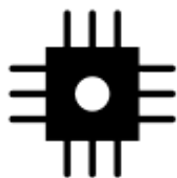


## Data Center Optimisation: from Virtualisation to Cloud



Consider how our world is changing:  
Our world is becoming **smarter** and more...



## INSTRUMENTED

- **30 billion** embedded RFID tags
- **1/2 of all sensors** in transportation, facilities & production equipment are smart sensors



## INTERCONNECTED

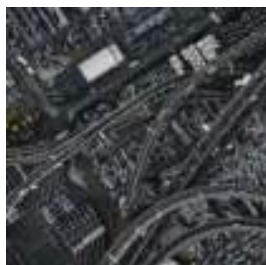
- **1/3 of the world's population** on the Web by 2011
- **4B mobile subscribers** globally at the end of 2008
- **37K cyber attacks** in the US in 2007; 158% increase since 2006
- Internet connected devices will **leap from 500M to 1 Trillion by 2011**



## INTELLIGENT

- **15 petabytes of new information** generated every day (8x more than the information in all U.S. libraries)
- **64B credit card transactions/annum; up 35%**

As the world gets smarter, demands on the infrastructure will grow



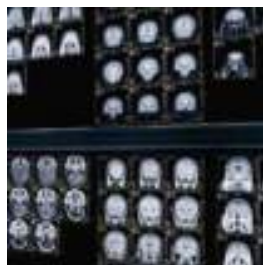
Smart traffic systems



Intelligent oil field technologies



Smart food systems



Smart healthcare



Smart energy grids



Smart retail



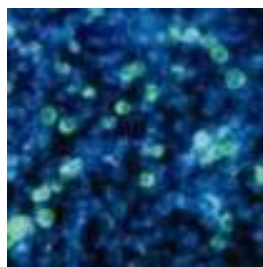
Smart water management



Smart supply chains



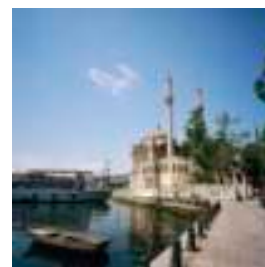
Smart countries



Smart weather



Smart regions



Smart cities

IT needs to be service-driven and highly efficient

... about delivering “services” and service management

... about optimising workloads

... about deployment choices



**Analytics**



**Collaboration**



**Development  
and Test**



**Desktop and  
Devices**



**Infrastructure**



**Business  
Services**

## Cloud: Consumption & Delivery

“Cloud” is a **new, evolving consumption and delivery model** inspired by consumer Internet services.

### Cloud enables:

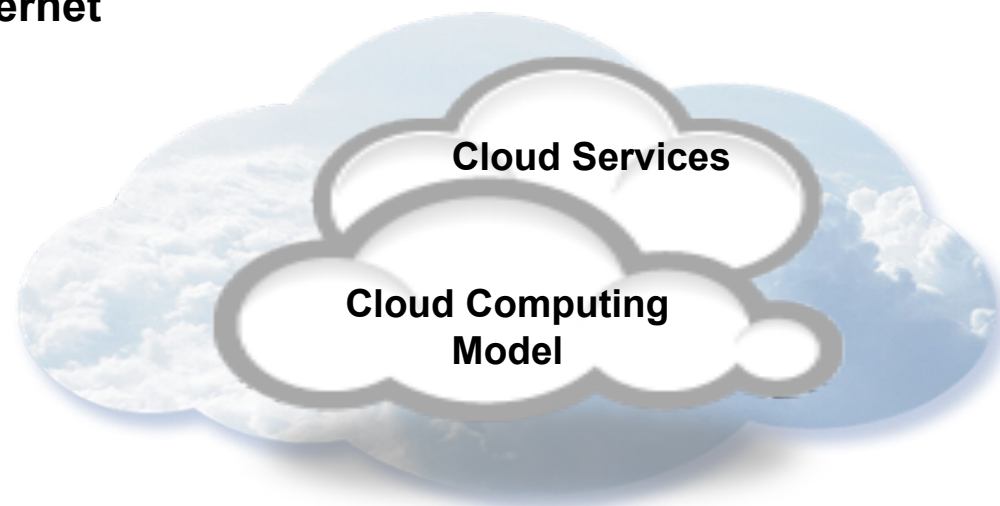
- Self-service
- Sourcing options
- Economies-of-scale

### “Cloud” represents:

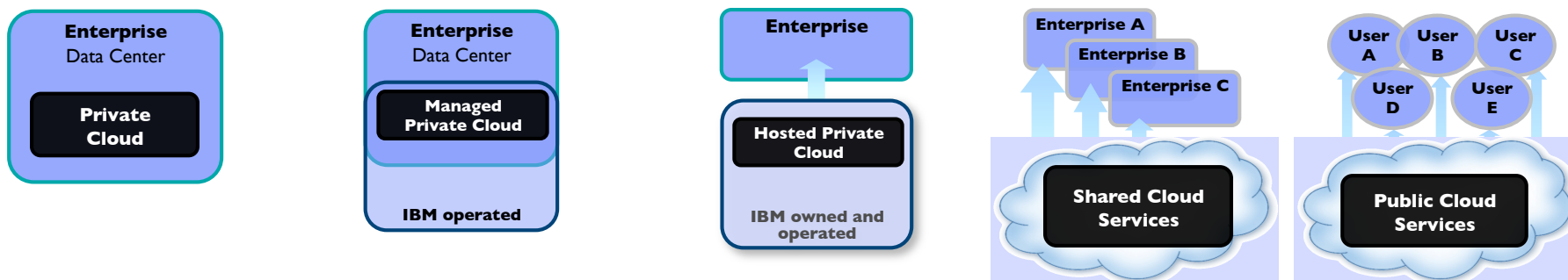
- The **Industrialisation of Delivery** for IT supported Services

### Multiple Types of Clouds will co-exist:

- **Private, Public** and Hybrid
- **Workload** and / or **Programming Model** Specific



## New, evolving consumption and delivery models drive new sourcing options and business flexibility



- Enterprise owned

- Either enterprise operation or 3<sup>rd</sup> party

- Fixed price or time and materials services

- Internal network

- Dedicated assets

- 3<sup>rd</sup> party owned and operated

- Centralized, secure delivery center

- Fixed price, time and materials, or pay as you go

- Internal network

- Dedicated assets

- Mix of shared and dedicated resources
- Shared facility and staff

- Pay as you go

- VPN access or public internet

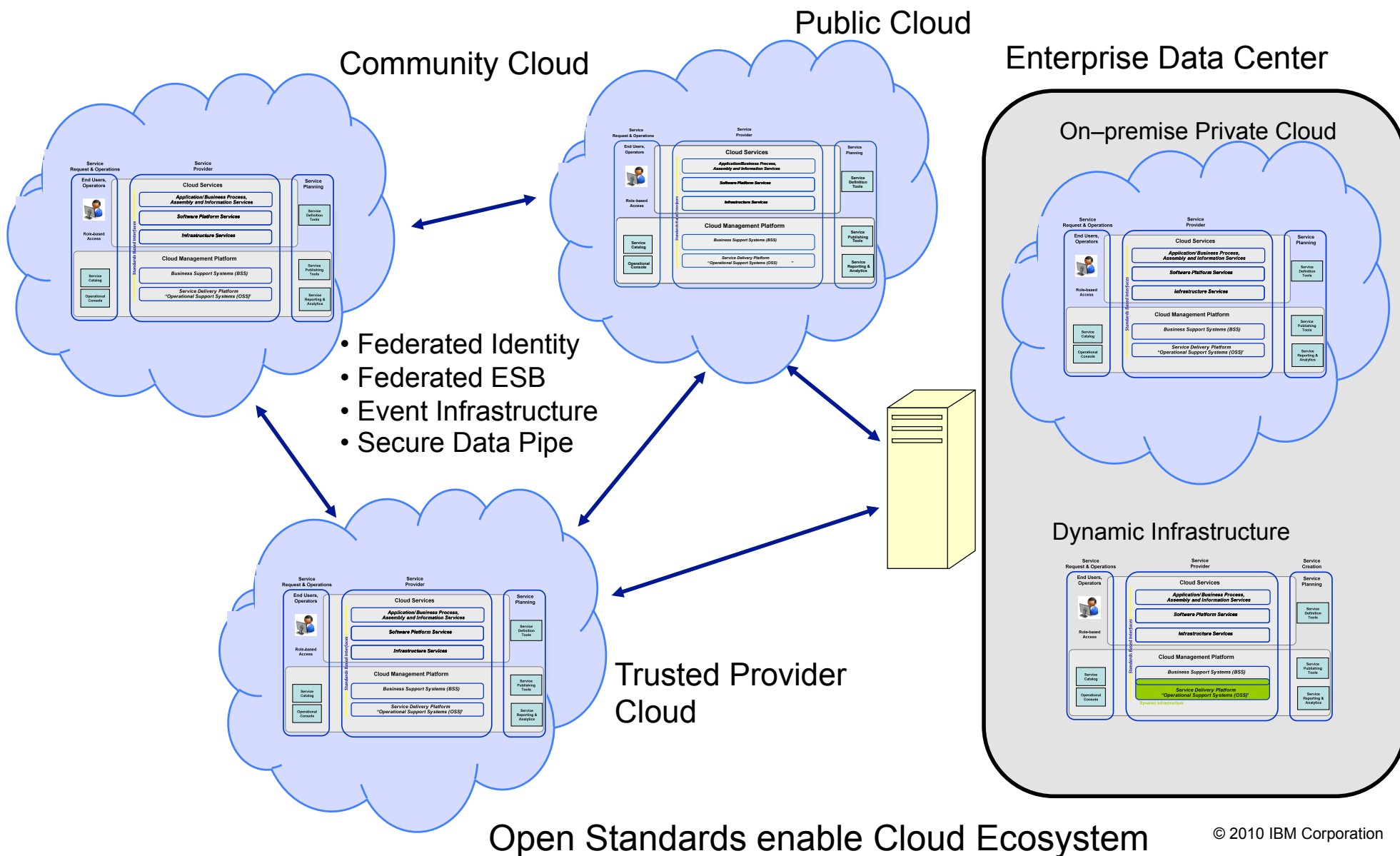
- Shared resources

- Elastic scaling

- Pay as you go

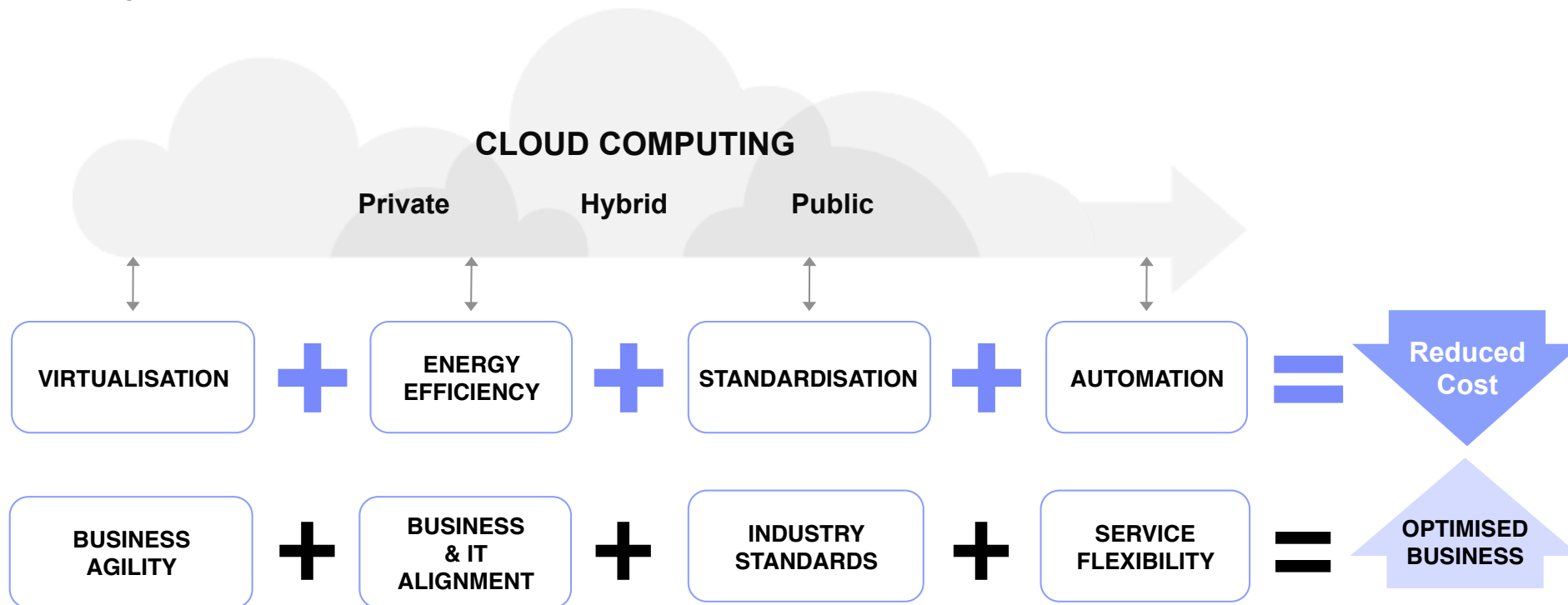
- Public internet

# Enterprises will connect to many clouds



## Cloud computing infrastructure:

Is optimised to achieve more with less....



...leveraging virtualisation, energy efficiency, standardisation and automation to free up operational budget for new investment.

Effectively we are entering a new phase of “IT Industrialisation” to improve efficiency, responsiveness, lower cost and manage risk



# IT transformation roadmap for cloud environments

## Physical Consolidation



- Improve utilisation
- Reduce costs
- Lower power usage

*Improve capacity utilisation by as much as 60%, while reducing the power and cooling costs*

## Advanced Virtual Resource Pools



- Decouple complexity from scale
- Share resources optimally
- Automate workload management
- Incorporate HA & DR

*Hands-free operation, eliminate mundane tasks and manual processes and deploy workloads in minutes*

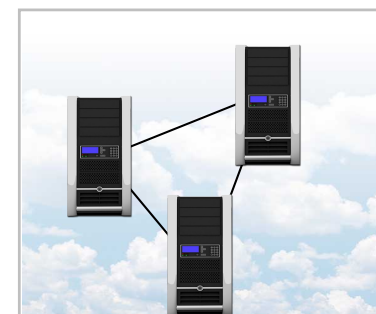
## Fully virtualised IT with integrated Service Management



- Sense and respond to workload requirements
- Dynamically move workloads to best-fit infrastructures
- Integrated virtualisation management with IT processes

*Save time and reduce skill level required for workload provisioning through pre-packaged automation templates*

## Cloud



- Low cost through economies of scale
- Fully virtualised
- Globally available
- Elastic scaling
- Automated service management
- Pay for use
- Self-service with rapid provisioning
- Service catalog

*Give users the flexibility to request and pay for services they want without the complexities of establishing an IT infrastructure*

## Achieve results through workloads and service management

- Workload characteristics will drive the rate and degree of standardisation of IT and business services.
- Complex transaction and information management processes, for example, will likely present **challenges and risks** of migration to standardised services. Other workloads will move faster, presenting **rapid return-on-investment and productivity gains**.
- A **Service Management System** will provide ***visibility, control and automation*** across IT and business services to ensure consistent delivery.
- A **consistent, trusted service** will drive lower operational costs, unlock productivity and ensure security.



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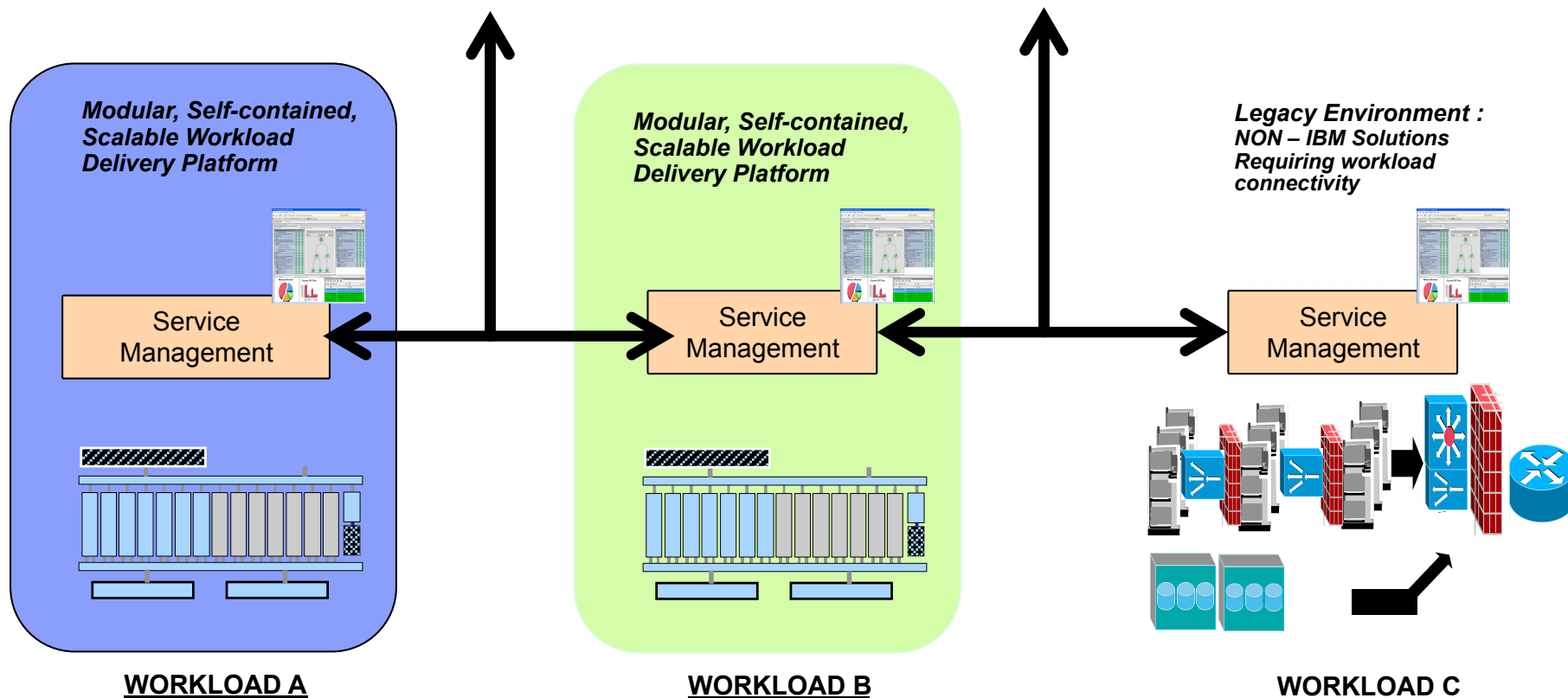
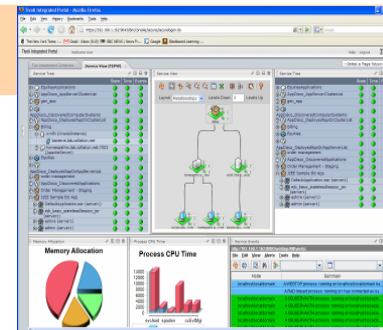


**Business  
Services**

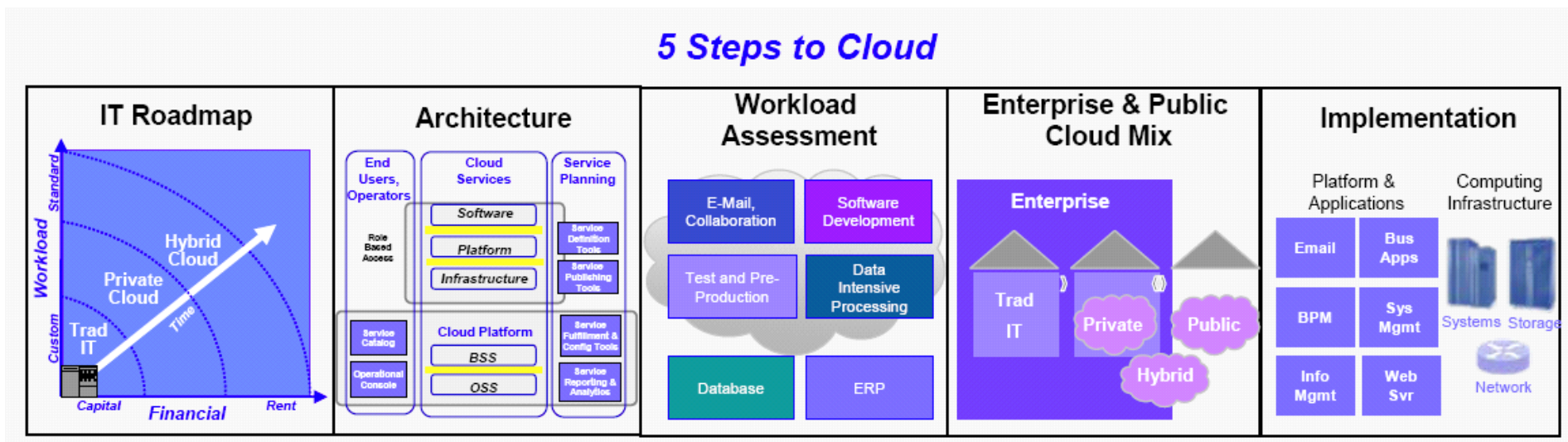
# Data Center Optimisation through modularity

## End to End Service Management

Architectural and process level integration that delivers business aligned Visibility, Control and Automation of all Data Center Elements

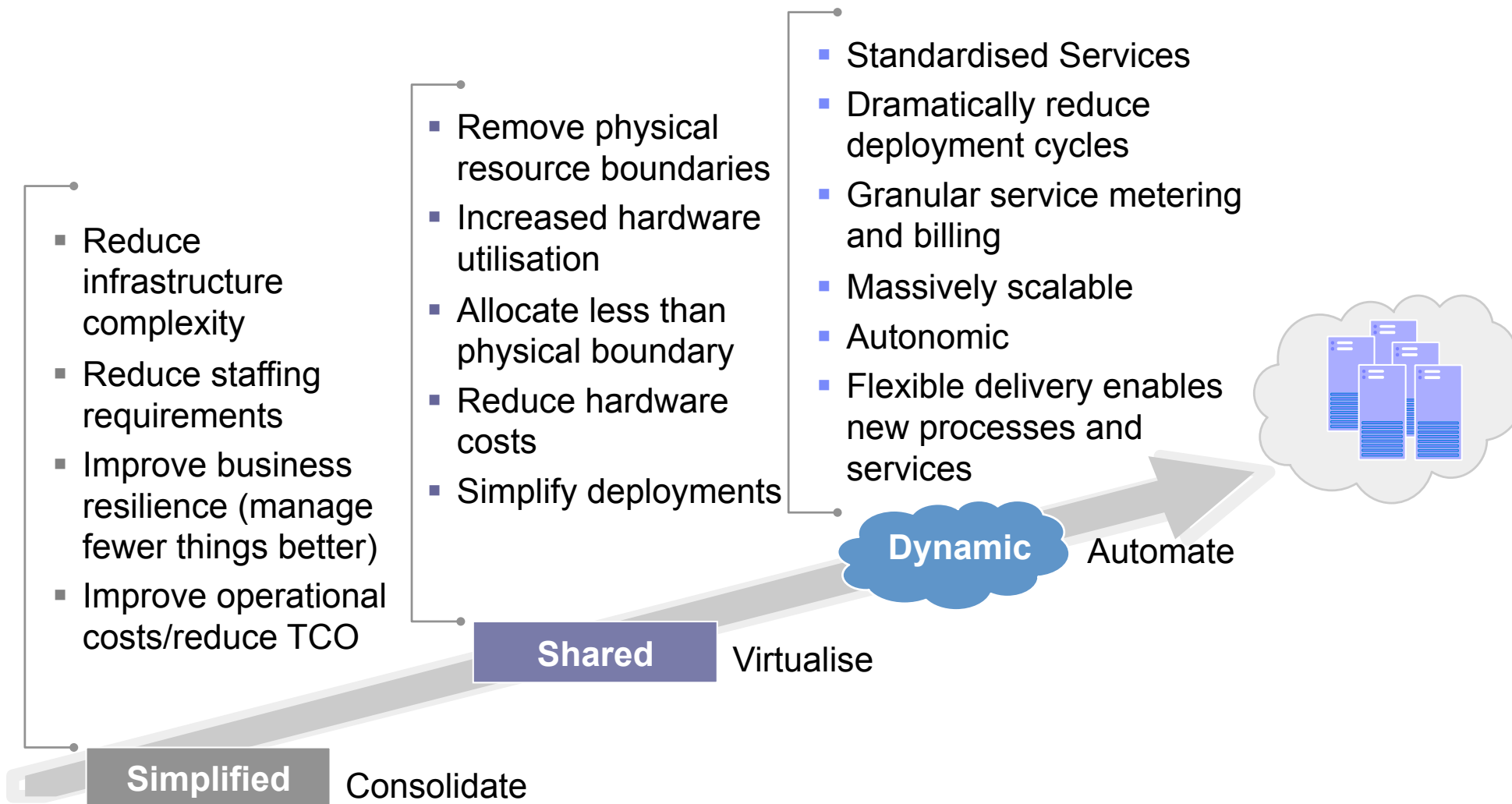


## 5 Step approach to adopting a Cloud model

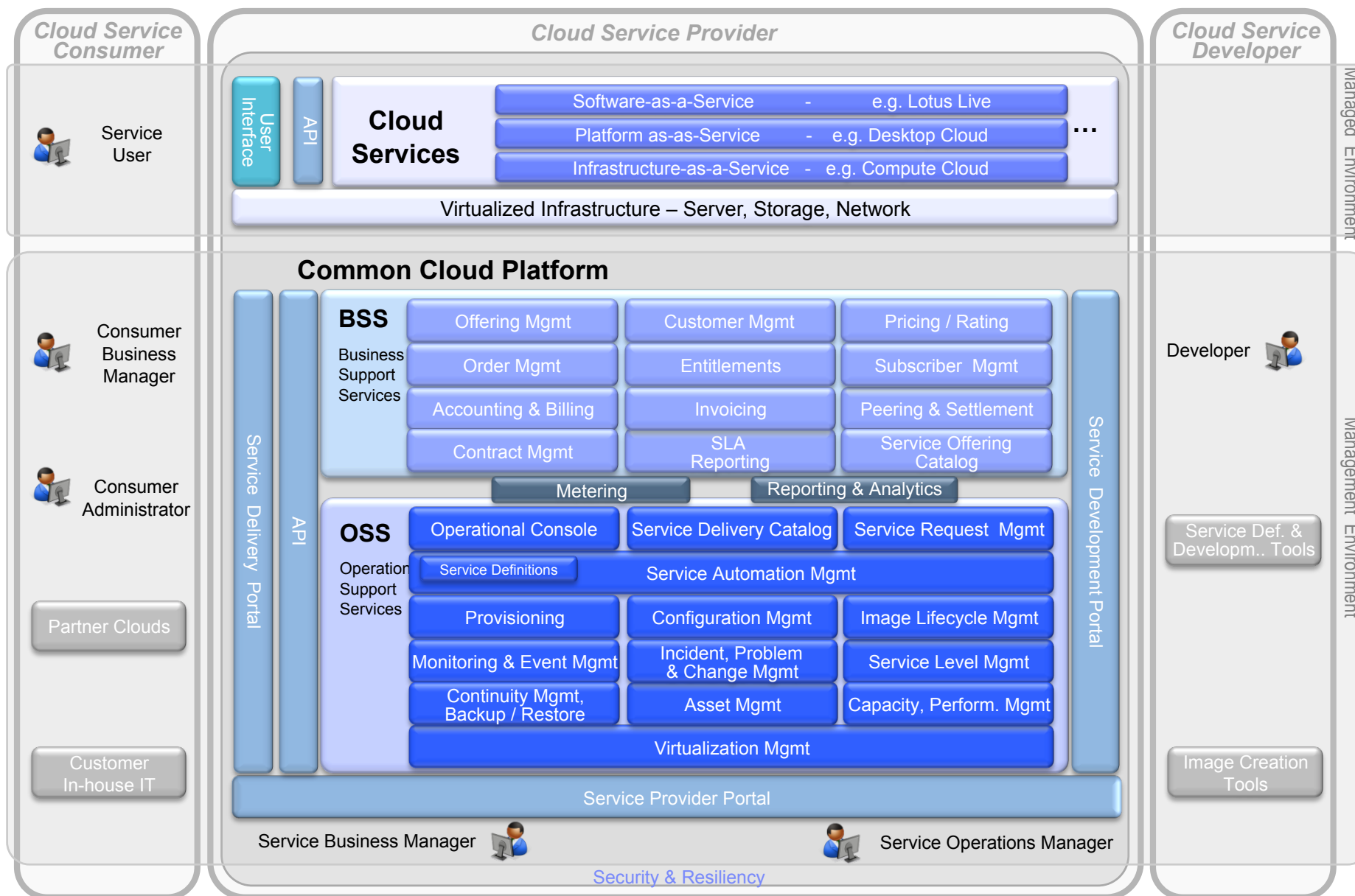


1. Start with a transformation roadmap.
2. Adopt a reference architecture that supports a Cloud computing model.
3. Conduct a detailed analysis of your current and future workloads.
4. Decide upon the right mix of workloads (Cloud and non-Cloud).
5. Backup up your decisions with detailed ROI analysis.

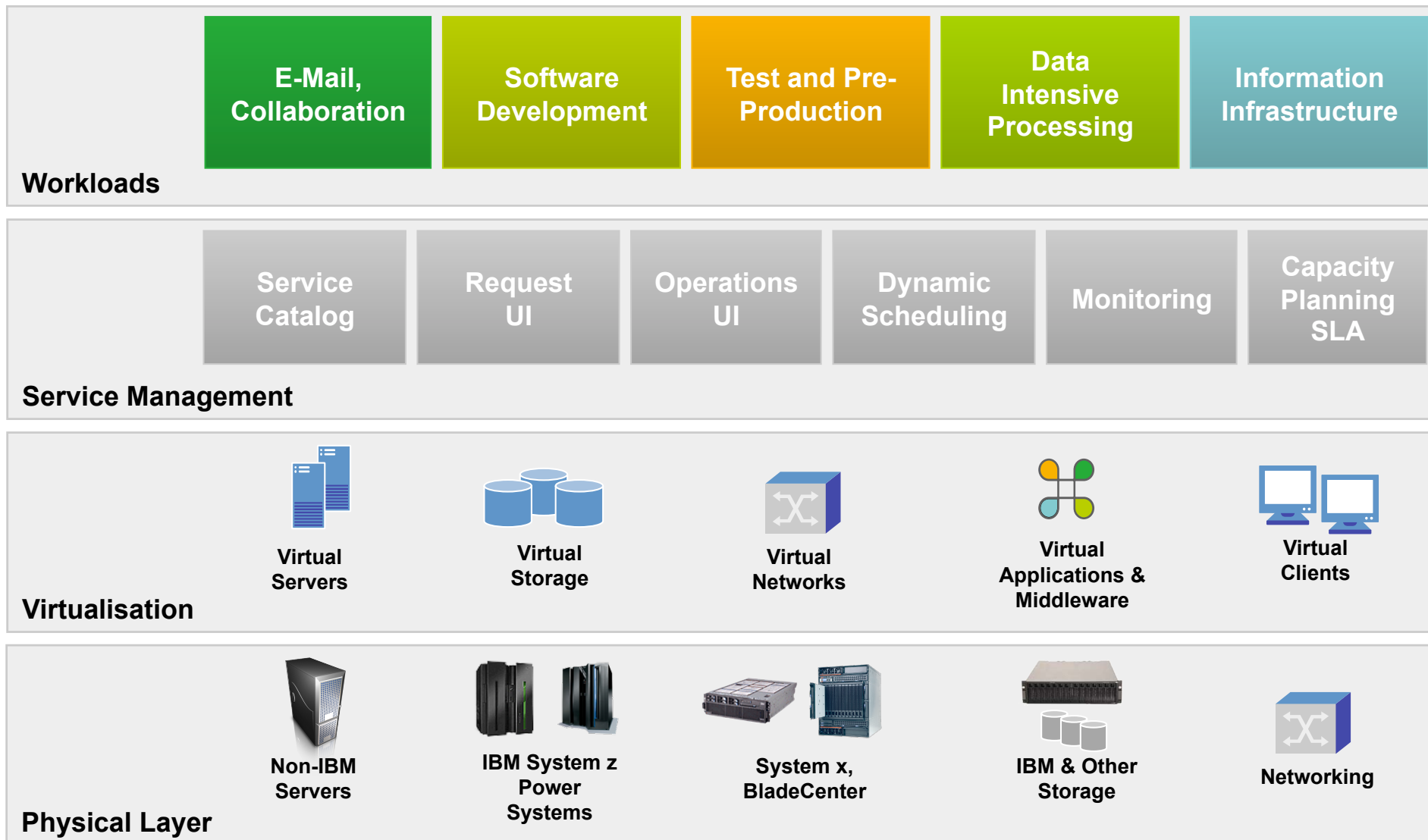
# Step 1: IT transformation roadmap



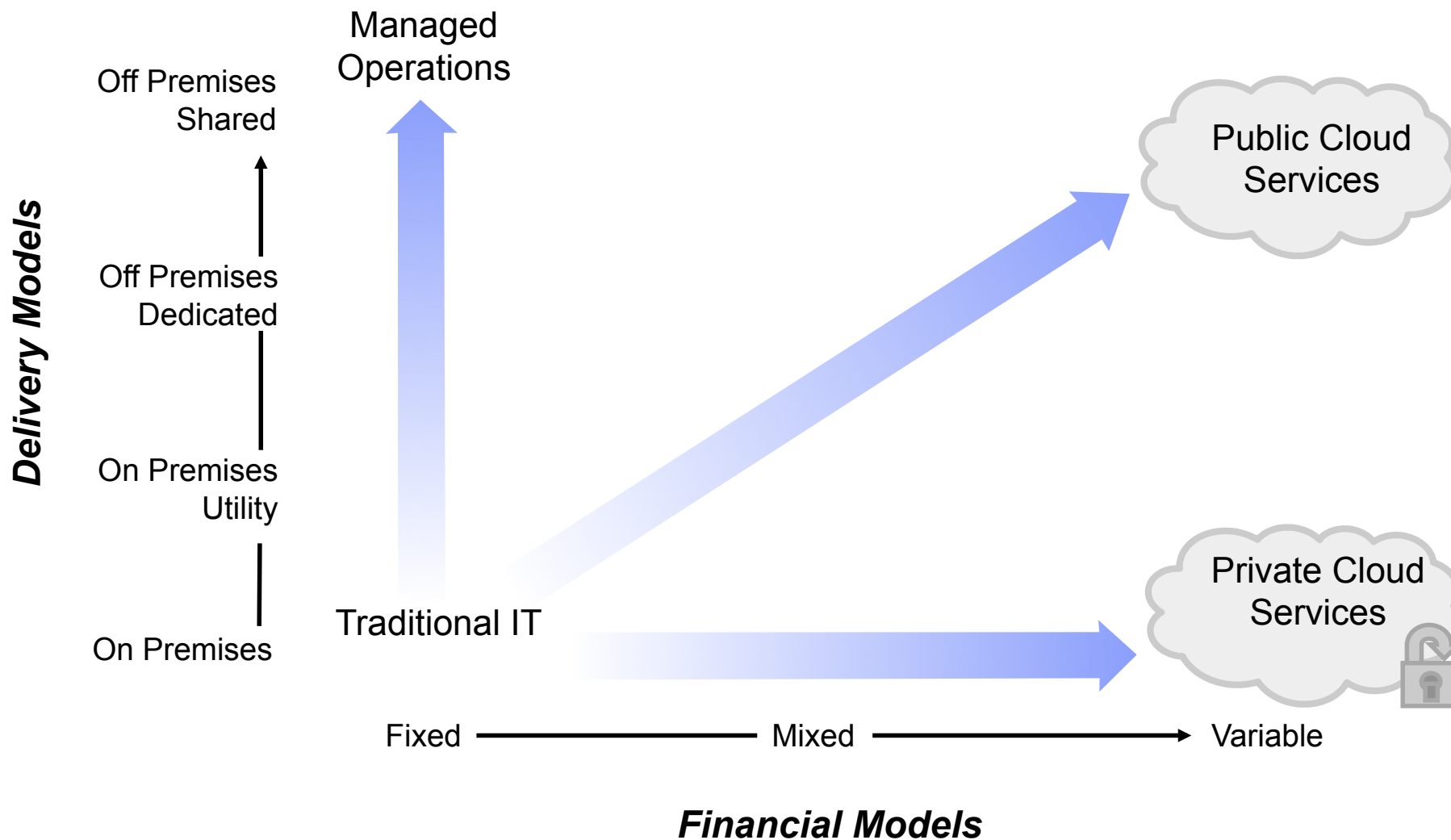
## Step 2: Reference architectural model for cloud computing



## Step 3: Workload analysis



## Step 4: Decide the right mix for the enterprise

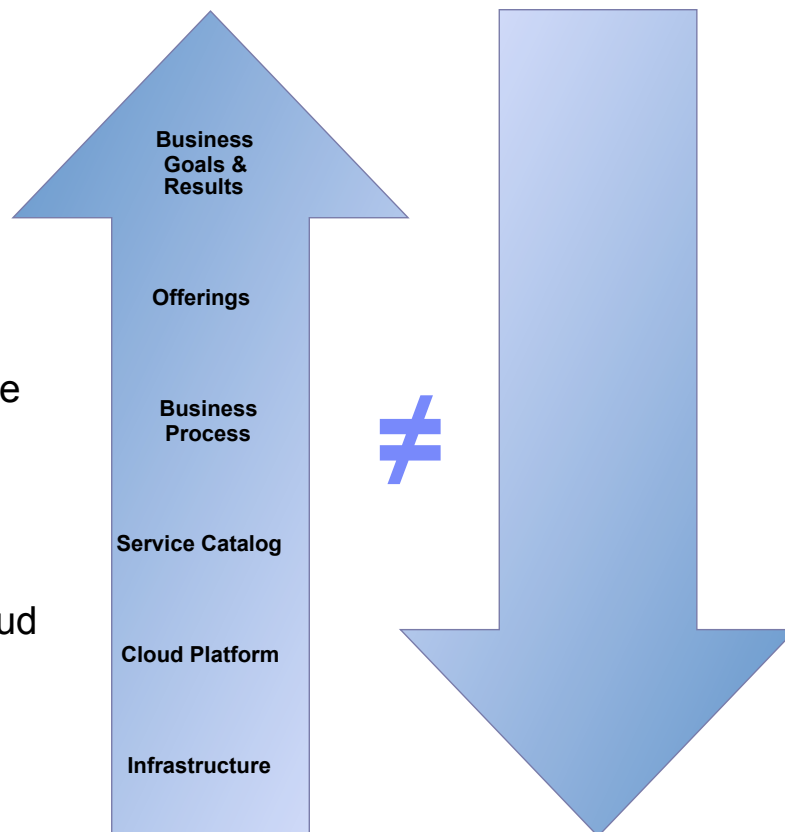




## Step 5: Implementation

### Bottom-up approach

- Fit Cloud into existing landscape (brown field).
- Integrate with existing hardware, storage, network, security.
- Build up service catalogue with existing workloads.
- Optimise & automate processes.
- Incrementally extend Cloud offerings.



### Top-down approach

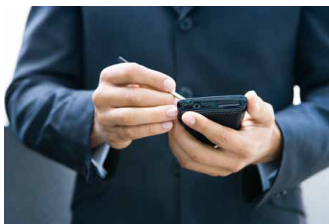
- Define standardised service offerings.
- Optimise business processes to achieve goals / KPIs.
- Build simplified cloud environment (green field).
- Build up new service catalogue.
- Migrate workloads to simplified model.

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## Lastly: Selecting a pilot project

- Address a well understood IT project.
- Incorporate aspects of self-service requests and provisioning automation.
- Incorporate Line of business and IT objectives into the project.
- Consider test and development environments as entry points.
- Require an achievable stretch beyond current capabilities to address gaps (skills, processes etc.).
- Target an area that will eventually make it into production.

## A practical approach to cloud computing



Plan & Prepare

### Condition your existing infrastructure for cloud

- Virtualise and automate existing systems
- Add service management, service catalogue

### Define cloud strategy & roadmap

- Assess cloud deployment models, service options and workloads
- Plan cloud strategy and roadmap
- Choose initial project



Test & Deploy

### Start with an isolated cloud deployment

- Choose low-risk workload such as test and development
- Standardise applications and systems
- Deploy self-service portal



Extend & Evolve

### Use trusted cloud services to supplement data center capabilities for:

- Infrastructure as a Service (IaaS)
- Platform as a Service (PaaS)
- Software as a Service (SaaS)

## In summary

- Cloud computing is a disruptive change to the way IT services are delivered
- Without a strategy, Cloud computing can be a threat
  - IT services delivered over the Internet
  - Perceived cost gap between a cloud service and traditional IT
  - “The next compute model after client/server”
- With a strategy, Cloud computing is a huge opportunity
  - Lower cost of delivery for some workloads
  - More responsive IT
  - Ability to optimise delivery to traditional, private cloud, public cloud
  - Greater visibility in billing / chargeback to LOBs
- IBM can help!
  - Several years of implementing and building Cloud technologies
  - Range of offerings from software, appliances, services



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**Business  
Services**

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## More Information

### Dynamic Infrastructure

- <http://www.ibm.com/dynamicinfrastructure>

### Smarter Planet

- <http://www.ibm.com/ibm/ideasfromibm/us/smartplanet/20081106/index.shtml>

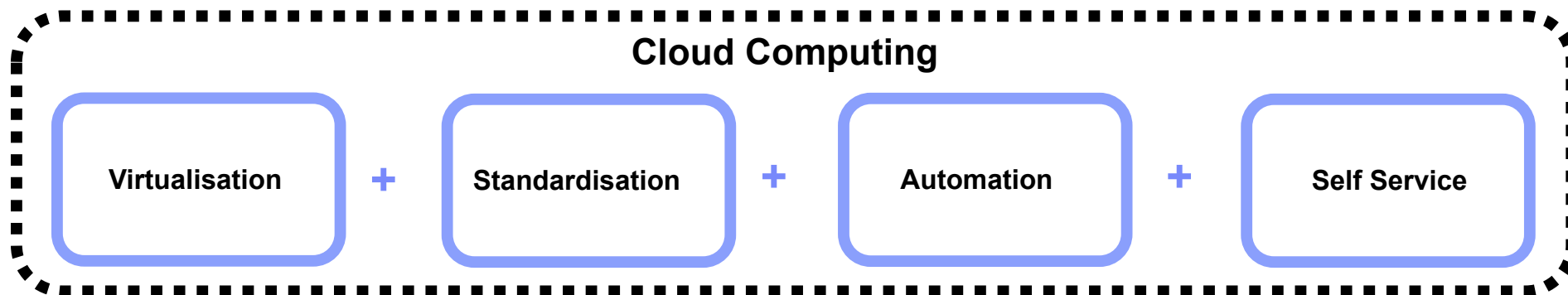
### Service Management and Cloud Computing

- <http://www-01.ibm.com/software/tivoli/solutions/cloudcomputing/>

### Contact

- [Sven\\_Strassburg@uk.ibm.com](mailto:Sven_Strassburg@uk.ibm.com) (Tivoli Sales & Strategy Leader for Business Process and Industry)

# Cloud computing is more than the sum of the parts...



- With**
- Enables flexibility
  - Increase utilisation
  - Energy efficient
  - Soft configuration
  - Infrastructure abstraction

- Without**
- Physically constrained
  - Capital intensive
  - Hard configuration
  - Linked to PO process

- With**
- Simplification
  - Few configurations
  - Enables automation
  - Easier support

- Without**
- Physically constrained
  - Many configurations

- With**
- Low human involvement
  - Rapid deployment & mgt
  - Repeatable configuration
  - Improves compliance

- Without**
- Manually intensive
  - Skill dependent
  - Error prone
  - Costly

- With**
- User in control
  - Cost and usage choices
  - Increased visibility
  - IT/Business alignment

- Without**
- Dependency of availability of data centre staff
  - Lack of awareness

