

# PaaS Cloud Migration

## Migration Process, Architecture Problems and Solutions



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# Cloud Migration Motivation

## HOW TO MIGRATE TO CLOUD



IaaS

PaaS

SaaS

# Cloud Migration Definition

A cloud migration process is a set of migration activities carried to support an end-to-end cloud migration.



Implications of definition to be considered:

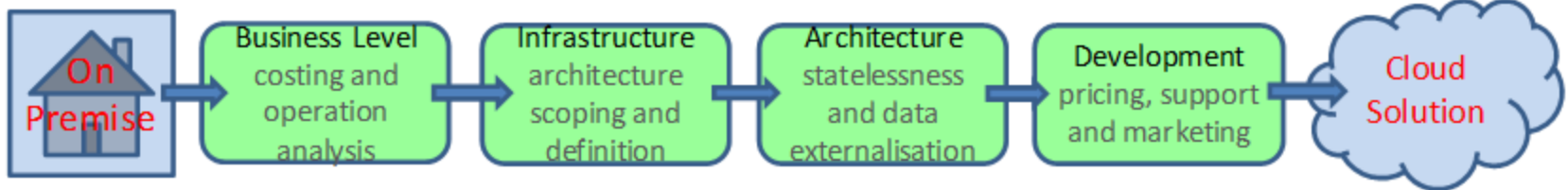
- initial requirements and expectation elicitation
- tools for automated migration of IT artefacts
- plans for the deployment of new cloud services
- decommissioning of old infrastructure.

# Cloud Migration Use Cases

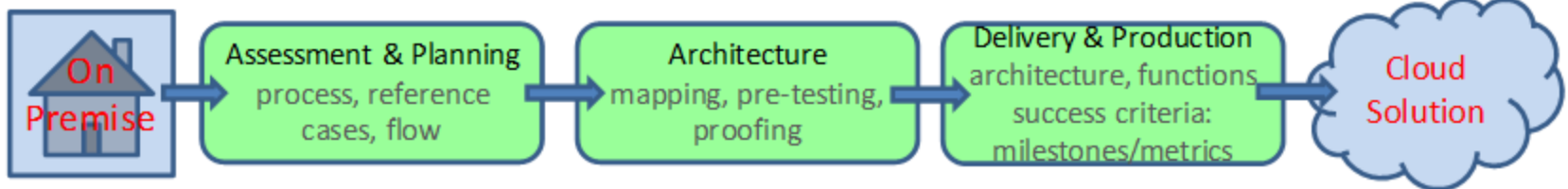
## SaaS Provider



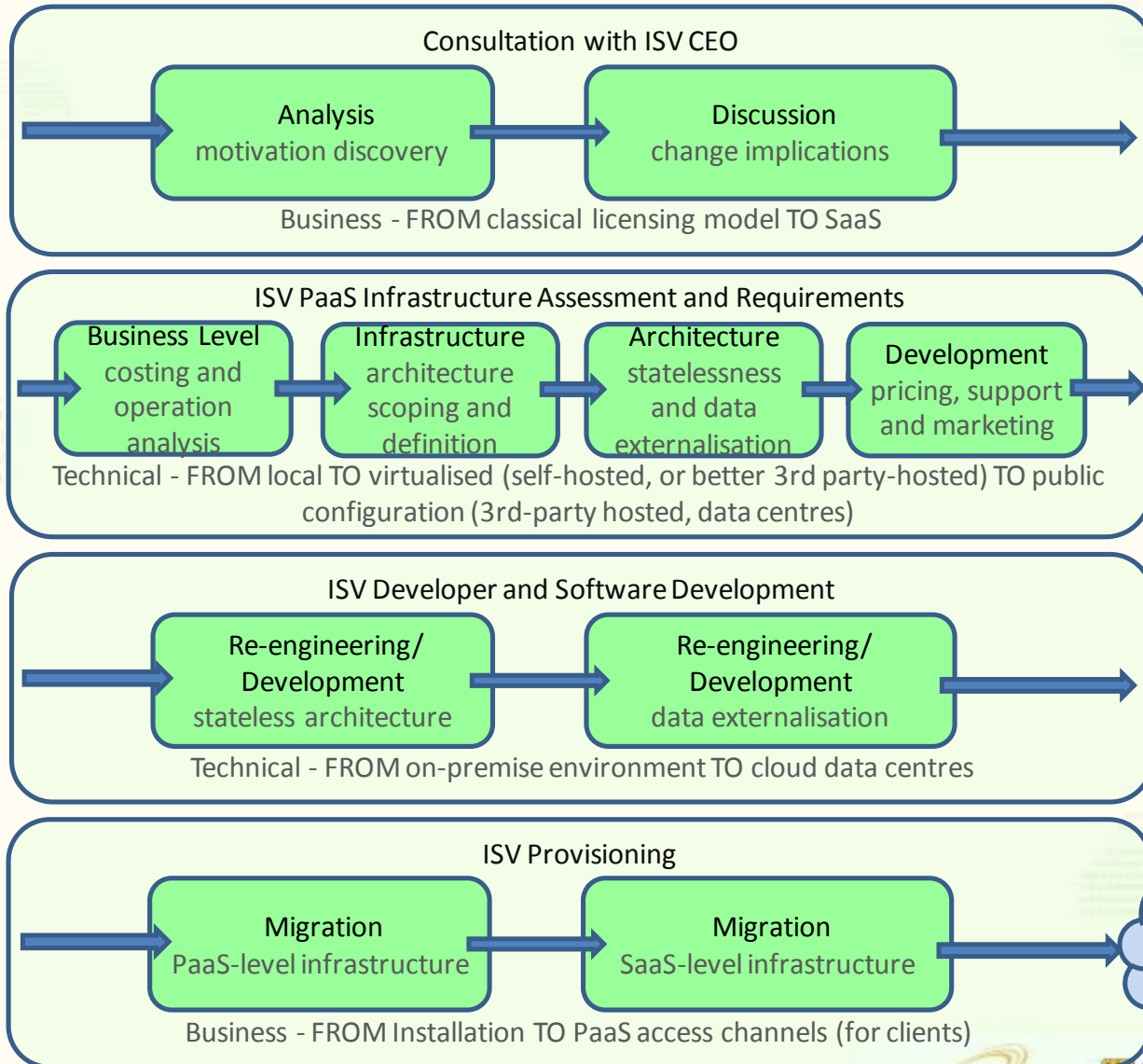
## PaaS Provider



## IaaS Provider



# Cloud PaaS Migration



# PaaS Migration Solutions

- ❑ A **basic solution** – without quality gains – would replicate the existing server in a virtual world, i.e. essentially just running and maintaining applications elsewhere in the cloud, but not delivering performance gains that the cloud allows.
- ❑ **The scalable solution -- Stateless programming** and the separation of data from processing are solutions as well as **NoSQL data representation.**

# PaaS Migration Solutions

- ❑ In a **migration process**, architecture and programming need to be embedded into:
  - ❖ **methodological process** support, e.g. through enhanced questionnaires about the infrastructure used, complexity of programs and data, etc.
  - ❖ **analytical /diagnostic tools** supporting dependency analysis and other preparations for the actual re-engineering and refactoring

**Scalability (scale-out/down)  
and performance as a cloud  
benefit**



# PaaS Migration Techniques

## Migration Techniques:

- Programming Models for Stateless Programming
- Databases for State Management
- Data Externalisation for Resiliency

This results in an identification of some key solution components

- the first two address **elasticity and scalability**,
- the third addresses **resiliency**.



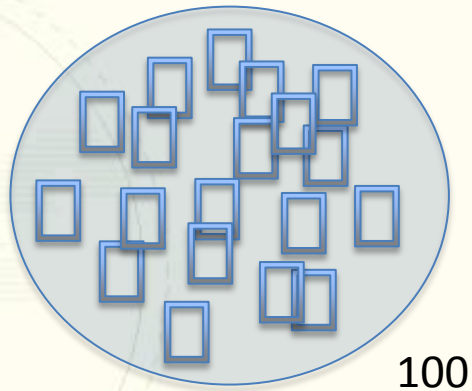
# PaaS Migration Concerns

- **Elasticity:** how well (such as quickly, automatically) the system can adapt to workload, For providers, elasticity implies the ability to move resources across different infrastructure dynamically which is in relation to scale out.
- **Scalability:** the capability of the system to accommodate larger loads by adding resources either making hardware stronger (scale up) or adding additional nodes (scale out)

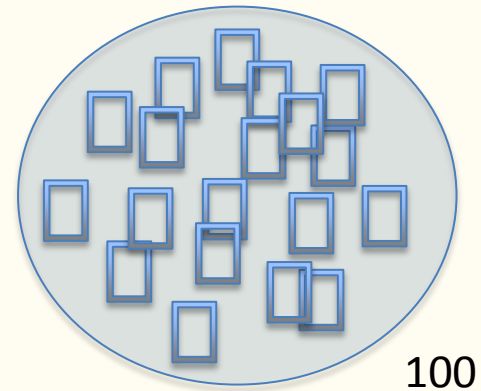
# PaaS Migration Concerns

- **Resiliency**
  - refers to dependability and fault tolerance.
  - For providers, this means to avoid failure through building in redundancy and loose coupling into a solution.

# PaaS Migration Test Case



10  
servers  
serving  
**1000**  
users



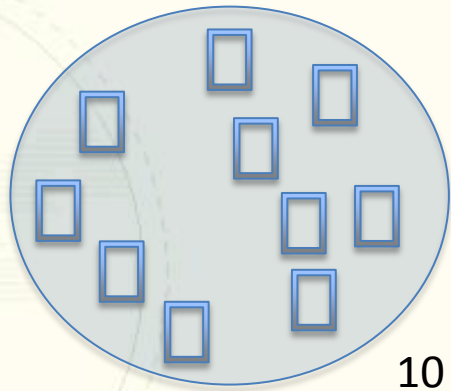
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# PaaS Migration Test Case



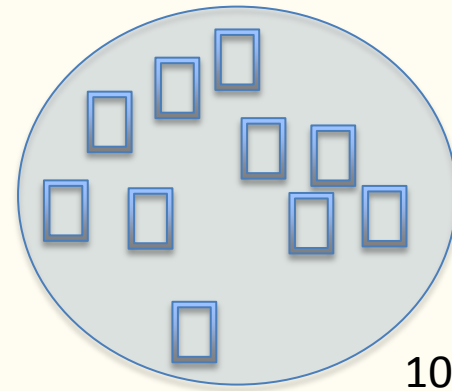
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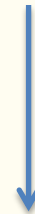
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10  
servers  
serving  
**100**  
users

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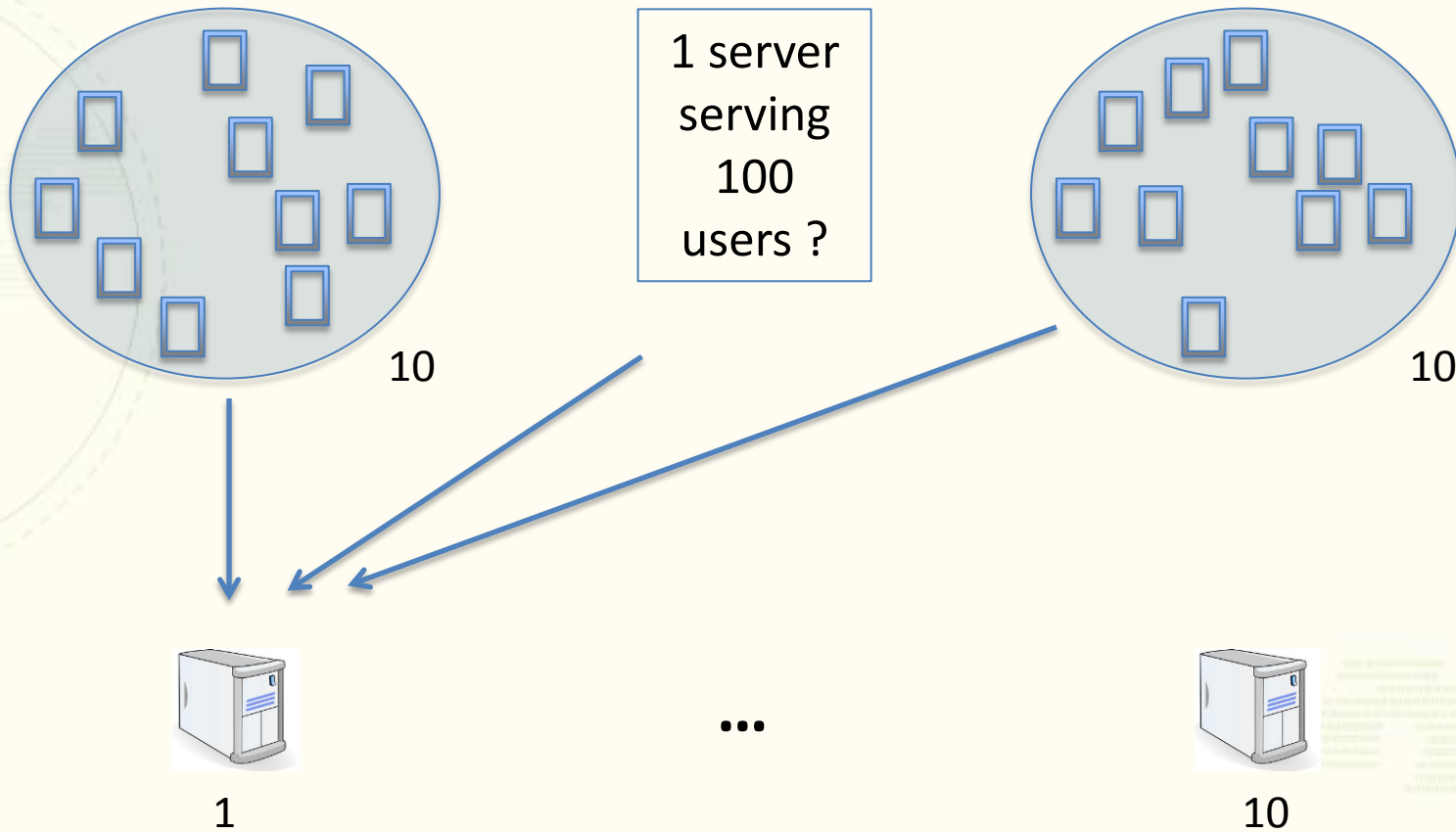


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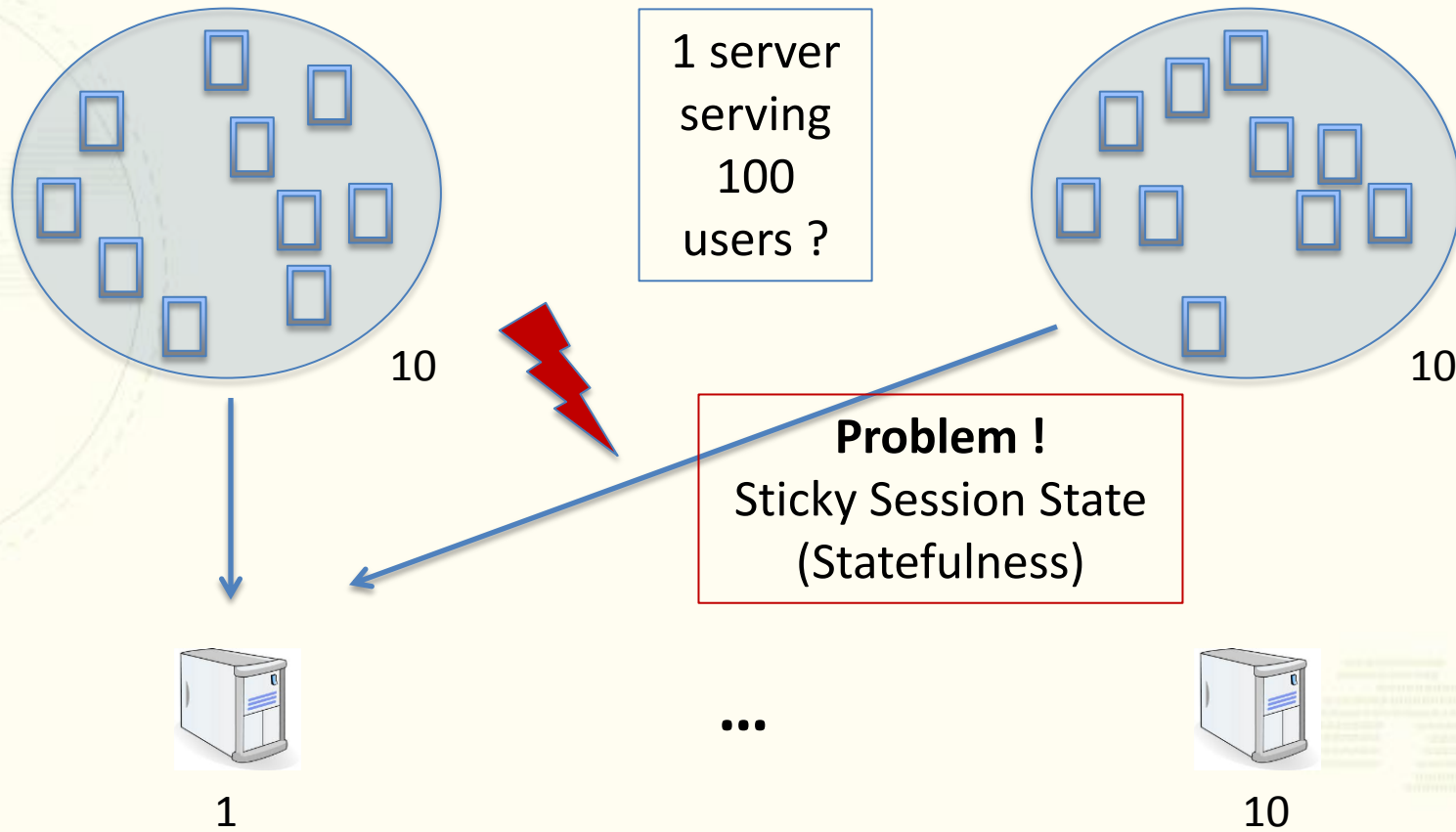


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# PaaS Migration Test Case



# PaaS Migration Test Case



# Analysis

Concerns emerge that potential users and also providers do not properly understand and address.

- **Technical:**

- Stateless components and data externalisation are required if cloud advantages like elasticity are to be gained.
- Re-architecting and modernisation is often necessary if more than data transfer into the cloud is the migration scope.

- **Business:**

- IT staff need more skills in integration, configuration, security.
- Energy efficiency and cost reduction

# Conclusions

- **Activities and steps** across different layers point to a common set of migration tasks that can be assembled to match needs of the different deployment layers, but also provider and user types.
- The discussion has highlighted immaturity of established procedures and availability of **tools**.
- Important challenges arising from our observations include the importance of **adequate architecture design** for the cloud, but also the implications in terms of changed business models.



# A Perspective

- A plan arising from the **migration pattern catalogue**:
  - Patterns are templates applied in a concrete situation.
  - A migration pattern is more specific than the processes described.
- **Quantifying the cloud benefits**:
  - re-engineering and modernisation techniques needs to be quantified.



рахмат  
 Баярлалаа  
 спасибо  
 faafetai lava  
 kiitos  
 dankie  
 dhanyavadi  
 hvala  
 maururu  
 köszönöm  
 enkosi  
 bedankt  
 nammi  
 nandiri  
 bayarlalaa  
 gracie  
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