

RESERVOIR

from a large-scale ICT perspective



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- Clouds
 - Large pool of easily usable and accessible virtualized resources
 - Can be dynamically reconfigured to adjust to a variable load (scale)
 - Exploited by a pay-per-use model.
- Premise
 - No single cloud can create a seemingly infinite infrastructure capable of serving massive amounts of user at all times, from all locations.
- RESERVOIR
 - Investigate technologies for advanced, future Cloud Computing
 - Focus on technologies that enable to build a federation of cooperating computing clouds
 - Develop and promote (thru standardization) an open architecture where resources and services can be transparently and dynamically managed, provisioned and relocated like utilities – virtually “without borders”
 - Identify the gaps in today’s (commercial) offerings, build (research prototype)
 - Build a proof of concept that validates the architecture and shows the viability and value of a federated cloud

- Cloud computing in early stages
- Constantly undergoing changes as new vendors, offers, services appear in the cloud market.
- Driven by cloud providers, who bring constantly new services to the ecosystem or revamping newer more efficient services
- Primarily triggered by requirements from consumers

BUT

- predominantly adopted by start-ups or SMEs so far
- Wide scale enterprise adoption of cloud computing model is still in an early stage
- Enterprises still carefully examining the various usage models where cloud computing can be deployed to support large-scale business operations

Enterprise IT components and adoption of Cloud



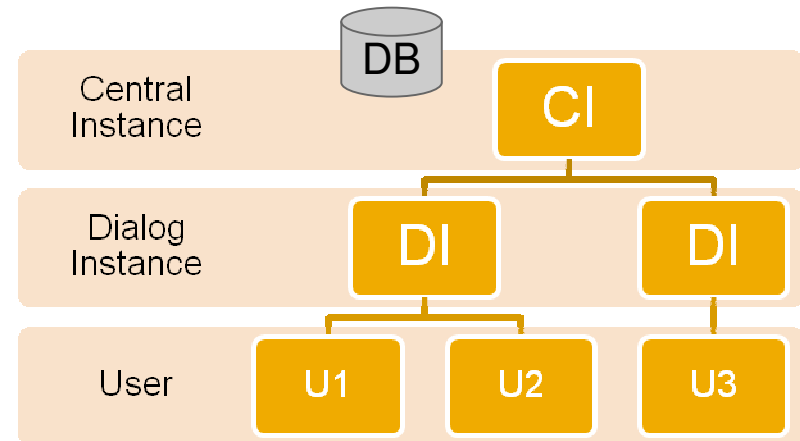
- Typical components of enterprise IT components:
 - Sales and Distributions (SD), banking and financials, customer relationship management (CRM) or supply chain management (SCM).
- Major technical and non-technical challenges
- Shared-everything architecture vs. shared-nothing
- Optimal adoption depend on:
 - size of the organization,
 - understanding of IT impact on business,
 - predictability of workloads,
 - flexibility of existing IT landscape and
 - available budget/resources for testing and piloting.

Experiments for the SAP use case



Components of the used SAP ERP System

- Central Instance: main business layer (CI image: 120GB)
- Dialog Instance (DI): user processes (DI image: 1.5GB)



Deployment environment

- KVM hypervisor, which is the supported hypervisor for the RESERVOIR stack
- other components of the RESERVOIR stack such as the VEEH, VEEM, the networking component and the OVF parser of the Service Manager (SM)
- Distributed testbed and RESERVOIR/Messina testbed

The following two scenarios where the focus of our attention in Y2:

- Rapid Provisioning
- Elasticity

Scenario 1

Rapid Provisioning



Completely unattended and fully automated deployment of an SAP ERP 6.0 system from an OVF descriptor and KVM images.

Challenge for the scenario on a “RESERVOIR-enabled” data center

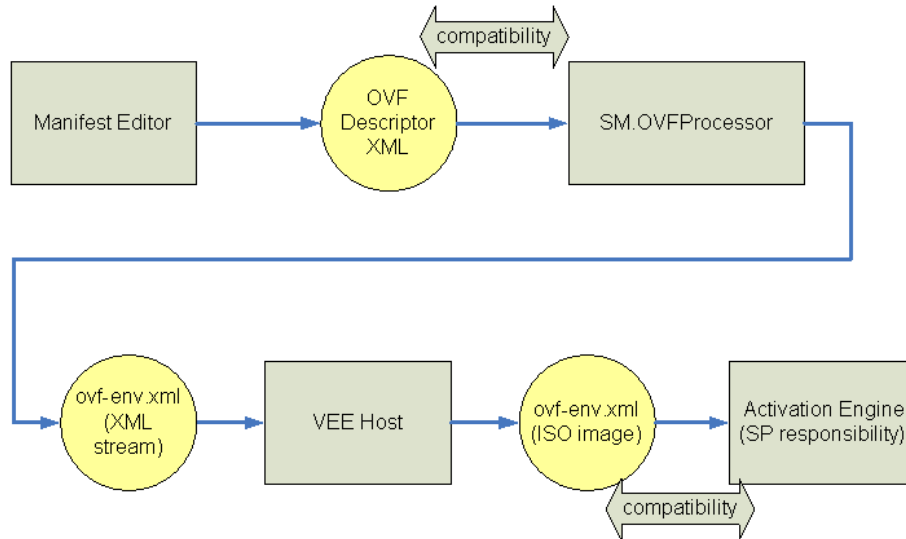
- Create template OVF descriptor
- Creation of virtual machine image

Goal

- Create a data center-independent OVF appliance
- Describe rapid customization aspects of a virtual appliance in a declarative manner in the OVF descriptor

Scenario 1

Rapid Provisioning – the process



1. OVF Processor parses OVF descriptor
2. Prepare an environment file for each VM of the appliance with all the customization and configuration parameter values that are specific to the actual deployment and VM (e.g., host names and IP addresses).
3. VEEH places file as an ISO image on the CD drive of the to-be-booted VM
4. Service Provider prepared the Activation Engine and embed it in the image. It is also the responsibility of the service Provider to prepare the OVF descriptor and images.
5. Pre-prepared software module (Activation Engine) is embedded in the image of the VM, reads this file and makes the appropriate settings for the starting image

Scenario 2

Elasticity



Provide a Business IT System, that automatically adds and eliminates system components according to business load.

Challenge

- Define elasticity rules in OVF descriptor
- Add and eliminate Dialog Instances (DI) according to system load
- Elasticity rules rely on applicative KPIs that have to be monitored

Goal

- Demonstrate elasticity
- Usage of monitoring framework for rule enforcement

Issues

- Size of the images and the time it takes to create them, especially for the first time.
- Moving images this size between different data centers requires moving them by postal mail

- Applications that are at the center of gravity of the enterprise: remain on-premise
- Enterprises should adopt a model that is a hybrid of on-premise and on-demand models.
- Such a hybrid model should support transitions between on-premise and on-demand modes of operation for certain type of applications along with their data sets.

Main categories of cloud business applications in hybrid model

- Edge applications. Applications with a well-defined yet limited functional scope
- Functional utilities such as Business Intelligence and Interoperability that are offered as on-demand service utilities.
- A wide spectrum of business services, ranging from address verification and exchange rate calculation to complete business-to-business commerce services that includes order and payment processing.

Drivers

- applications interchangeable and cloud-agnostic, use of standards, management frameworks

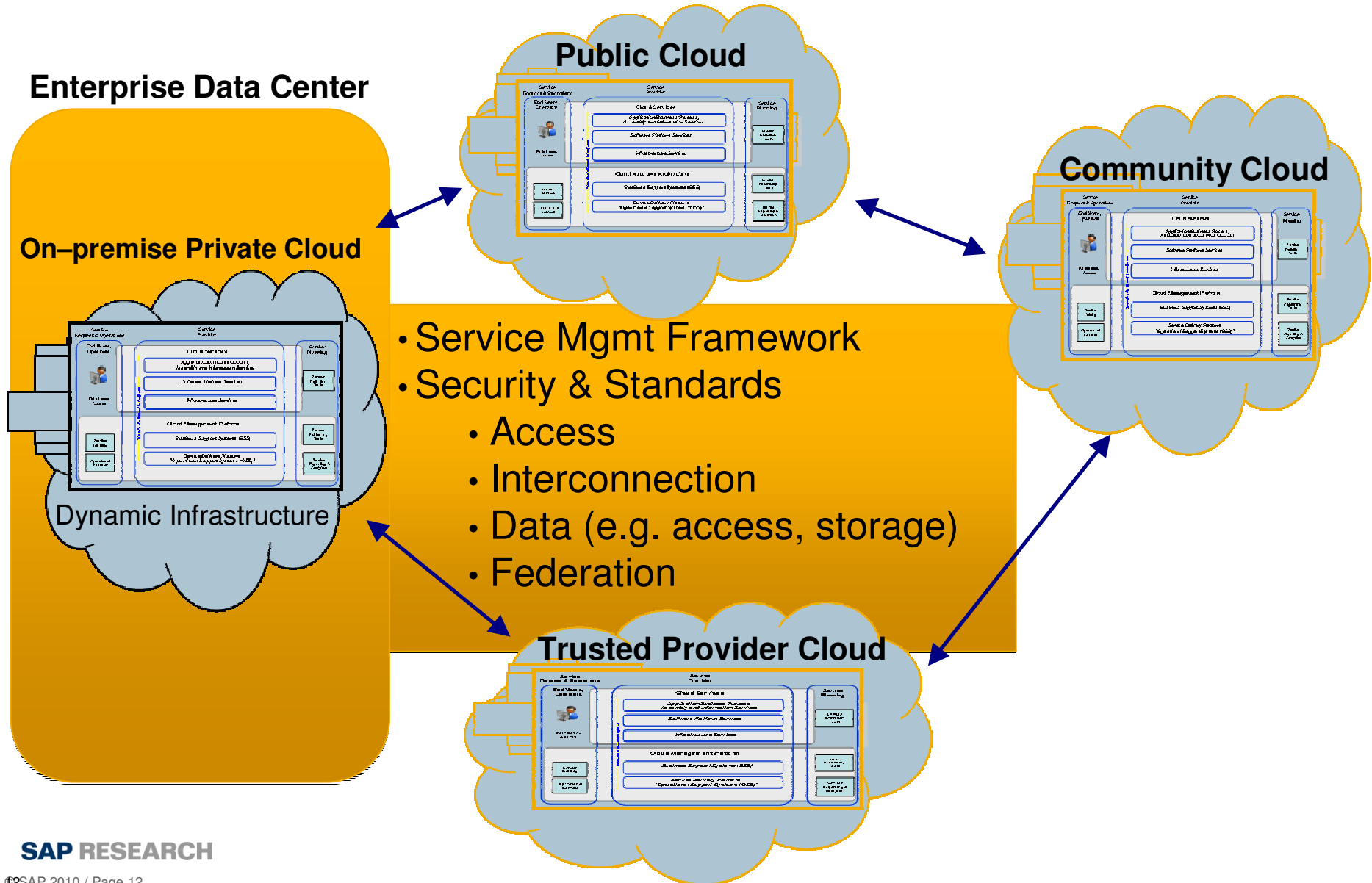
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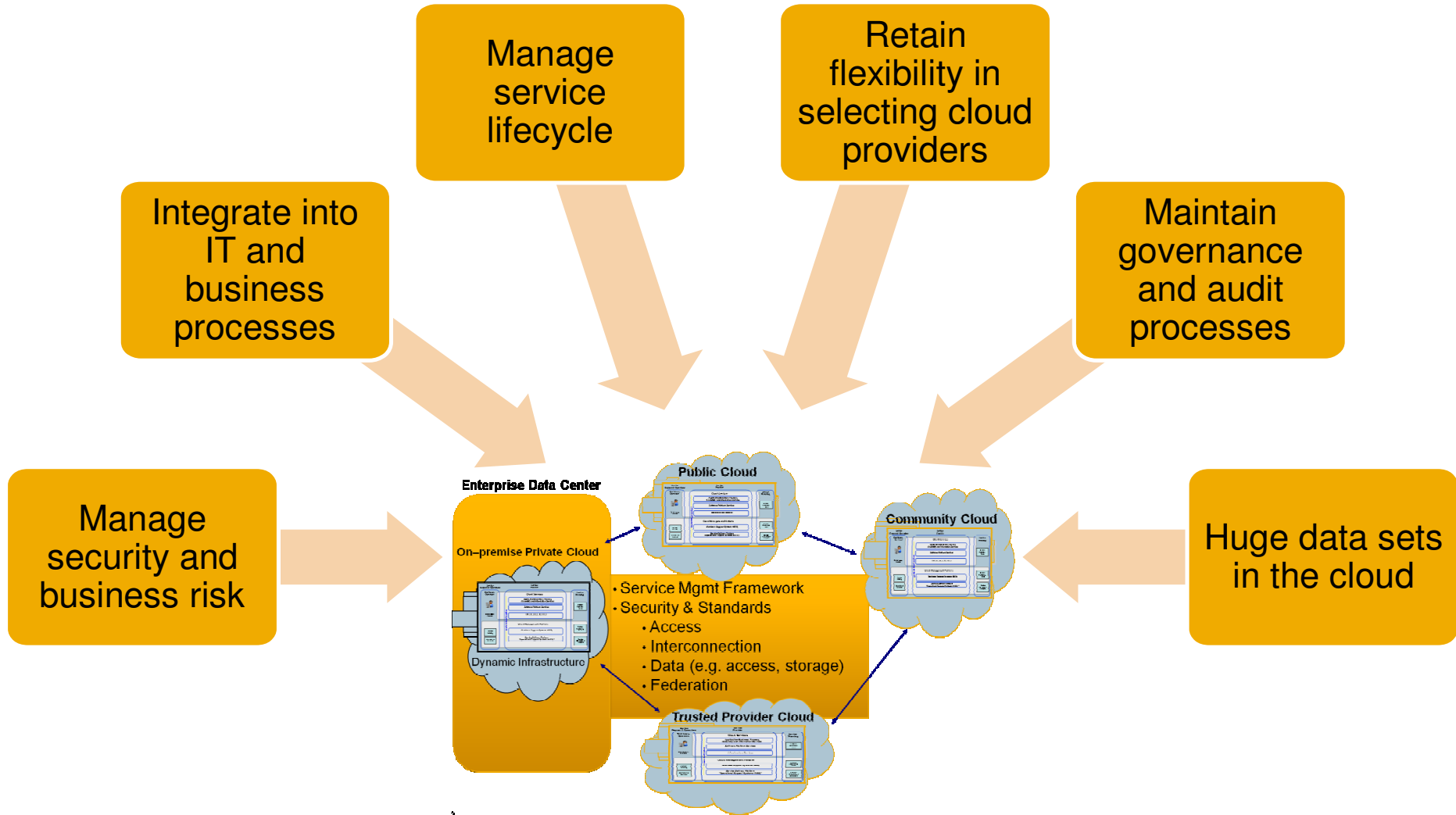
Backup



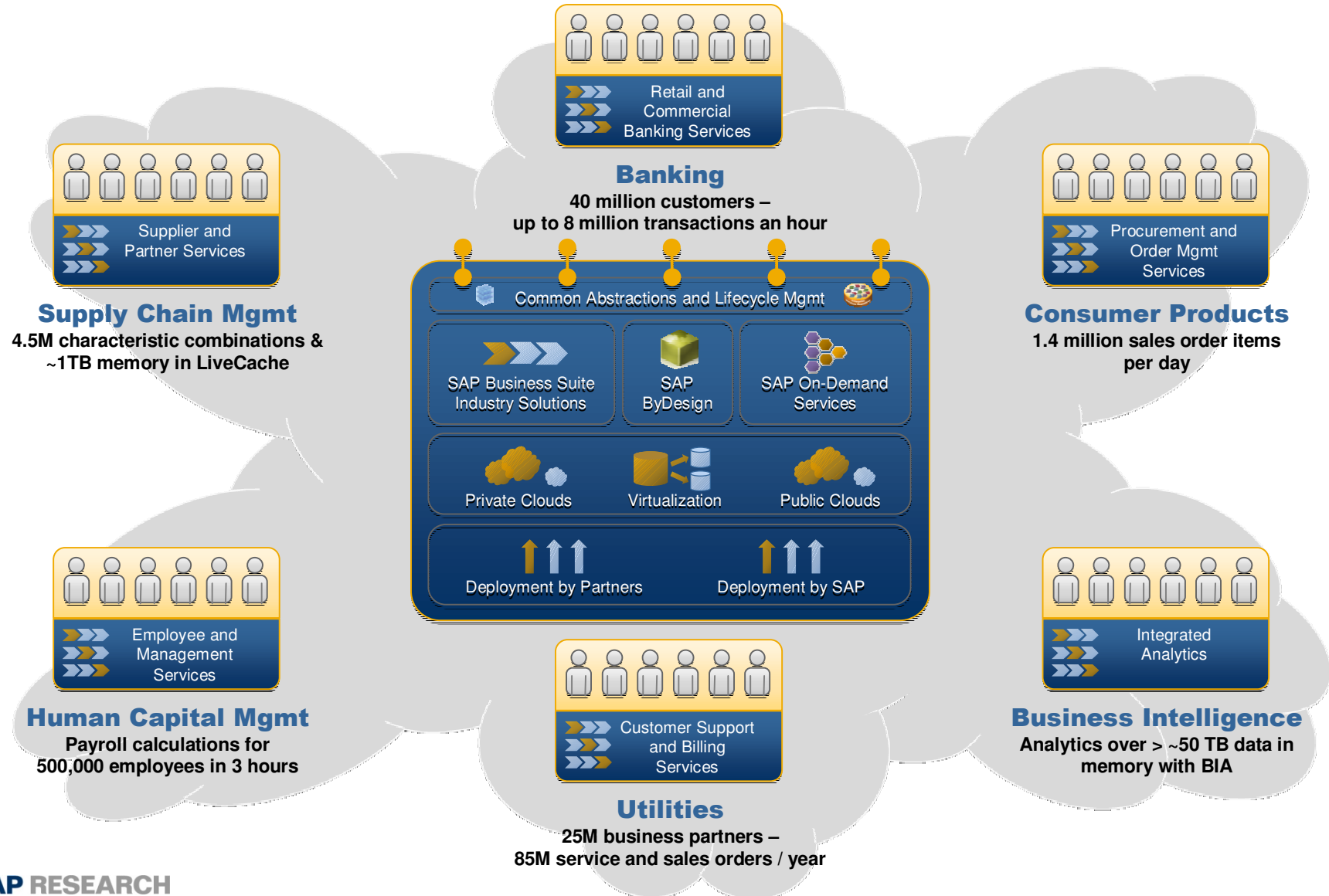
Standards, Interconnection and Management Frameworks will drive Cloud Adoption.



Cloud Deployment Scenarios - potential challenges



Why SAP and cloud?





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