

## Agenda

- Cloud-Computing in general
- Why build a private SAS® cloud?
- Architecture Vision
- Architecture Principles
  - Multi Tenancy
  - Scalability and elastic resource
  - Availability
  - Service measurement and Charging
  - Identity and Access management
  - Client Management
- Summary



# Cloud Computing

## Essential Characteristics:

- On-demand self-service
- Broad network access
- Resource pooling
- Rapid elasticity
- Measured service

## Deployment Models:

- Private cloud
- Community cloud
- Public cloud
- Hybrid cloud

## Service Models:

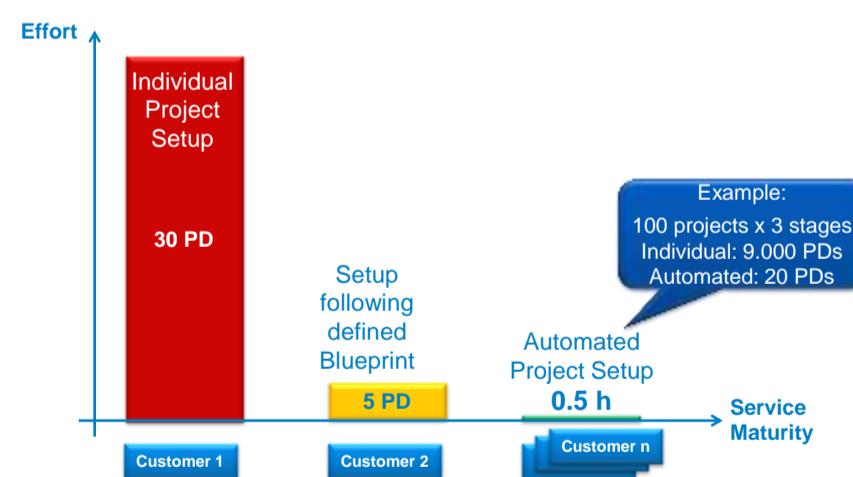
- Software as a Service (SaaS)
- Platform as a Service (PaaS)
- Infrastructure as a Service (IaaS).



## Why build a private SAS® cloud?

### Economic Advantages

- Economies of skill
- Economies of scale
- Economies of scope



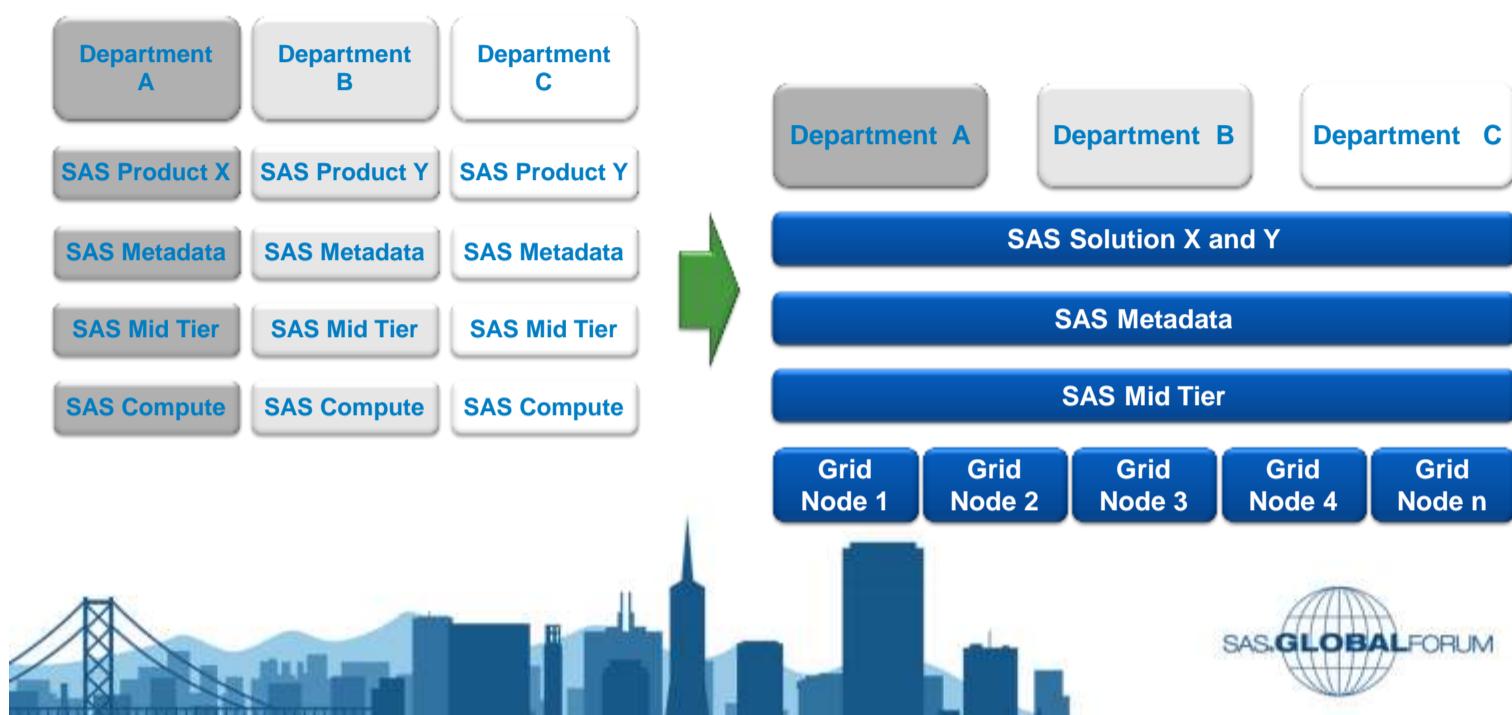
### Business Advantages

- Do more with the same or less.
- Standardises routine operations.
- Allows focus on those activities that add real business value



## Architecture Vision

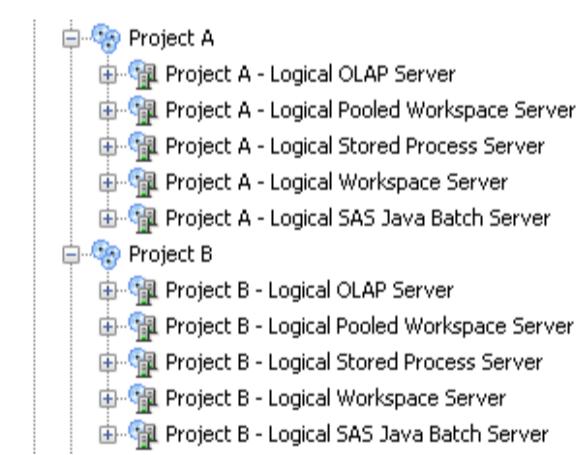
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## Architecture Principles

Multi Tenancy

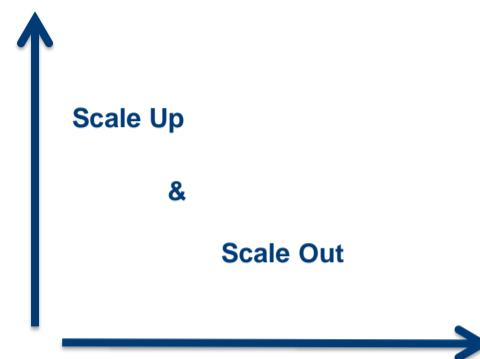
- **Objective – 1 SAS to many customers.**
- Logical separation of user communities within SAS.
- Mask from users the fact that they are using a shared service. Transparent execution from an end user perspective.
- Reduces setup and install costs as no new SAS environment or configuration is required.



# Architecture Principles

## Scalability and elastic resource

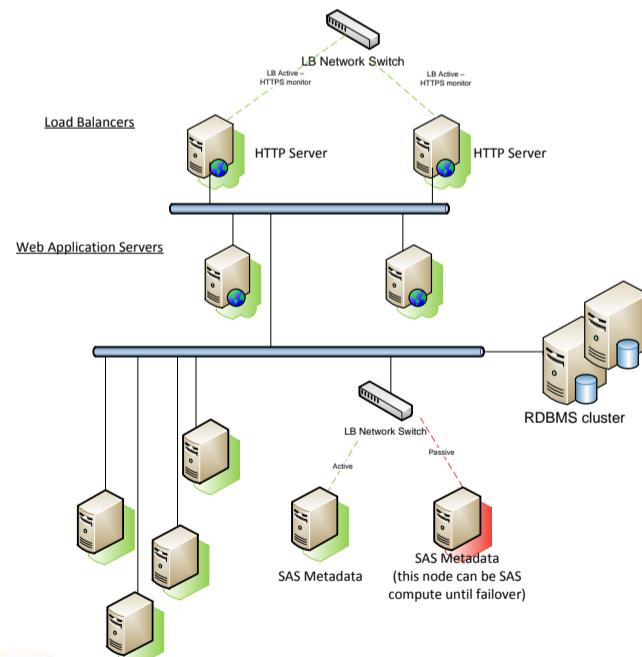
- **Objective – Support quick and cost effective scaling.**
- Clustering
- Load Balancing
- Grid Computing
- High Speed Scalable Storage
- Virtualization



# Architecture Principles

## Availability

- **Objective – keeping the lights on**
- High Availability
  - Service Monitoring
  - Service Restart
  - Service Migration
- N+1 redundancy.
- Minimize or eliminate single points of failure.

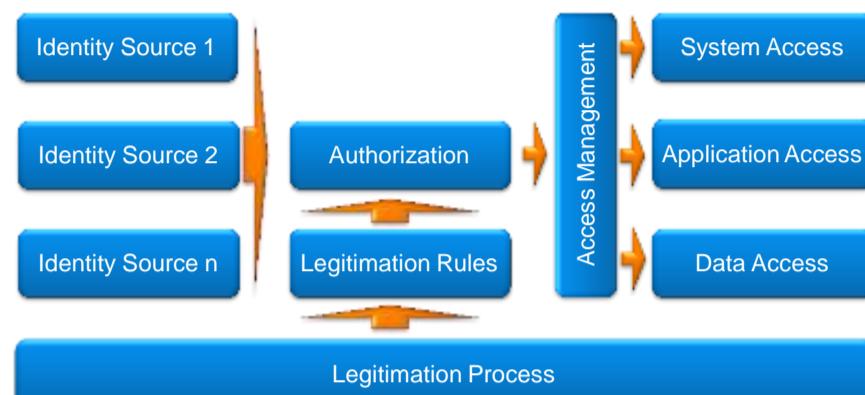


# Architecture Principles

## Identity and Access management

- **Objective – Self Service**

- Empower business owners to manage who can access what.
- Removes overhead from IT from managing low level change requests.
- Requires standardization of Security Model – Groups and Roles:
  - Developers
  - Consumers
  - Administrators.....

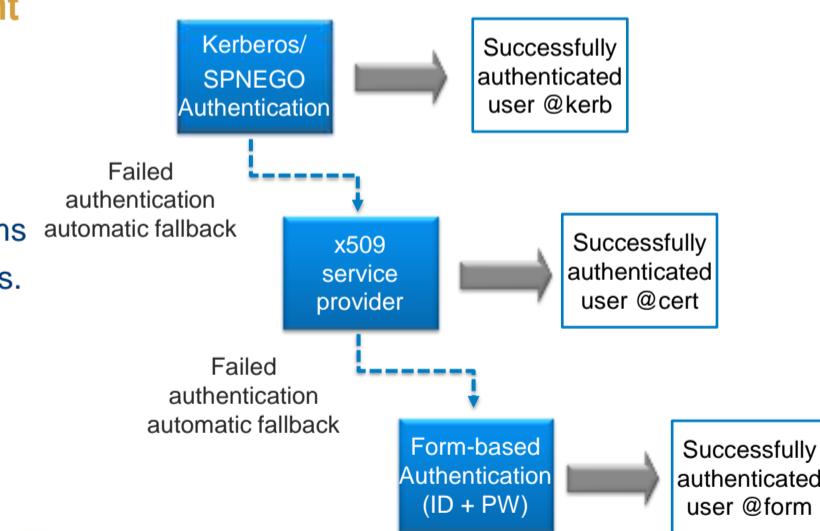


# Architecture Principles

## Identity and Access management

- **Objective – provide company wide access to SAS.**

- Multiple Authentication Mechanisms
  - Requires custom login modules.
  - Supports non Kerberos SAS connections.



# Architecture Principles

## Client Management

- **Objective – enable deployment of SAS Web and Desktop clients to a geographically distributed user base.**
  
- Application Virtualization
  - Central deployment of SAS applications, streamed to users.
  - Virtualized desktop
  - Standardize SAS client versions across the company.



## Summary

SAS in the cloud is not a dream. It is achievable right now.

Some careful planning and engineering will realise enormous benefits both to IT and also business agility.

Start small, build big.

Watch this space for more development in SAS 9.4 – API's, Apps

