimenting

Use hybrid

Start experimenting

Use hybrid

Consolidate & standardise

Start experimenting

Use hybrid

Consolidate & standardise

Mitigate future exist costs

Start experimenting

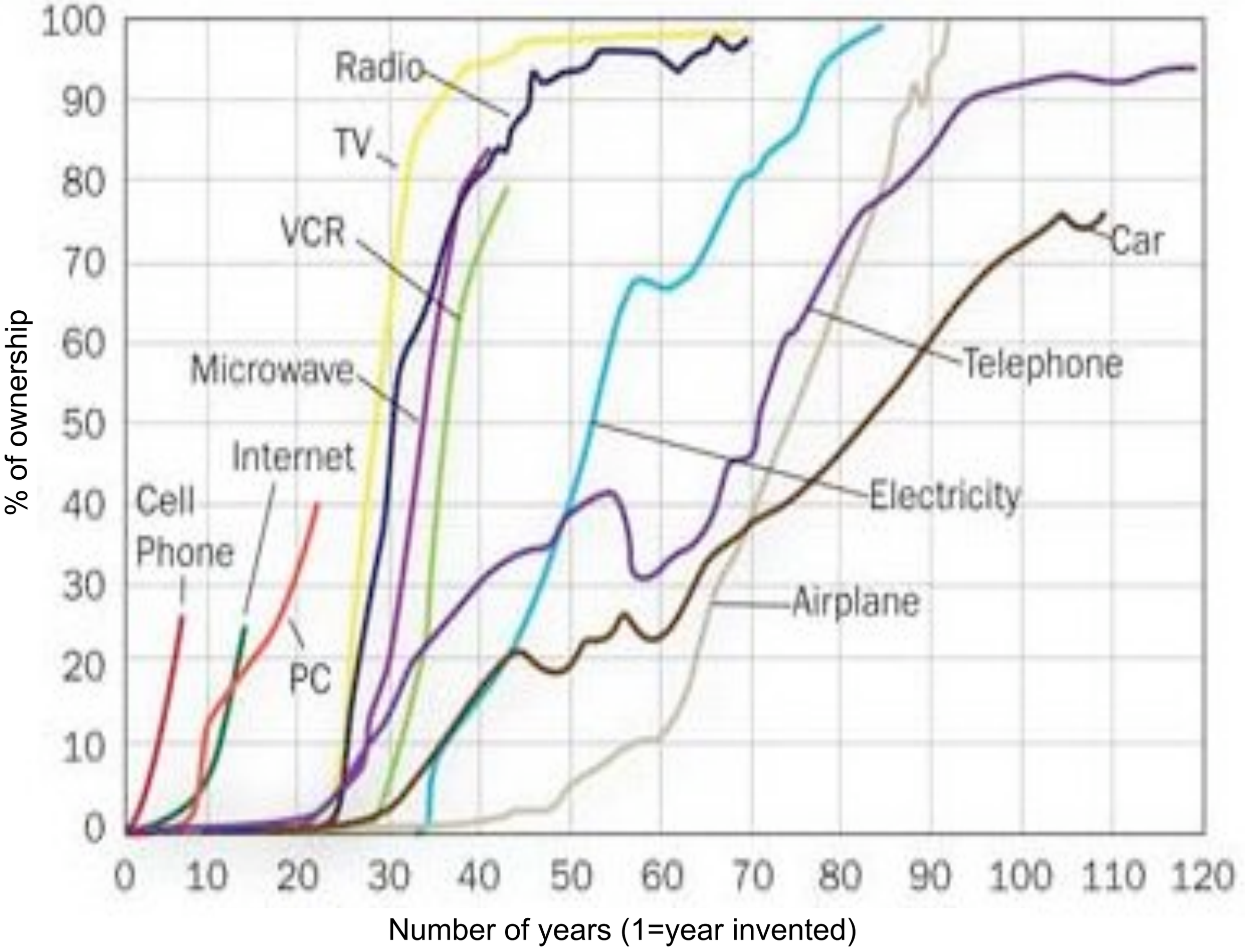
Use hybrid

Consolidate & standardise

Mitigate future exist costs

No "one size"

Summary


% of ownership
100
90
80
70
60
50
40
30
20
10
0
0
10
20
30
40
50
60
70
80
90
100
110
120
Number of years (1=year invented)
Radio
TV
VCR
Microwave
Internet
Cell Phone
PC
Car
Telephone
Electricity
Airplane

Ubiquity

Utility Services

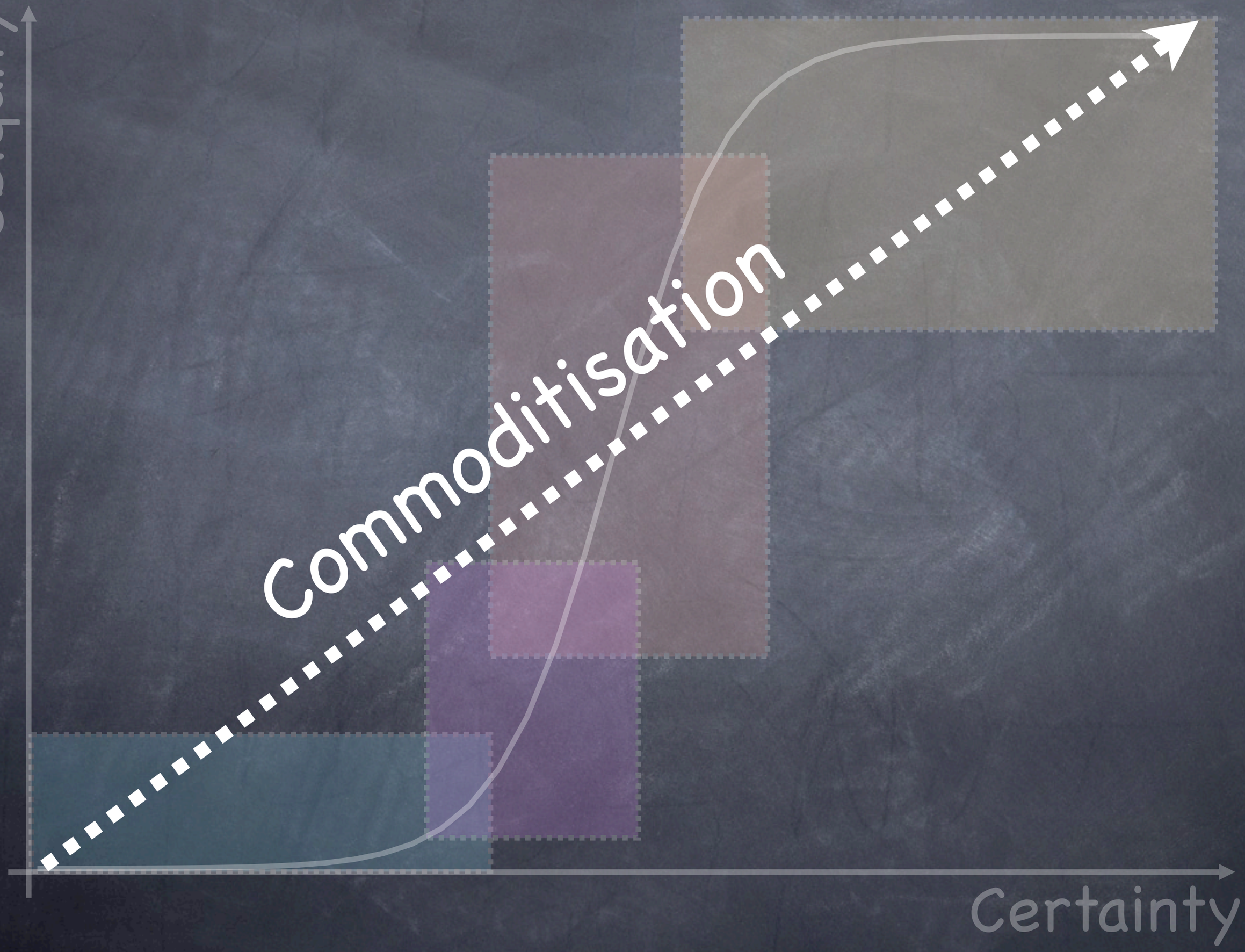
Commodity

Product

Custom built

Innovation

Certainty


Ubiquity
Commoditisation
Certainty

Ubiquity

Demand
(user competition)

Commoditisation

Improvement
(supply competition)

Certainty

Cloud = Our Product

Ubiquity

Software

Platform

Infrastructure

… as a **Service**

… as a **Product**

Certainty

Ubiquity

Economies of scale
(volume operations)

Focus on core
(outsource)

Pay per use
(utility)

Speed
(componentisation)

Certainty

Ubiquity

Accelerated Innovation

Reduced cost per unit

Greater consumption

Certainty

Ubiquity

Transition

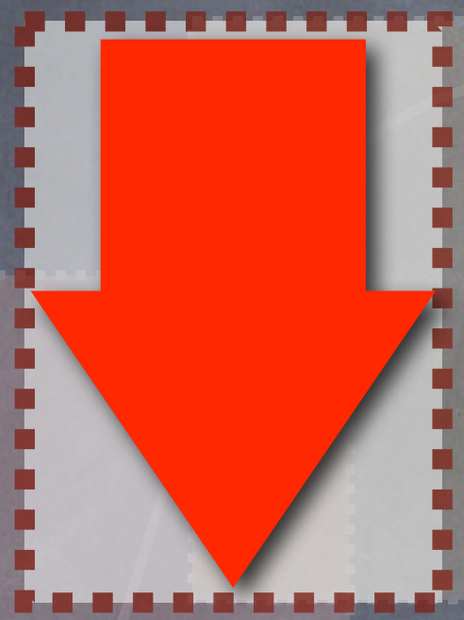
Confusion

Governance

Trust

Security

Transparency



Outsourcing

Suitability

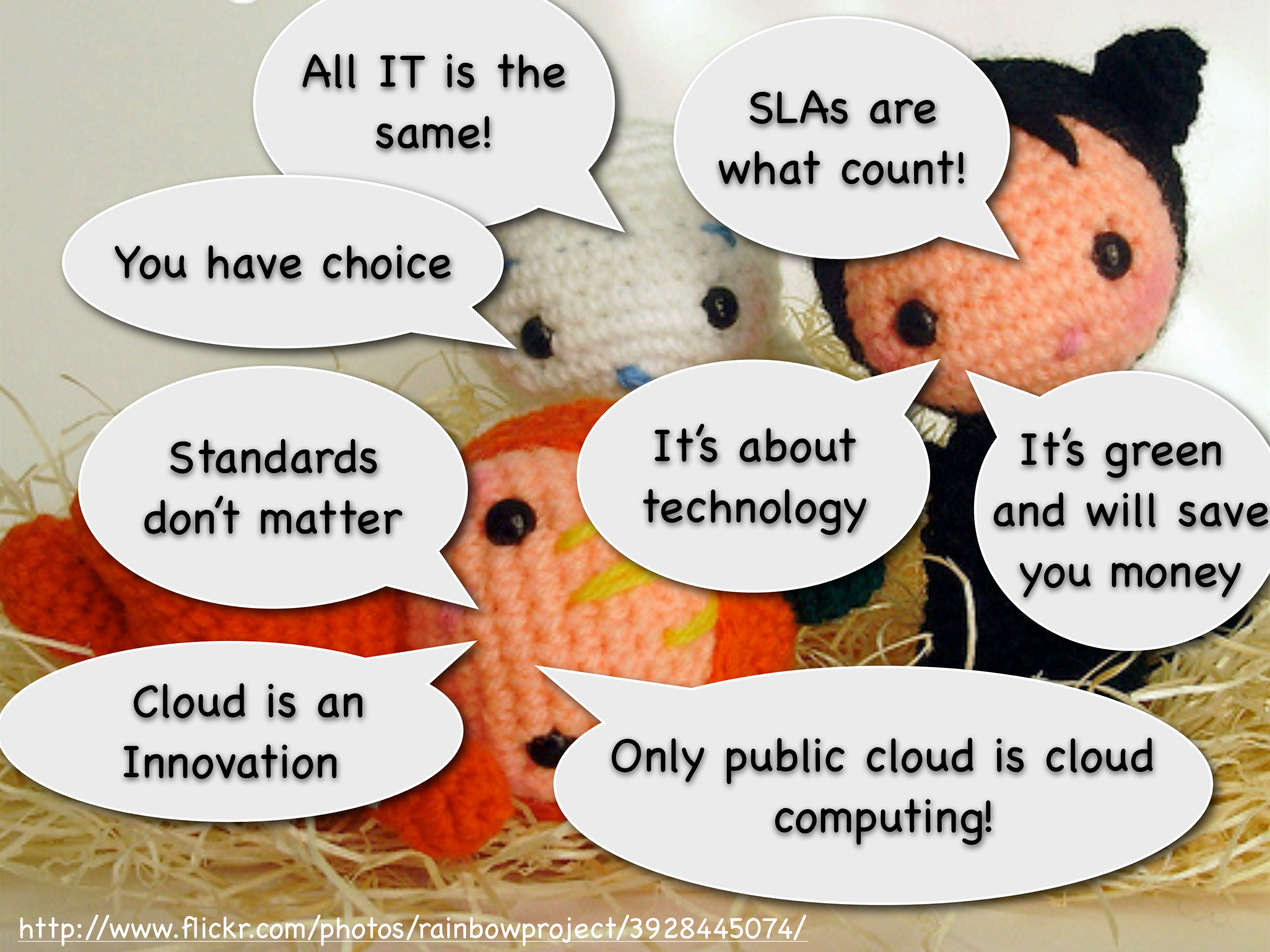
Competition

Lock-in

Second Source

Control

Certainty



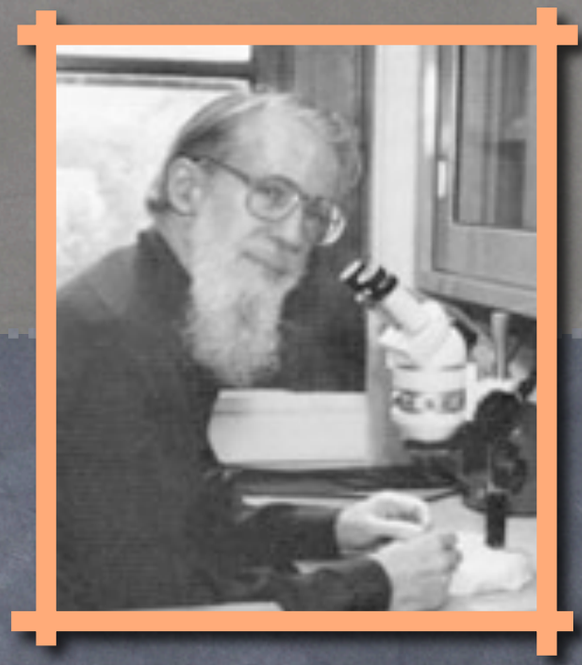
http://www.flickr.com/photos/rainbowproject/3928445074/

Ubiquity

Market

Pressure

You



Prof. Van Valen

"Red Queen Hypothesis"

Certainty

Benefits VS Risks

Ubiquity

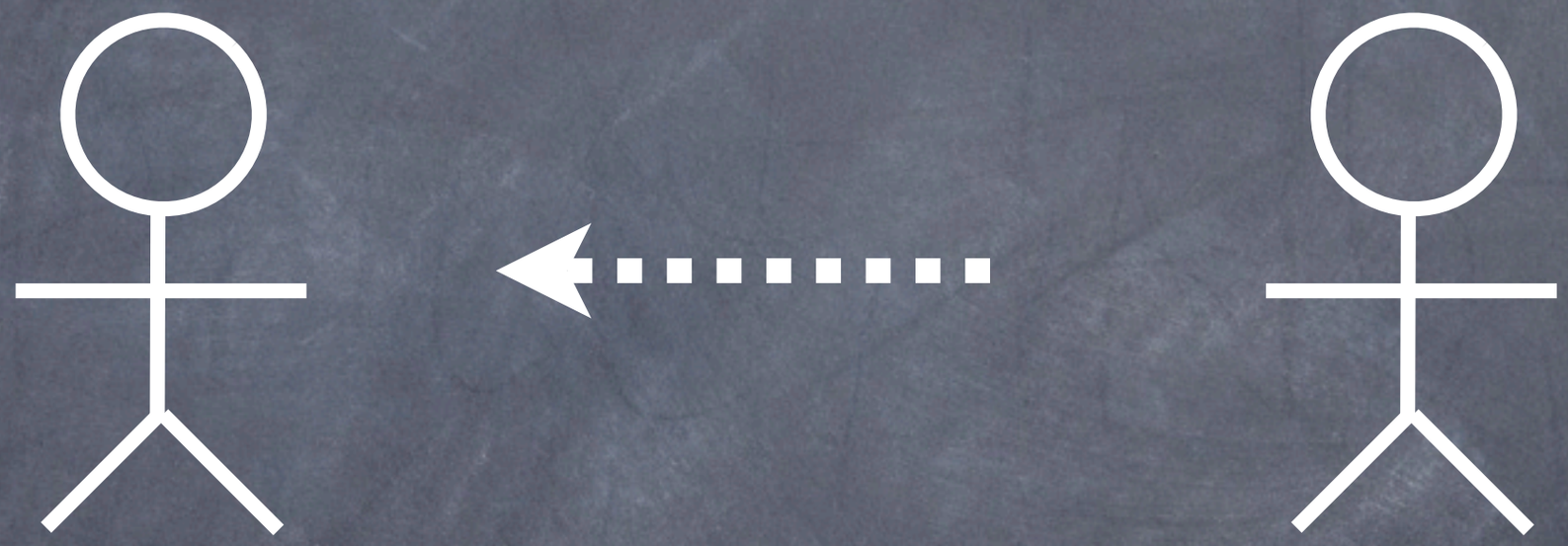
Disruptive

… as a

Product

Certainty

variety of models



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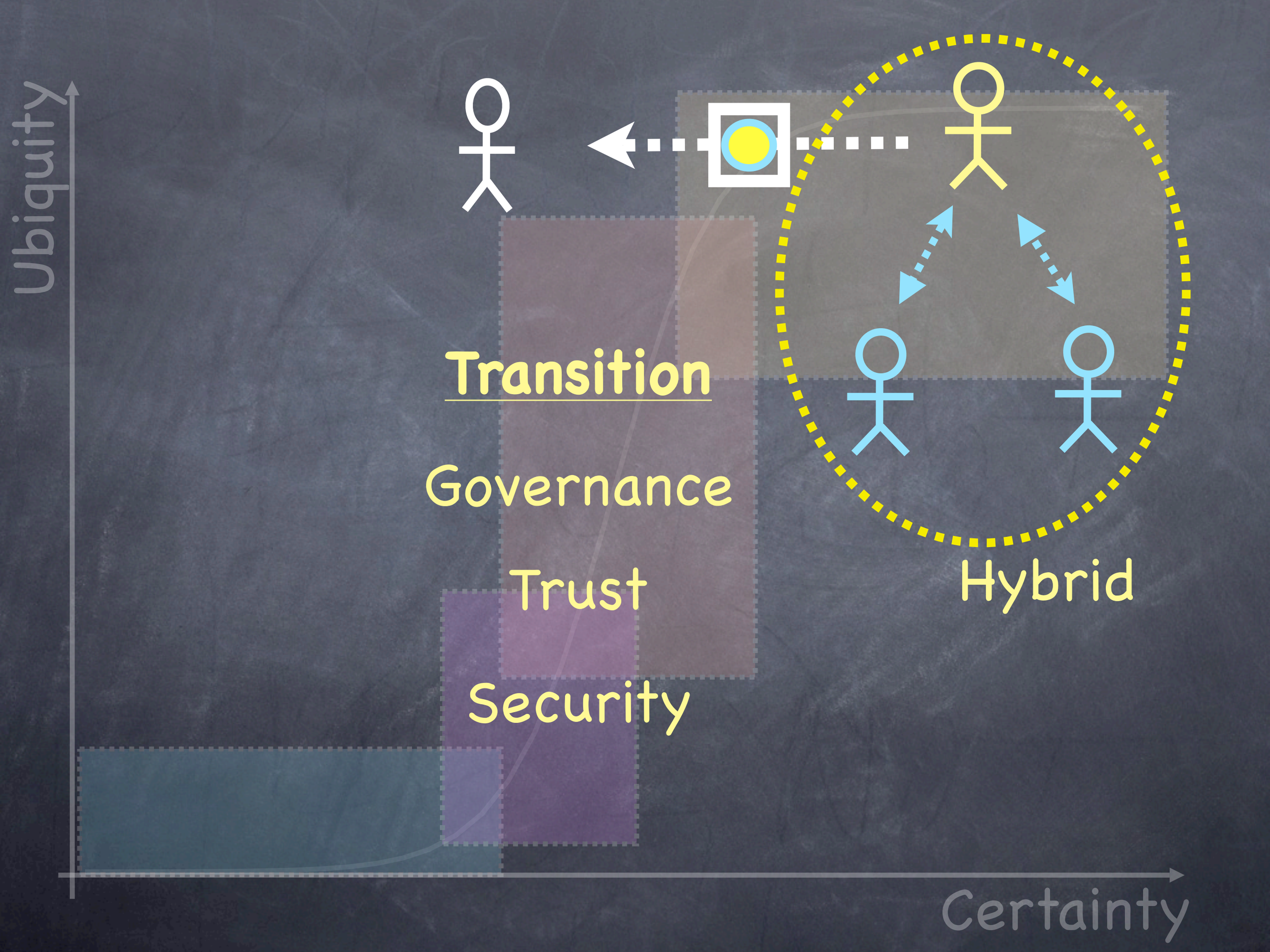
Provider


Ubiquity
Transition
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Six Sigma
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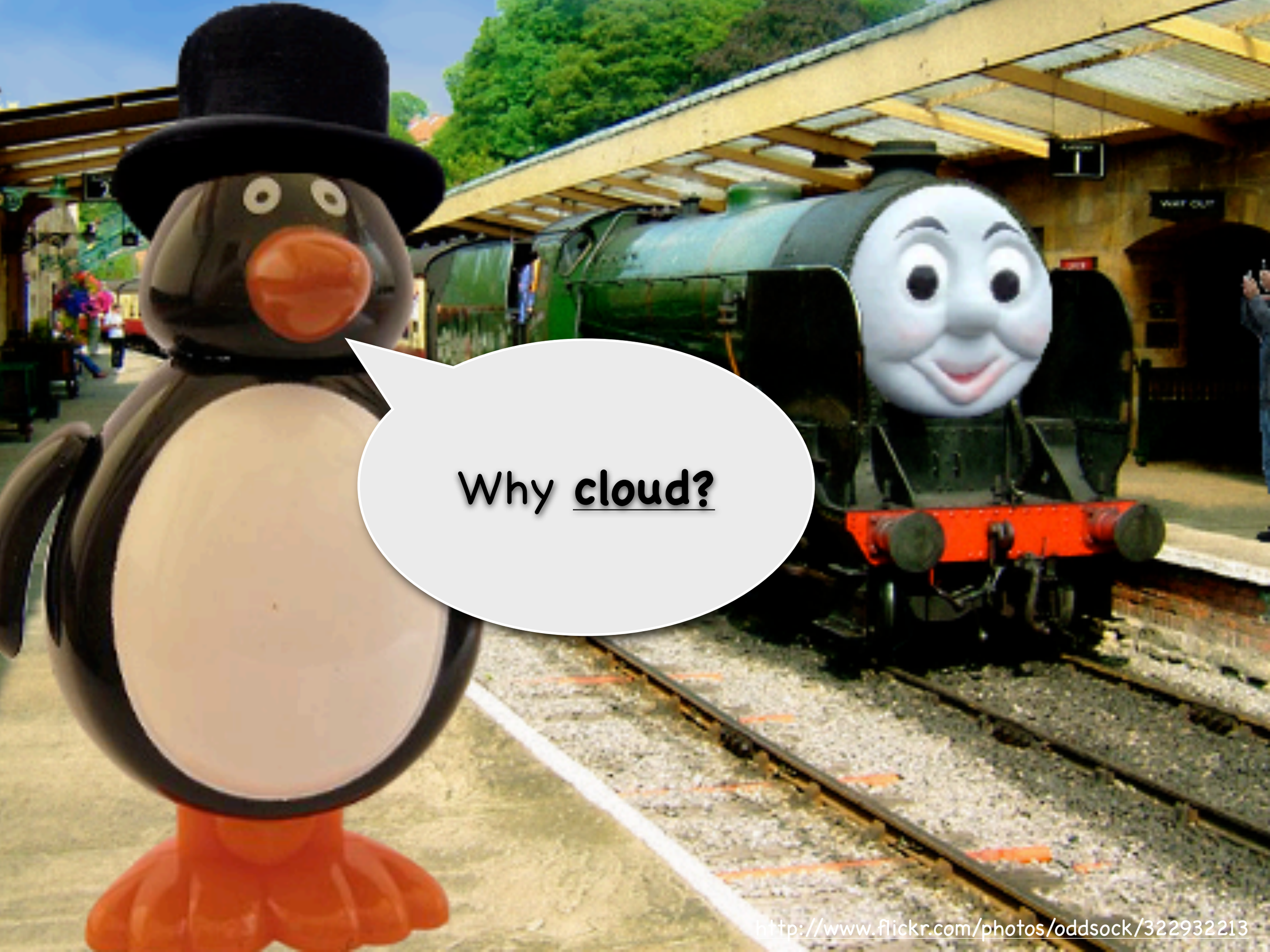
Minimise Exit

Adopt defacto public standard

open source implementation

How to spot a **cloud**

http://www.flickr.com/photos/oddsock/322932213



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photos/videoplacebo/3481780379/

http://www.flickr.com/photos/rainbowproject/3928445074/

Thank you

ubuntu.com/cloud
simon.wardley@canonical.com
twitter: swardley