

**"Solution-Driven, Customer-Centric, Asset-Light, Consulting-Led, Industry Benchmarked"**



"Test data and environment management services vendor of the year"



# Test Eco-systems & Services

## Practice Brochure



# OUR AGENDA



## Case Studies

Successful Implementations & Experience



## Go-To-Market Strategy

Our Service Portfolio



## Our Solutions

Lifecycle & Tooling Options



## Thought Leadership

Industry Insights & Publications



## Executive Summary

Practice Capability & Growth





## Executive Summary

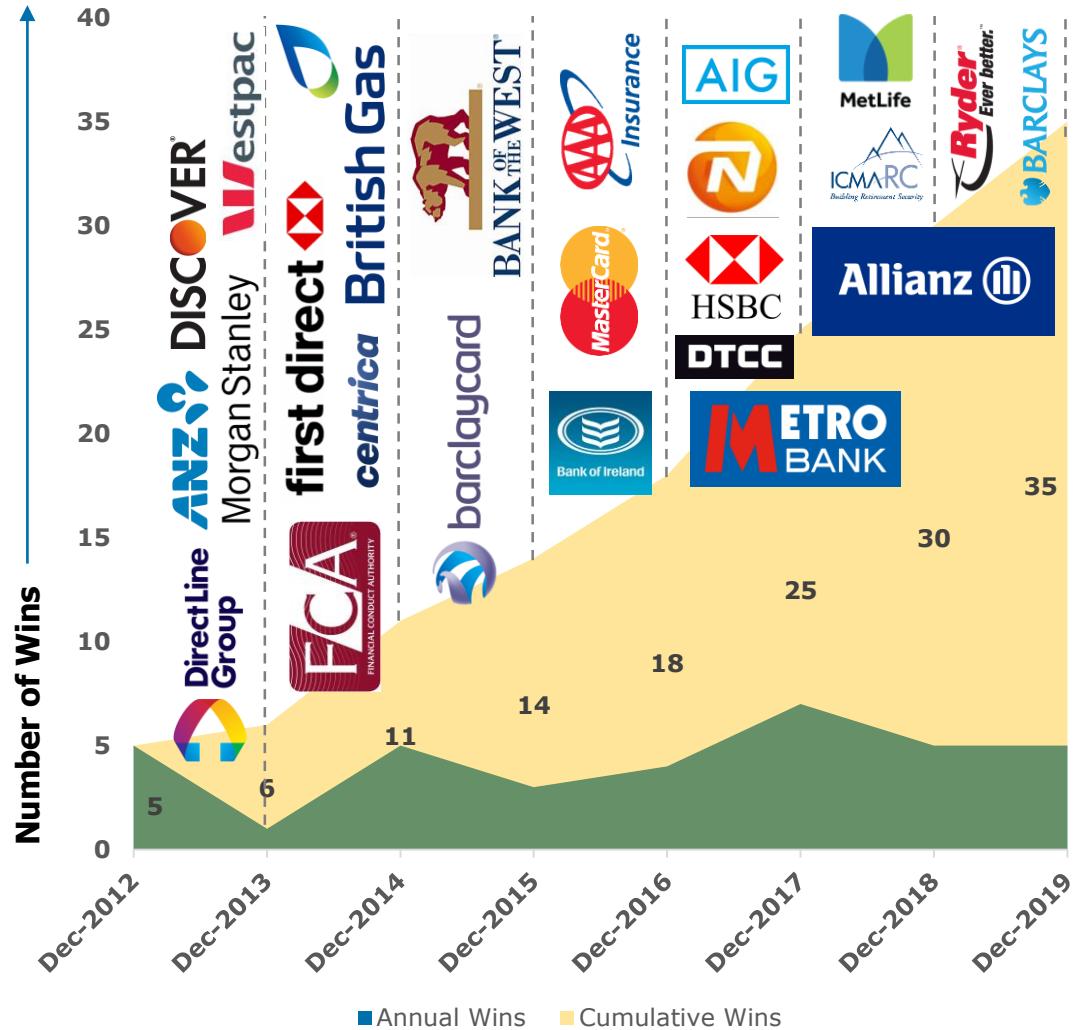
## PRACTICE SNAPSHOT

What is our Capability  
& Growth Pattern



# Test Ecosystems Growth Trend - 5 years

In 5 Years, Test Eco-Systems Practice grew to 25+ new clients, with a revenue of \$50 Million+ and we will continue to grow in 2019 and 2020 at the same pace



In a little more than **5 years leading to 2019, we have delivered for 25+ clients**



On an average we are **winning 4-5 new clients every year** in Test Eco-Systems (TEM, TDM & SV)



Already **in 2019, we have confirmed wins for 50% of the opportunities** in Test Ecosystems.



**Secure, long term engagements** in AIG, Allianz, Bank of Ireland, Direct Line Group, DTCC, ANZ, Metro Bank, Morgan Stanley



Test Eco-systems sales have been primarily around **high end consulting, core banking environments, end to end service, transformation including cloud**



In the UK & IE, there are currently 4-5 long term (2Yrs+) engagements



# Test Ecosystems Practice Summary





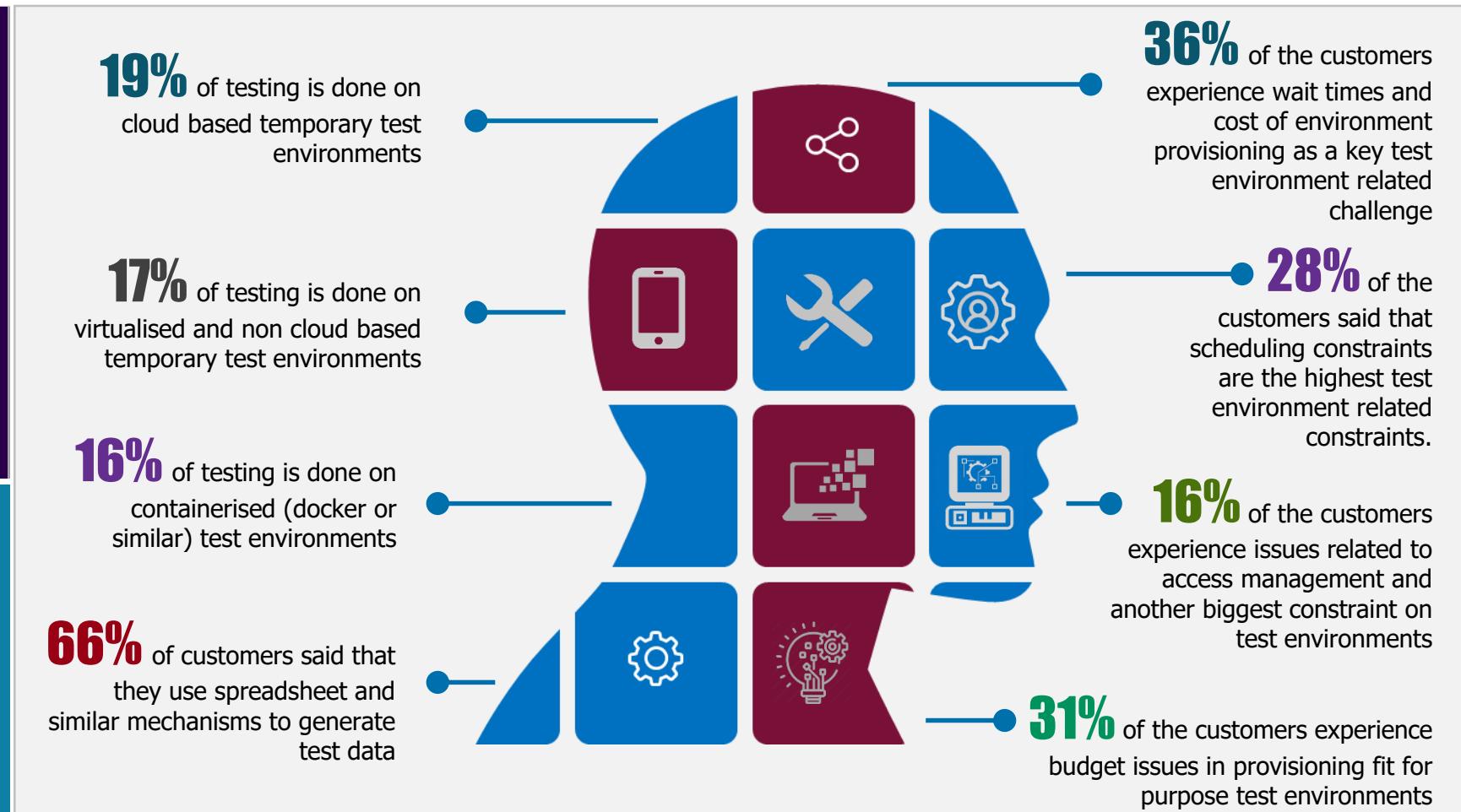
Thought Leadership

Industry  
Insights





# Our Test Eco-systems practice leads the way in the industry...



**"The industry uses both permanent and virtual test environments, which can be either cloud or non –cloud based. According to the World Quality Report 18-19, an average of 69% of all test environments used today are non permanent test environments"**

*- World Quality Report 2018-19*

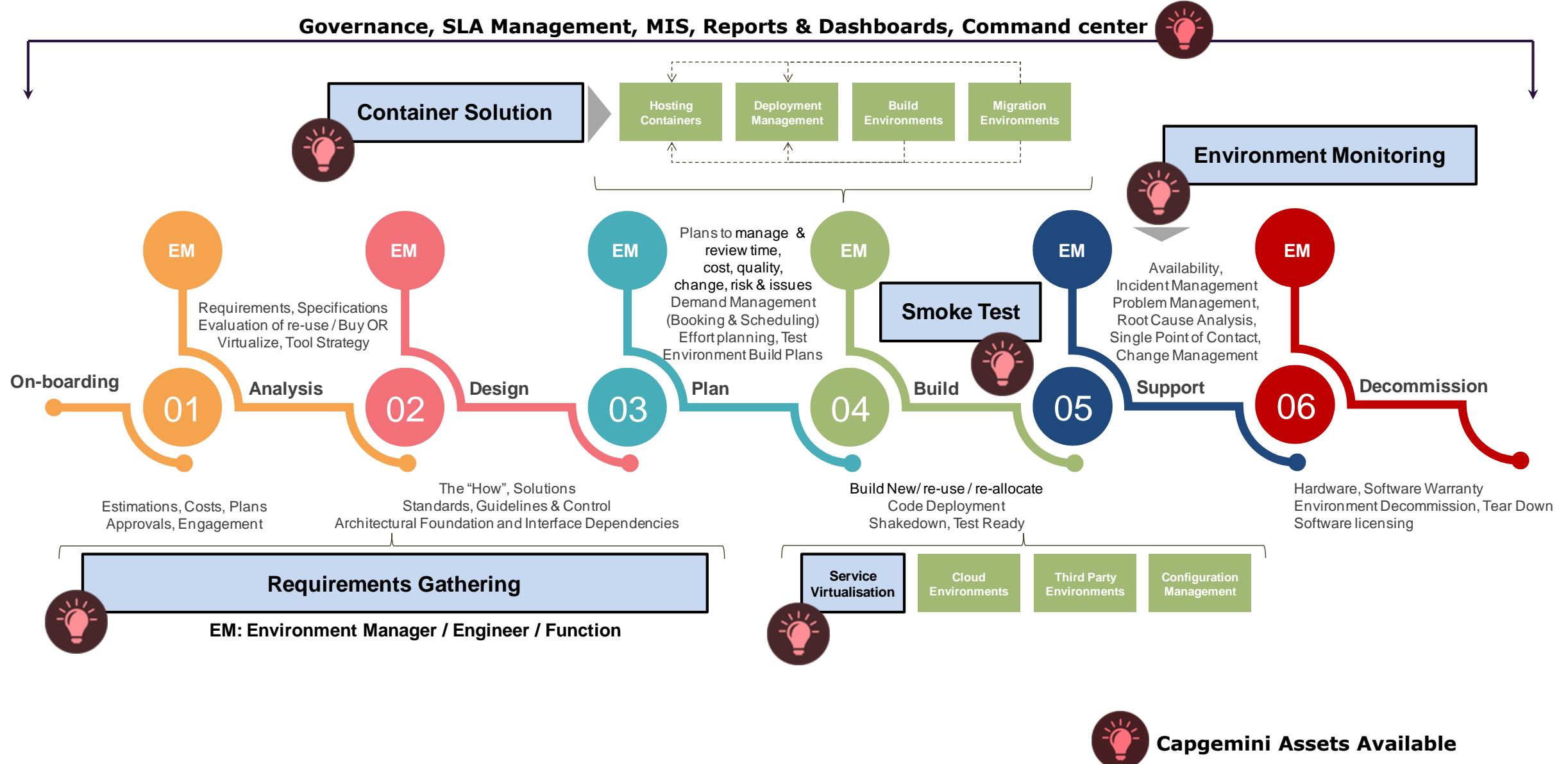
# Lifecycle & Tooling

- How we can help with Solutions

Our Solutions



# Test Eco-Systems Solution Snapshot

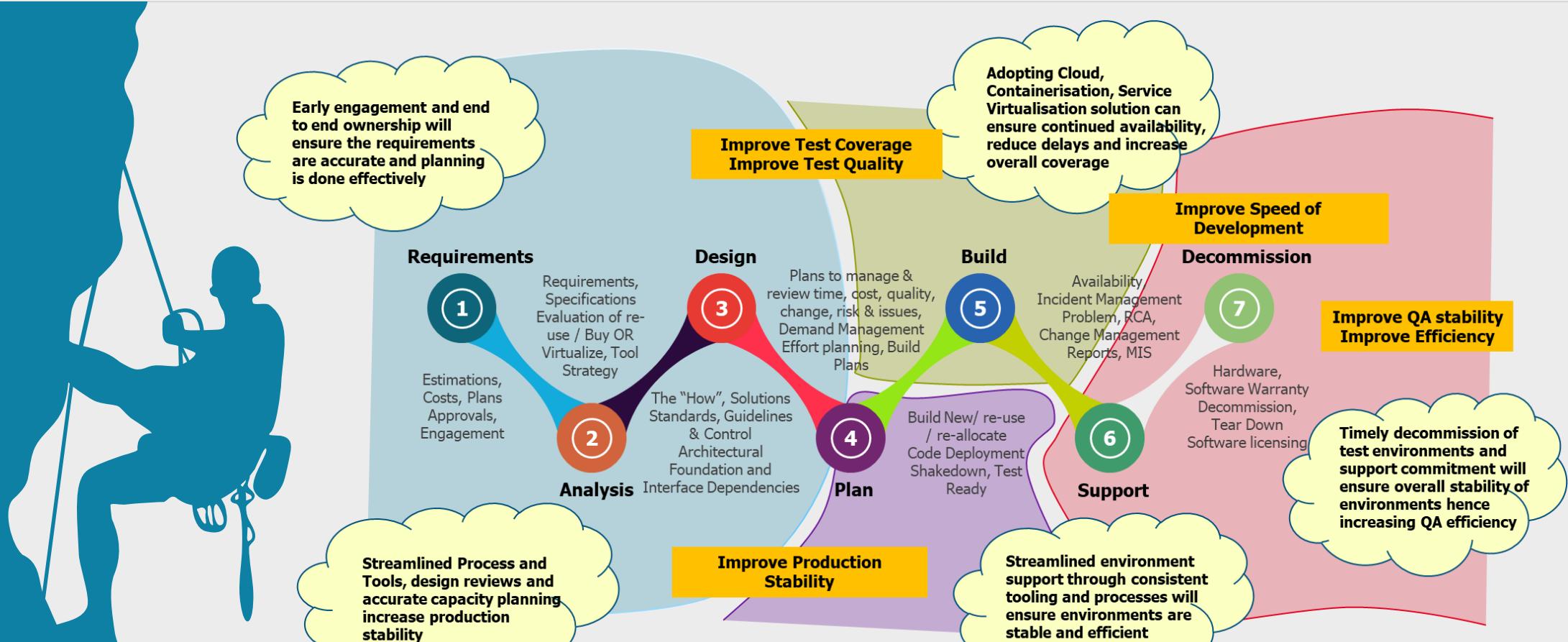




# Test Ecosystems Lifecycle Driving the clients Test Strategy

Capgemini suggests an **end to end test environment life-cycle** that closely aligns with the client SDLC.

This will ensure that there is a framework to build and provision of test environments to **deliver fit-for purpose environments**



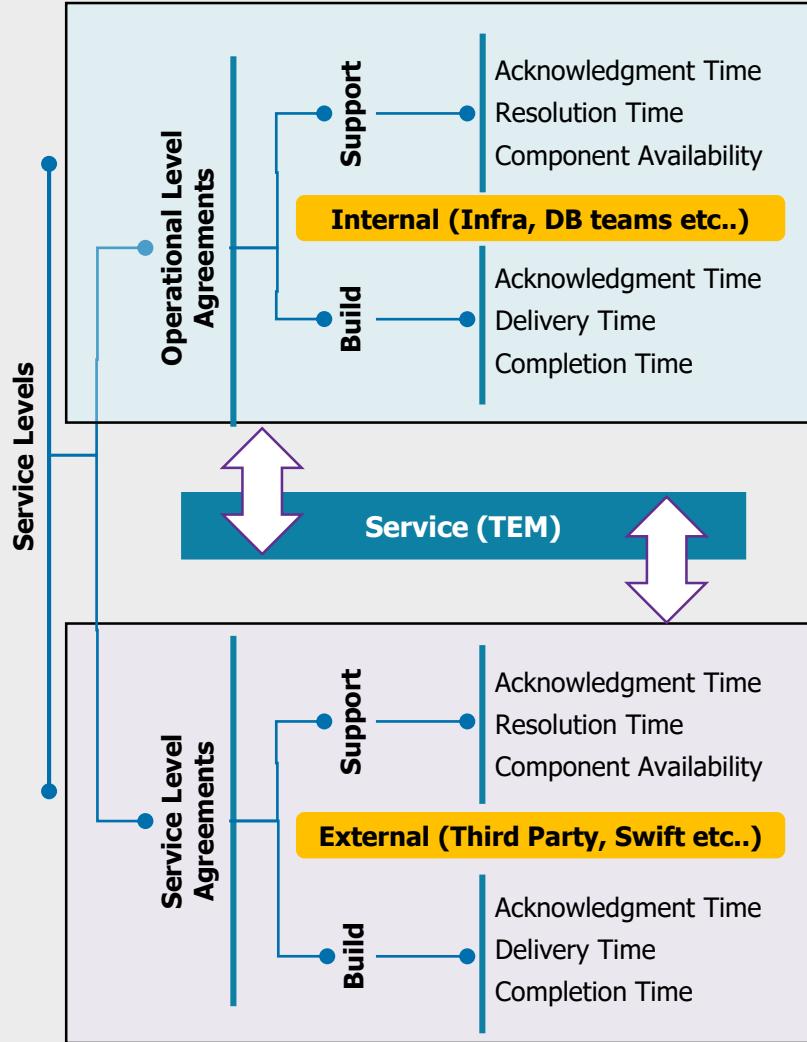
"Test Environments are one of the biggest bottlenecks to achieving continuous testing. The CTR 2019 report has seen a significant development in adoption of virtualisation, containerisation and tool based automation"

- *Continuous Testing Report 2019*

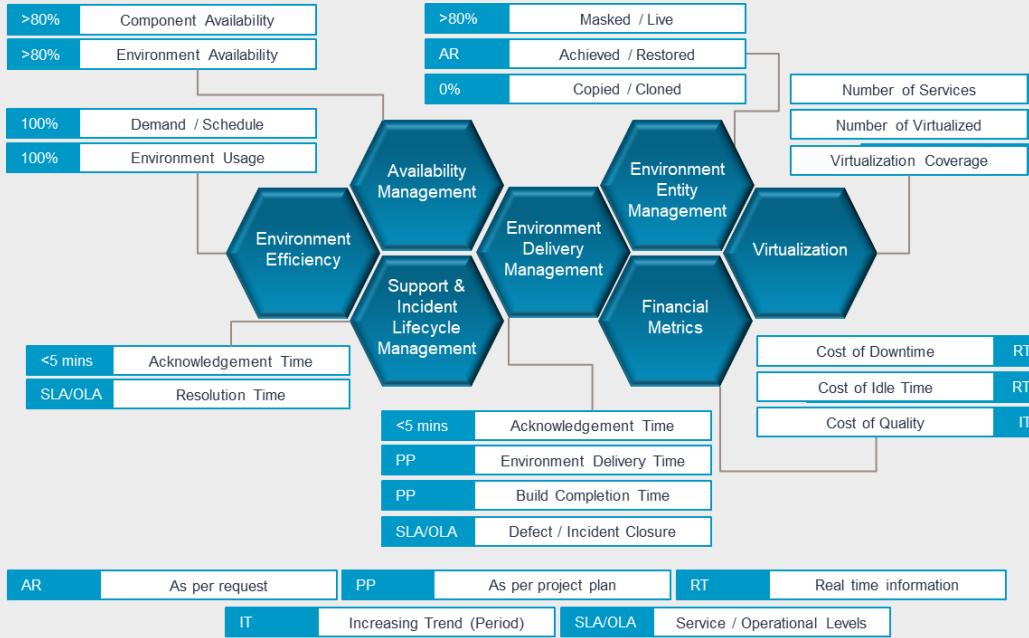


# Test Ecosystems – Metrics & Service Levels driven Service

## Recommended Operational & Service Levels



## Recommended Metrics (From an Industry Perspective)



## Industry Experience

Capgemini delivers these metrics using a variety of tools for a large UK based Insurance Client

Capgemini uses **ServiceNow** to manage incidents and reports. The metrics are collated through various tools integrations. Environments Build & Provisioning metrics are generated using **Terraform and Cloud Formation**. **Ansible** is used for Middleware and **Docker** for Containers catering to 1000+ users.

Capgemini manages deployment using **Jenkins, SVN, Nexus, SonarQube, CA Automic, Fortify and Fish Eye**. **App-Dynamics, Graylog, Cloud-Watch** are used for Monitoring related metrics and virtualisation related metrics are generated using **CA DevTest**.

### A shared service delivery model would support the Client's Test Strategy Objectives as below

- Improve Test Coverage & Quality** through improving Environment Availability.
- Improve Production & QA Stability** through measuring and managing entities.
- Improve Efficiency** through SLA/OLA based support and build management.
- Improve Speed of Development** through using Cloud, SV & Dockers.





# Test Ecosystems Service – Tooling Options & Experience

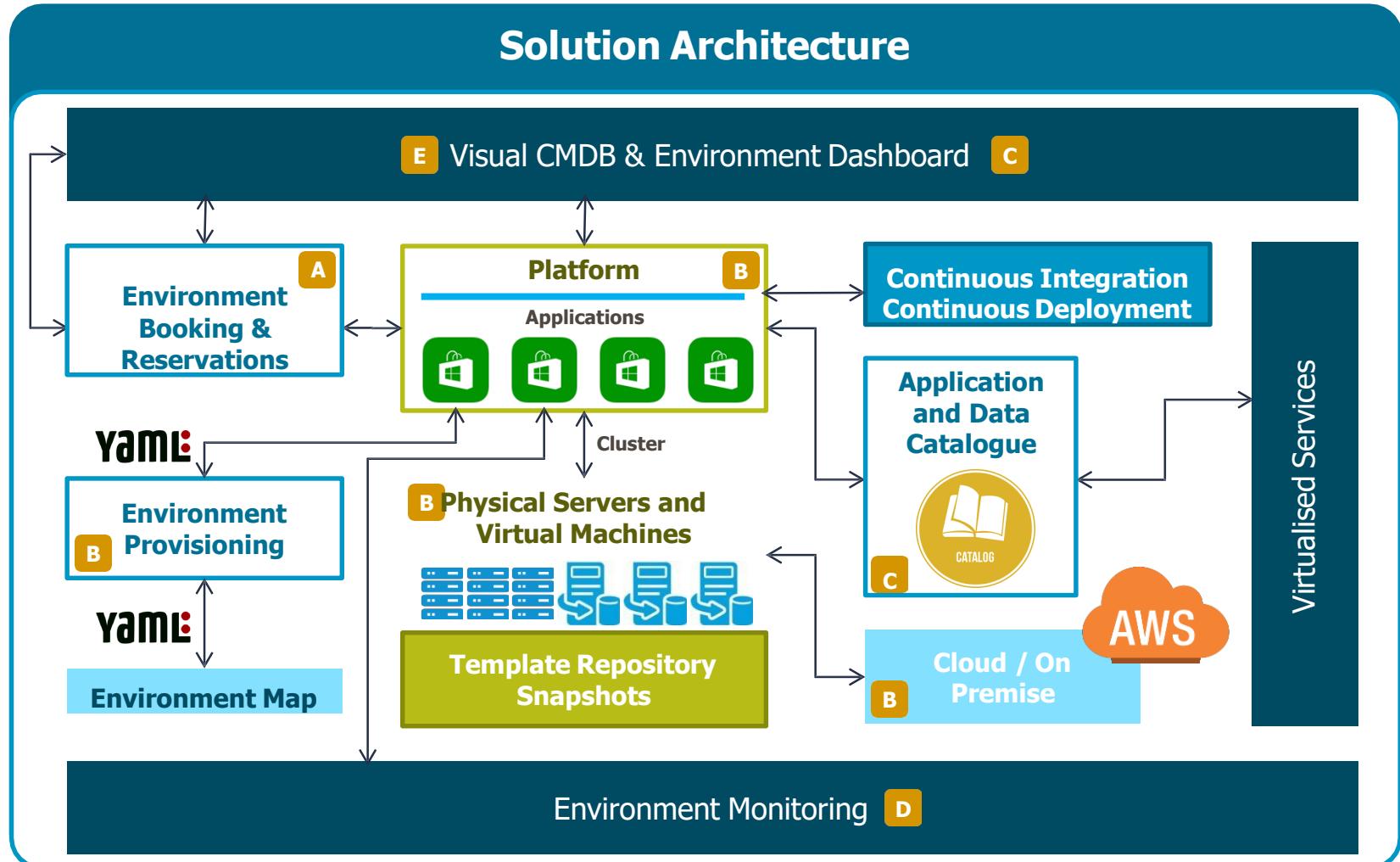
Capgemini has a **solution led approach** which is extremely **customer centric**.

For this, we use the various **combination of tooling currently available in the market** in conjunction with Capgemini specific IP's where required to **deliver the right solution to the customer**



Capability	Tooling	Clients
Requirements Gathering	ServiceNow, Jira, Confluence, CA Agile Centre, Micro Focus Octane	Allianz, ANZ Bank, Cable and Wireless Corporation, Bank of Ireland, HSBC, AIG Insurance
Booking & Scheduling	Jira, Microsoft SharePoint, Envo8, AppWide, Plutora	Allianz, HSBC, ANZ Bank, CWC, Metro Bank
Build & Provision	Jenkins, Docker, Terraform, TeamCity, TOSCA, SVN, GIT, Artifactory, Maven, Nexus, Endevor, PVCS, GITHUB, Bitbucket, GoCD, Puppet, Ansible, Cloud Formation, Vsphere, CloudBees,	ANZ, HSBC, Metro Bank, Direct Line Insurance Group, Bank of Ireland, AIG Insurance, Cable and Wireless Corporation, DTCC
Deployment Management	Jenkins, Fortify, Udeploy, Bamboo, IBM RTC, Xldeploy, GoCD, SVN, Fish Eye, SonarQube, CA Atomic, JIRA, Nexus, CloudBees, Bitbucket	ANZ Bank, Cable and Wireless Corporation, HSBC, AIG Insurance, Direct Line Insurance Group, Bank of Ireland, Metro Bank, DTCC
Support & Incident Management	JIRA, HP ALM, ServiceNow, SDM, CA-ServiceDesk, Plutora	Allianz, ANZ Bank, AIG Insurance, Bank of Ireland, Direct Line Insurance Group, DTCC, HSBC, Cable and Wireless Corporation, Metro Bank
Monitoring & Dashboards	Grafana, Splunk, AppDynamics, Command Centre (in-house equivalent of QACube), QACube, Idera, Enov8, Zabbix, Nagios, Cloudwatch, ServiceNow Monitoring, BSM Dashboard, SiteScope, Graylog,	Allianz, ANZ Bank, Metro Bank, HSBC, Direct Line Insurance Group, Cable and Wireless Corporation, DTCC
Workflow Management	CA Workload, JIRA, Confluence, Microsoft Sharepoint, CA AgileCenter, Plutora	Allianz, ANZ Bank, HSBC, Cable and Wireless Corporation, Metro Bank, DTCC, Bank of Ireland, AIG Insurance
Service Virtualisation	Tricentis Tosca, Microfocus SV, IBM RIT, CA DevTest, Parasoft Virtualize, SprintTest Virtualise	Bank of Ireland, Metro Bank, Direct Line Group Insurance, Barclays Bank, Farmers, TransUnion, HSBC, IKEA, BMW, Euroclear, AVIVA, ANZ Bank, Morgan Stanley, T-Mobile, Clorox, NBCU, Royal Bank of Canada, VzVz, AGCS, EnterCard, Auspost
Test Data Management	Informatica Data Masking, Delphix, IBM Optim, Informatica ILMTDM, CA Datamaker	Bank of Ireland, HIG, NBFC, ANZ, Fifth Third Bank, AIG, Banorte, AIG, NBFC, RBC, RBS, Metlife, MaxBupa, Associated Bank, TD Canada, LPL Financial, Farmers,

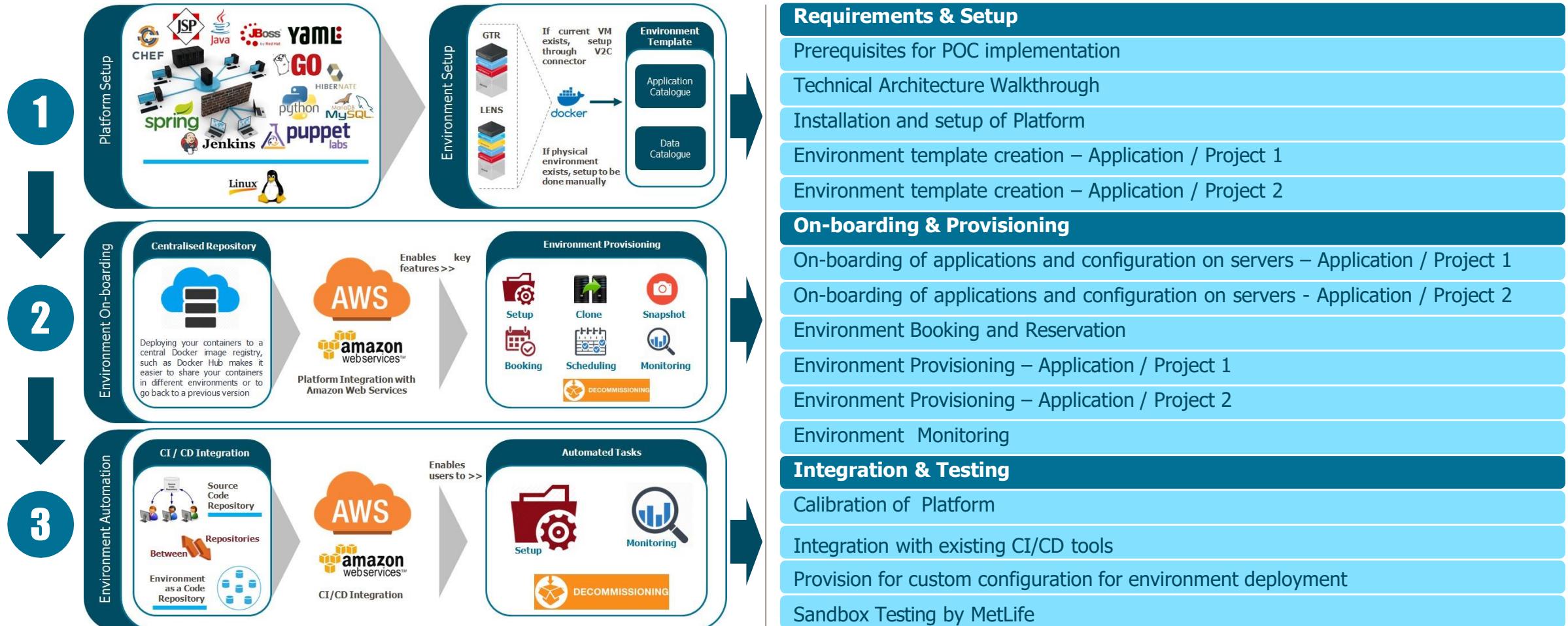
# Capgemini' Comprehensive Eco-Systems Solution



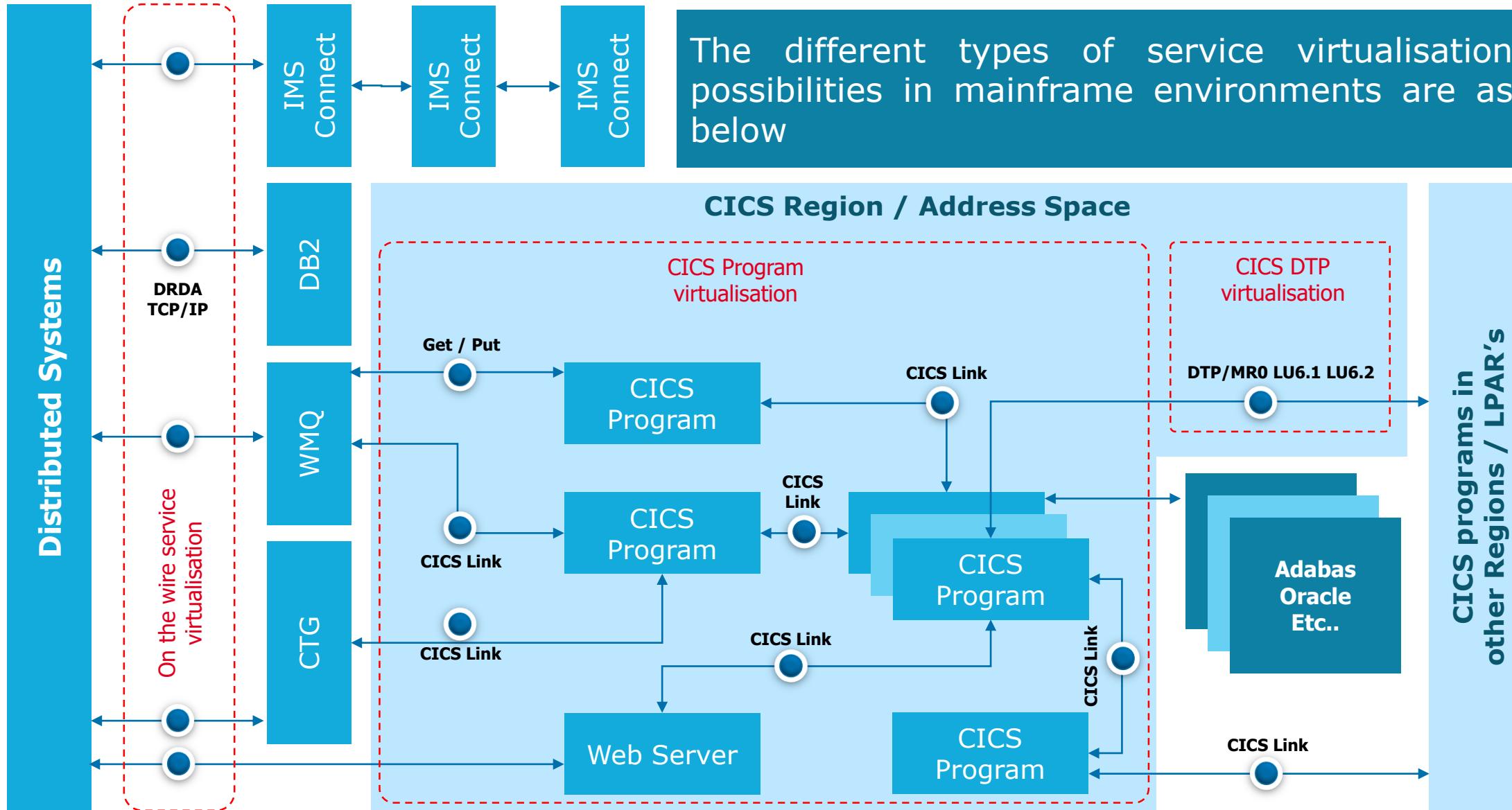
<b>A</b>	<b>Environment Booking &amp; Scheduling</b>
	Environment Contention
	Environment booking and reservation tool
<b>B</b>	<b>On Demand Environment Provisioning</b>
	Creating on-demand environments
	Environment provisioning
<b>C</b>	<b>Availability of environments</b>
	Centralised dashboards for environments
	Near real time view of environments
<b>D</b>	<b>View of planned environment outages</b>
	Tool support for app level monitoring
	Usage based Alerting
<b>E</b>	<b>End to End Environment Monitoring</b>
	Visibility in infrastructure resource allocation
	Visual representation of QA environments
	Integration to upstream/downstream systems



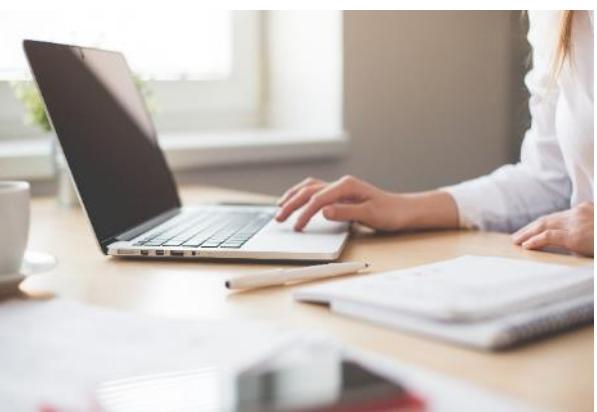
# 3-Step approach for Environments on Demand



# Test Environment Management solutions for legacy systems using Service Virtualisation



# Go to Market SERVICE PORTFOLIO

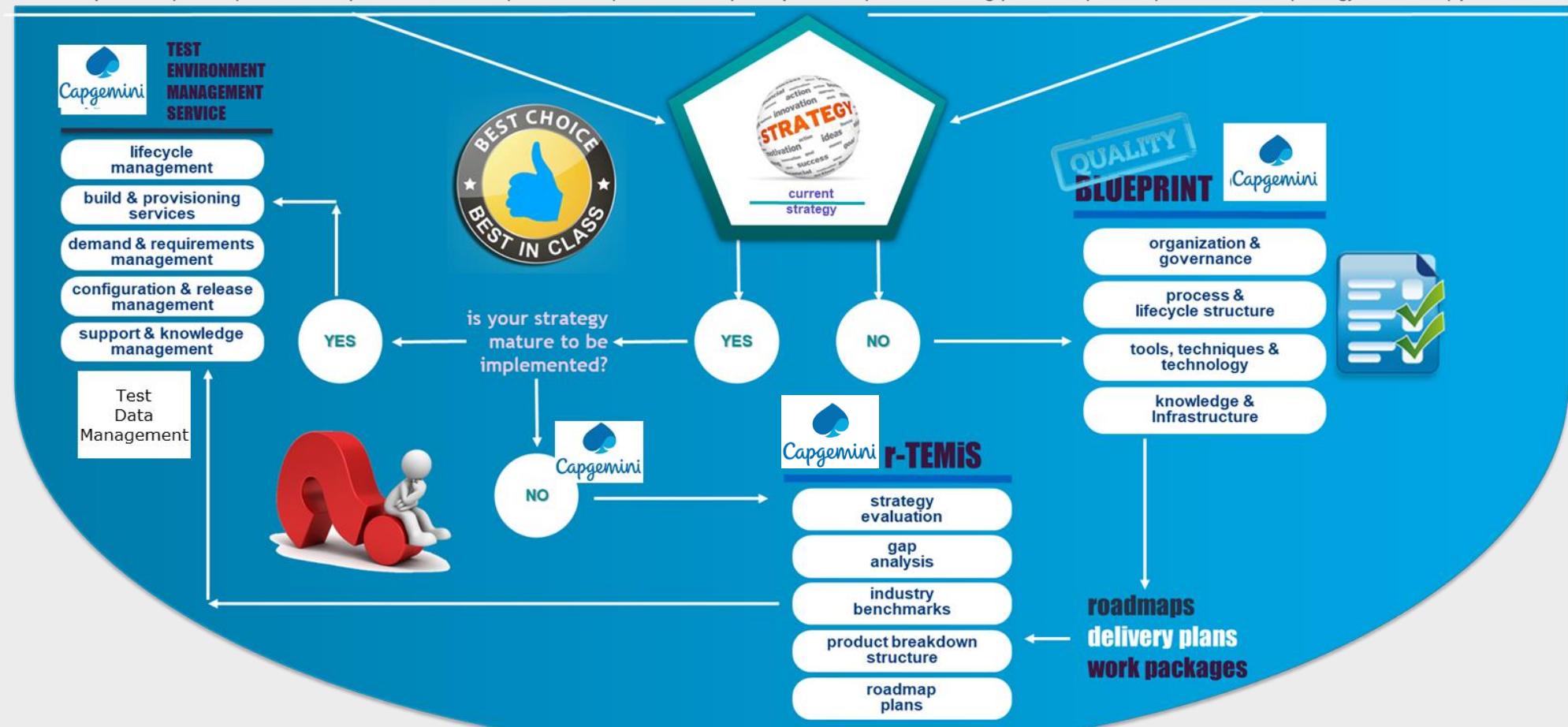




# What is the Go-To-Market Strategy for Test Eco-Systems



consumer products | retail | distribution | financial services | healthcare | life sciences | transportation | manufacturing | telecom | media | entertainment | energy & utilities | public sector





# Test Ecosystems – Service Offerings

## Test Eco-Systems Service Catalogue

Environment Services		Data Services
Project Services		Test Data Provision & Support Services
Support Services		Strategic Initiatives - Services
<b>Requirements &amp; Planning</b> <ul style="list-style-type: none"><li>• Requirements Gathering</li><li>• Requirements Analysis &amp; Documentation</li><li>• Lifecycle Ownership</li><li>• Demand Management</li><li>• Status Reporting</li><li>• E2E Design Management</li></ul>	<b>Build &amp; Deployment</b> <ul style="list-style-type: none"><li>• Build Co-ordination Services</li><li>• Shakedown Testing, Configuration &amp; Deployment Management</li><li>• Service Virtualization, Containerization</li><li>• Automated Provisioning (Cloud etc..)</li><li>• Batch Jobs Scheduling &amp; Management</li></ul>	<ul style="list-style-type: none"><li>• Data Requirements Management &amp; Feasibility Checks</li><li>• Data Extraction (into common format)</li><li>• Data Analysis &amp; Classification</li><li>• Test Data Definition (Rules)</li><li>• Data Masking (Obfuscation)</li><li>• Test Data Provision (to environments) &amp; Automation</li><li>• Tooling &amp; Process Management (Implementation)</li><li>• Test Data Management (Reports, MIS, Dashboards)</li><li>• Repository Management</li><li>• Standards &amp; Practices (Data Models, Flows etc.)</li></ul>
<b>L1 Support Services</b> <ul style="list-style-type: none"><li>• Incident Management</li><li>• Change Support</li><li>• Environment Monitoring</li><li>• Batch Jobs Support</li><li>• Status Reporting</li><li>• CMDB, Asset Management</li><li>• Escalation Management</li></ul>	<b>Operations &amp; L2 Support Services</b> <ul style="list-style-type: none"><li>• Problem Management &amp; Root Cause Analysis</li><li>• Environment Fixes and Coordination with Third Party Vendors</li><li>• Tool &amp; Process Management</li><li>• Audit &amp; Compliance (User Access Management)</li><li>• Mainframe &amp; Legacy Support</li></ul>	<b>Consulting &amp; Transformation Services</b> <ul style="list-style-type: none"><li>• Environment Strategy Review, Definition &amp; Improvements, Assessments</li><li>• Environment Provisioning Automation Strategy – Review, Definition &amp; Improvements</li><li>• Environment Support Strategy – Review, Definition &amp; Improvements</li><li>• Analysis, Re-define Reporting, Dashboards &amp; MIS</li><li>• Analytics on defect trends, ROI &amp; Trend Analysis</li></ul>

# CASE STUDIES

At Capgemini, we endeavor to provide best in class service to all our customers.

Test Eco-systems has been delivered to over 30+ customers worldwide and we have credible case studies to back the incredible work we have done over the years



EXPERIENCES >>>

## **Cloud – Container – Service Virtualisation – Monitoring**

**Test Environments Case Study**  
Large Insurance Organisation in UK



# Solution Goals

## Recommendation

Deploy application environments on **cloud**, **containerise** application environments

- Increase environment availability up **to 95%**
- Shift-left testing by **up to 25%** and
- Save an average of **5% - 10%** on testing costs

## Benefit



## Recommendation

Implement **Proactive Monitoring** for containers and have end to end **application level monitoring** to provide accurate environment status

## Benefit

- Reduce environment resolution times by 75%
- Increase E2E visibility and ownership
- Increase environment availability up to 95%

## Recommendation

Implement an end to end integrated solution encompassing cloud, containerisation, Service Virtualisation & Monitoring / Dashboards

Increase test effectiveness by 30%.

Reduce Infrastructure costs of test environments by 30%

## Benefit

Implement **Service Virtualization** to reduce environment contention & **Requirements Gathering** process.

## Recommendation

- Reduce 20-30% of test & QA Costs
- Reduce Environment Contention by 95%
- Reduce up to 30% hardware costs

## Benefit

## Recommendation

Realization and acceptance of **Metrics, SLA/OLA** through the effective reporting and dashboards

## Benefit

- Increase environment availability up to 95%
- Faster mean time to repair (MTTR)

# Solution Components

## Goals to be achieved



## Solutions to be delivered

Deploy CUBE, CLAWS & BIH to AWS Cloud Infrastructure

Containerisation of above applications for easy provisioning

Implement Service Virtualisation for end to end integration

Set-up monitoring and reporting for effective management

A

B

C

D

## Problems to be addressed

Lack of end to end non production environments available for development and test teams

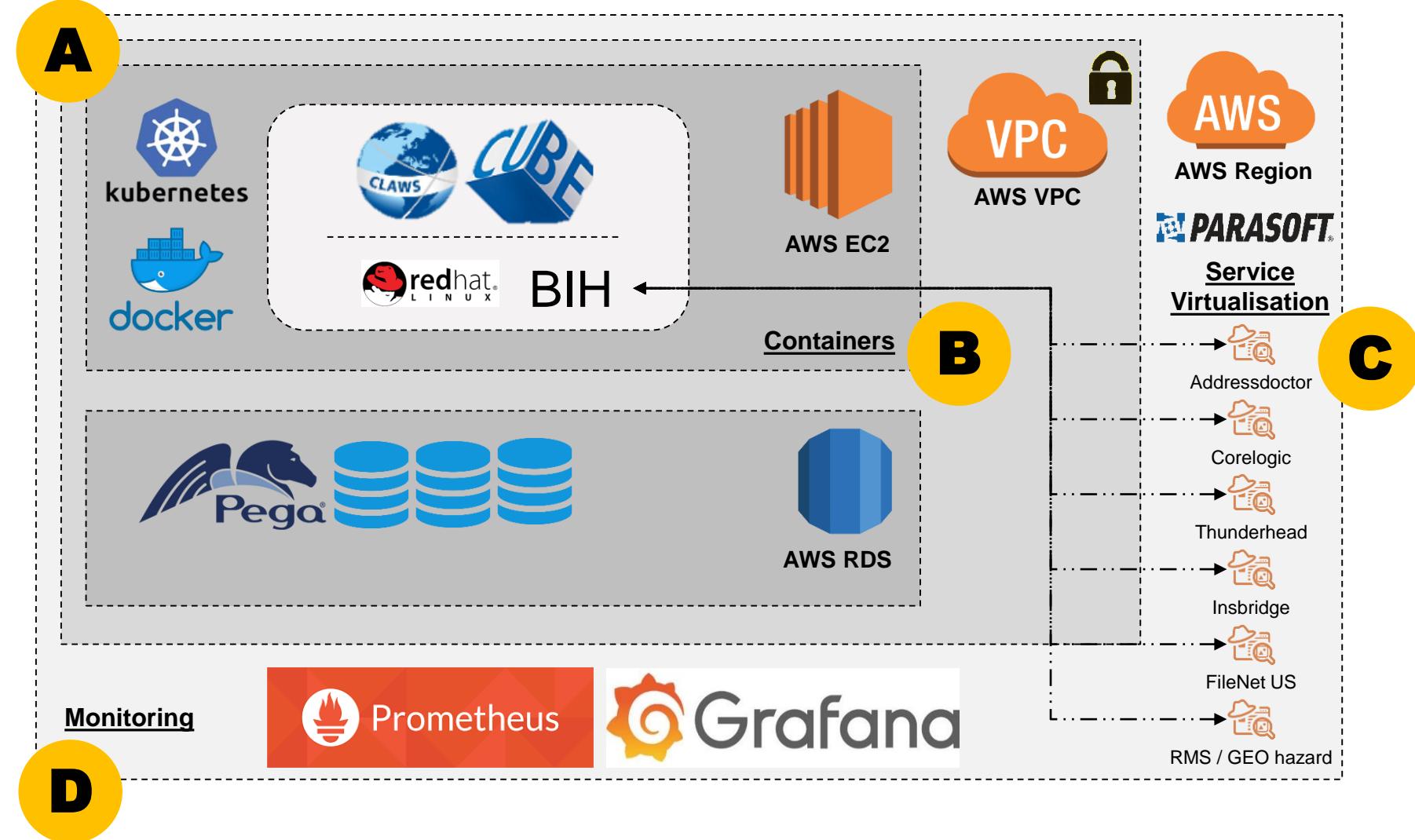
Limited number of end to end non production environments resulting in conflicts for parallel testing and development resulting in delay in schedule and delivery

# Solution Design

The POC scope is to host BIH, CLAWS and CUBE in AWS to provide a cost effective option for various test and development projects in AGCS

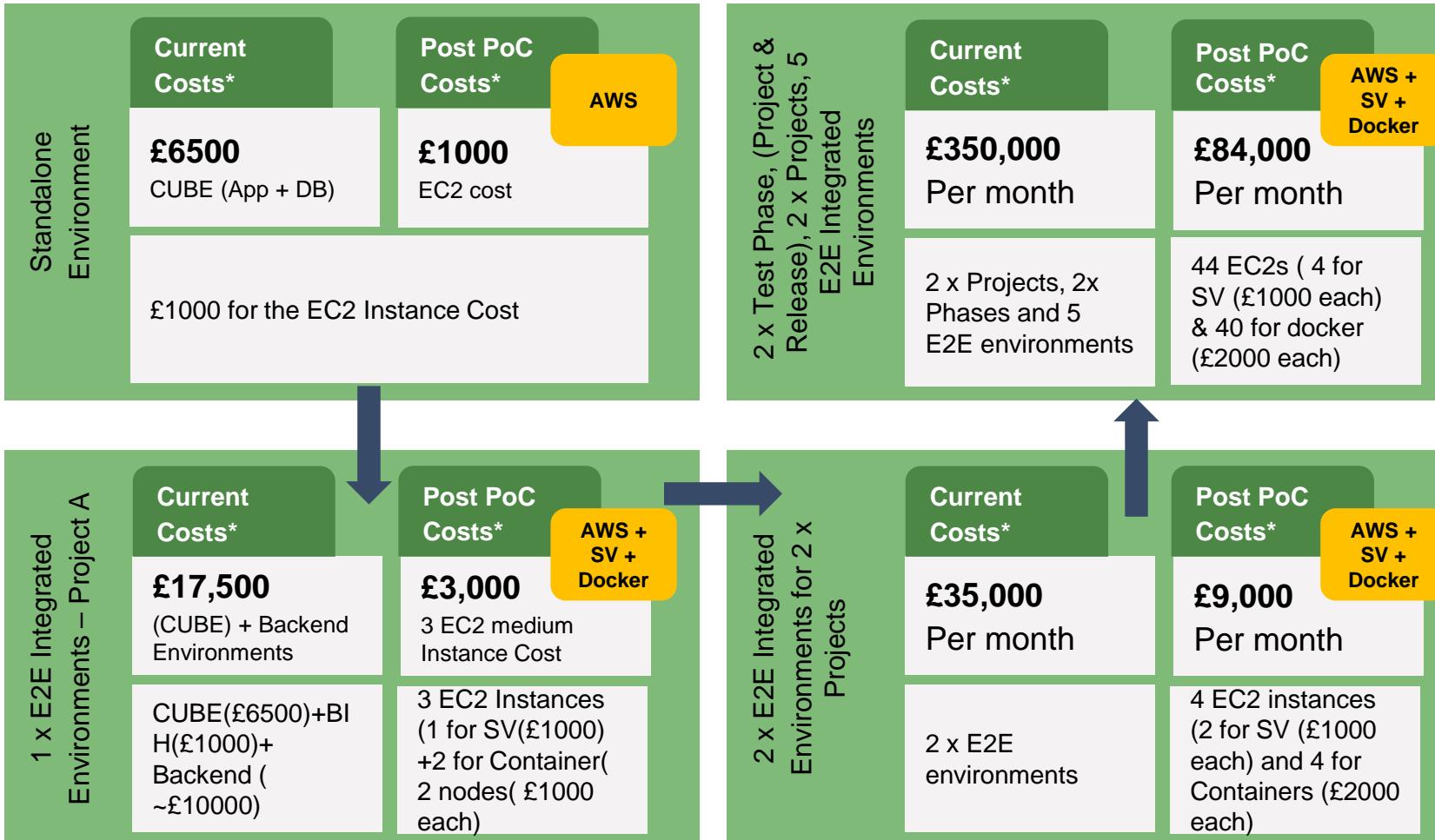
The Proof of Concept design includes BIH to prove that Service Virtualization can be effective in providing fully integrated end to end environments for test and dev

The drawing shows the high level container and service virtualization architecture using AWS.



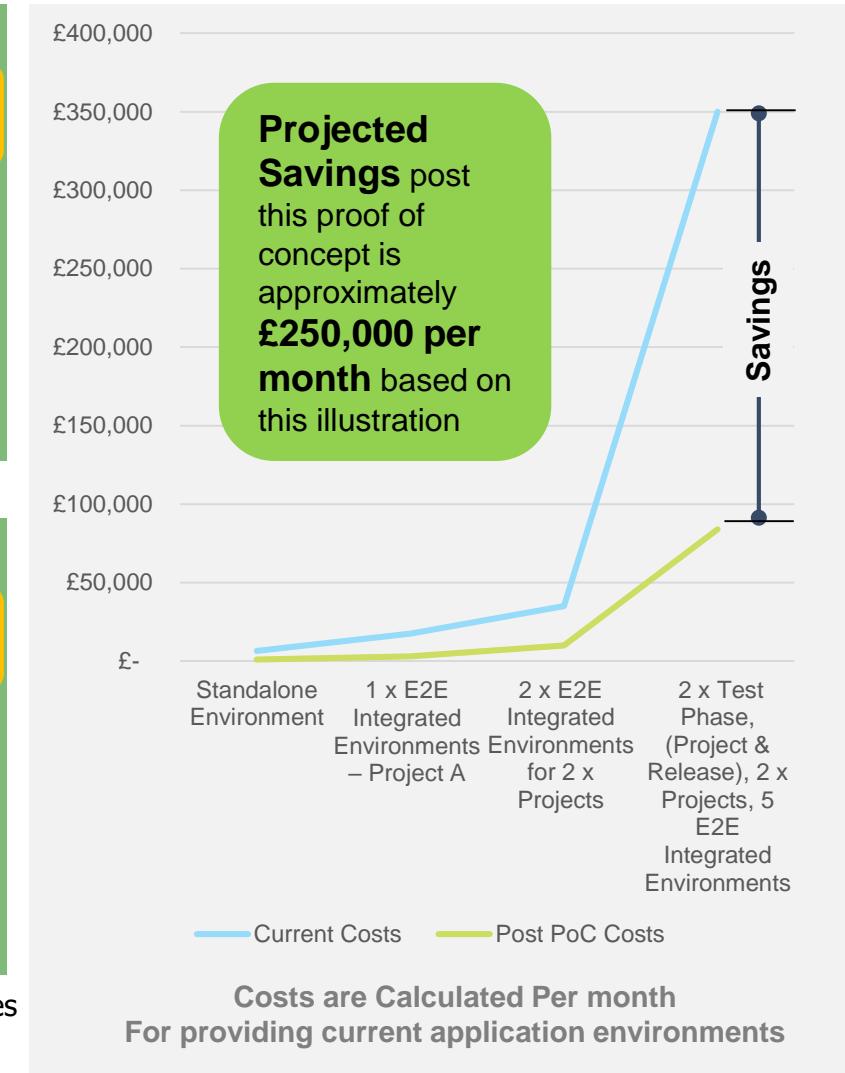
# Solution Benefits

The benefit mentioned below is realised after 2 years once the on-prem environments are decommissioned



\* Approximate Costs are calculated per month and are Indicative based on current understanding. Licences costs are not covered and is expected to be covered through current licence agreements

\*\* Multiphase includes Dev, SIT1, SIT2, SIT3, ETE3, ETE4 Environments



# Other Case - Studies





# Case Study – 1: TEM Assessment & Strategy Creation for Large Financial Regulator in UK



- Environments Management Strategy was created internally but shelved for two years due to lack of clarity in next steps
- Lack of buy-in from internal stakeholders, suppliers and partners on the current strategy and lack of appetite for change, based on the strength of the Strategy and limited internal capability to evaluate the Strategy against the industry and best practices
- Lack of a Central Environments Management function and limited governance and standards in managing test environments & no processes or standards to protect and properly manage these environments.



**Baseline**  
Current strategy was baselined through focussed **interviews** and **discussions** with key stakeholders

**Evaluation**  
Strategy was evaluated through **SWOT** analysis and the validity in the organisation **context** was done

**Gap Analysis**  
**Weaknesses** on the strategy and **gaps** in the strategic objectives were compiled

**Benchmark & PBS**  
Compared with **industry best practices** and a **product breakdown structure** was prepared

- Highlighted the weaknesses in the strategy to strengthen their internal position & qualitative analysis including common themes and pain points as done across the various internal teams. A best practice guide was provided to ensure the recommendations were future proof.
- Identified 75 work packages and delivered detailed work package descriptions for each. The client was able to pitch projects to their SLT to start the realization of the Strategy and successfully attained funding. Cost estimates for implementation of the strategy available to the client so business case preparations can begin

## BACKGROUND

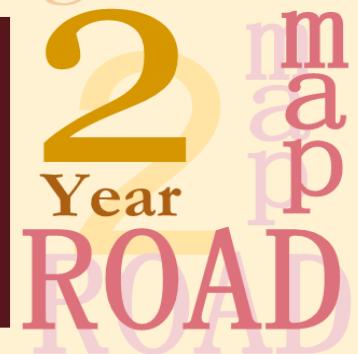


## Roadmap & Work Package

Clear **roadmap** to the future with a **delivery plan** was prepared along with **work packages** that were ready to be published as statement of requirements



## SOLUTION



## OUTCOMES





# Case Study – 2: Multiple Successful Implementation Case Studies

## TEM Manages Service



### Leading Australia Bank

#### Large international bank with 3000 + Apps

**Unique Capgemini solution:** Centralized governed delivery & support of fit-for-purpose development & testing environments using industry best practice service based models and SDLC focused best of breed tools.

The environment management for the customer was based on the “end to end Managed Service” model which is best suited for establishing the environment management service for large customer.

The operating model was build on the core TEM service – “**DevOPS**”, which includes Software Configuration Management, Build, Package and Deployment Management, Environment Services Management

**Lean process introduction resulting in a 25% sustainable through industrialized tool introduction**

## Shared Services implementation



### Leading Insurance institution

- Center of Excellence Model for test environment management with Leveraged Resources, Vertical Core Teams and Test Environment Management as a Horizontal Service spanning across all the Business Units
- Leveraged existing Delta process and QA rules engine to take prod object snap shot rather than dumps
- Independent team for environment management and engineering support
- The migration of applications were in three phased
  - Setup the environment management CoE
  - Migrate applications to the CoE framework as they are ready and standardize the services during migration
  - Expand the CoE model across the business units

**Significant reduction in overall testing cycle time and improved ( $\approx 24 \times 7$ ) QA Environment availability leveraging Delta process**

## Better Support and efficient Management



### A Large German Bank

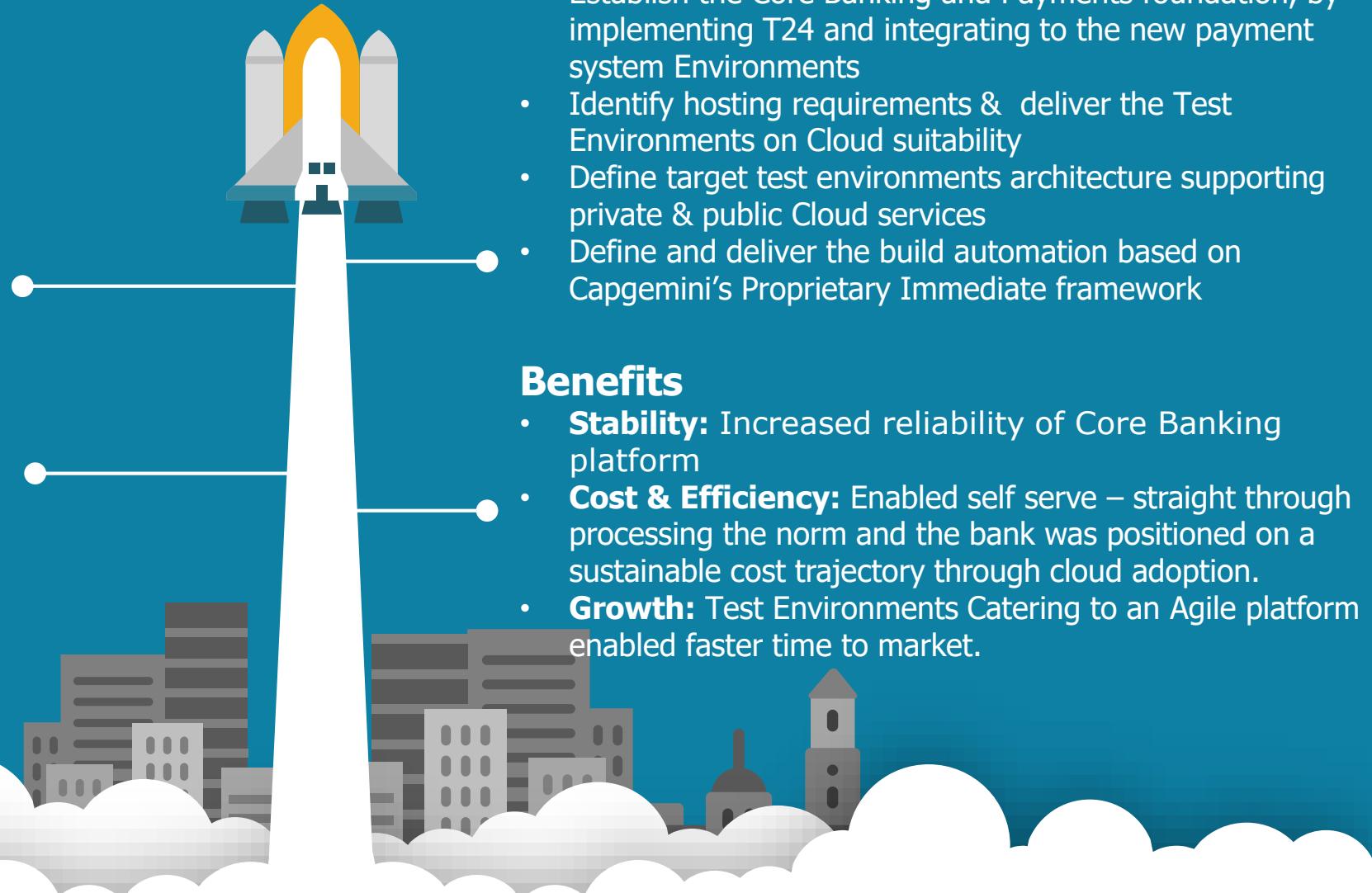
- **Unique Capgemini solution:**
- Developed a robust Environment build process based on ITIL principles
- LEAN programs implemented to increase efficiency
  - TEM GBS Offers Higher Flexibility to Release Management through Reduction In Duration of Environment Refreshes
  - Improved Availability For Testing
  - Capacity Management to free up 40%
- Capgemini’s Test Environment Metrics Management framework implemented to augment the continuous improvement initiatives
- The solution model was based on the “TEM as a Service” model providing a special focus on metrics-based management. All Environment services were addressed through a service desk and the SLA/KPI were defined based on the service desk

**Increased the environment availability from 48% to 97%. Reduced the environment support hours by 38%**



## Objective

- End-to-end solution for multiple line of businesses (channels, core banking, data and payments)
- Over 92% of accounts in scope, affecting majority of customers
- Major rationalisation of Bank' products through simplification (50-70% reduction)
- 430 systems to be replaced, including 4 core engines across 3 markets in Europe covering 4 brands and 3 Markets (Consumer, Business Banking and Corporate)



**Case Study – 3:** Capgemini fueled the Core Banking Test Environments for a Large Irish Bank in one of its largest transformation programs

# Case Study – 4: A successful Transition Case Study for a Large Insurance Company in UK



## Environment

50

### Release Environments

Mix of Distributed & Mainframes  
Quarterly and Monthly Releases



Back ends / Interfaces  
Agile & SLA based Model

35↑

### Technology Stack

- ❑ Linux, AIX, Solaris, Win2K
- ❑ Web-sphere, JBoss, IIS, Apache
- ❑ Oracle 10 and Oracle Financial Servers
- ❑ Hudson, Ant, Shell, VB Scripts
- ❑ Clear-case, PVCS Tracker, Remedy
- ❑ Guidewire , Thunderhead
- ❑ TIBCO, Mainframes, HPSA



### Service Catalogue

- ❑ New Setup , Re-Configure, Refresh
- ❑ Build, Deploy, Release Management
- ❑ Trouble Shooting of day today issues
- ❑ Clear-case Administration, Monitoring

- ✓ Current team primarily Contractors had to be replaced by Capgemini staff
- ✓ Support for Testing and Development teams **outside UK hours** was an issue
- ✓ Frequent Build and Deployment requests
- ✓ Migration to **New Data Center** planned in parallel to BAU.

6

WEEKS  
to commence  
**BAU**

### Challenges

- Highly complex Systems
- Low Documentation levels
- Knowledge in pockets

80%

Team based offshore and realised significant cost savings for the customer

Months end to end managed transition with no slippage and end to end coverage

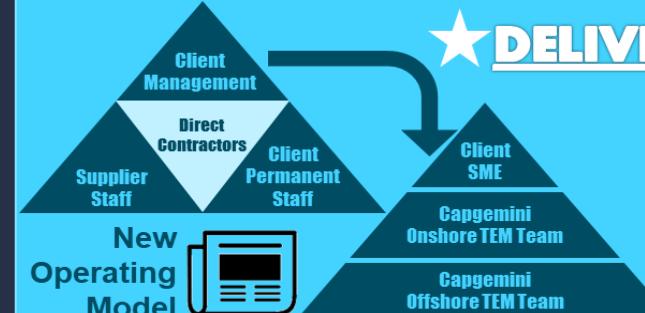
12x5

Support model established to provide extended support capability

3

## Benefits

## Background



Deployed a **5 member** team in UK with in **3 weeks** for Transition

Transition governed by a managed plan and regular sign off s with **Quality Gates**



**ON TIME at  
CLIENT EXPECTATION  
SCORE**

4.9/5

Entire team is co-located for Transition which helped to build the CORE team  
Sharing of experts from Capgemini team for contribution to migration activities

**EXCELLENT  
DELIVERY**

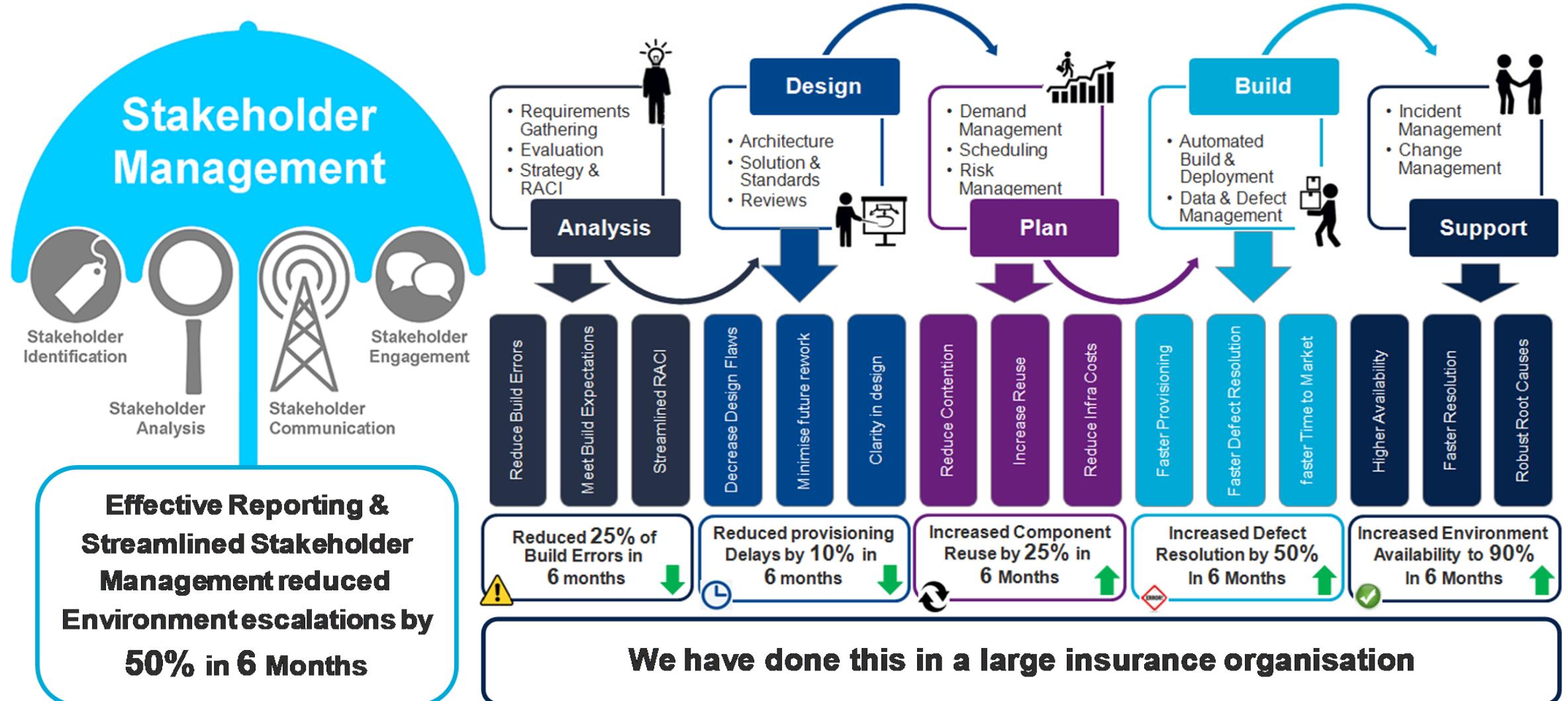


**HIGH  
CONFIDENCE**

## Solution

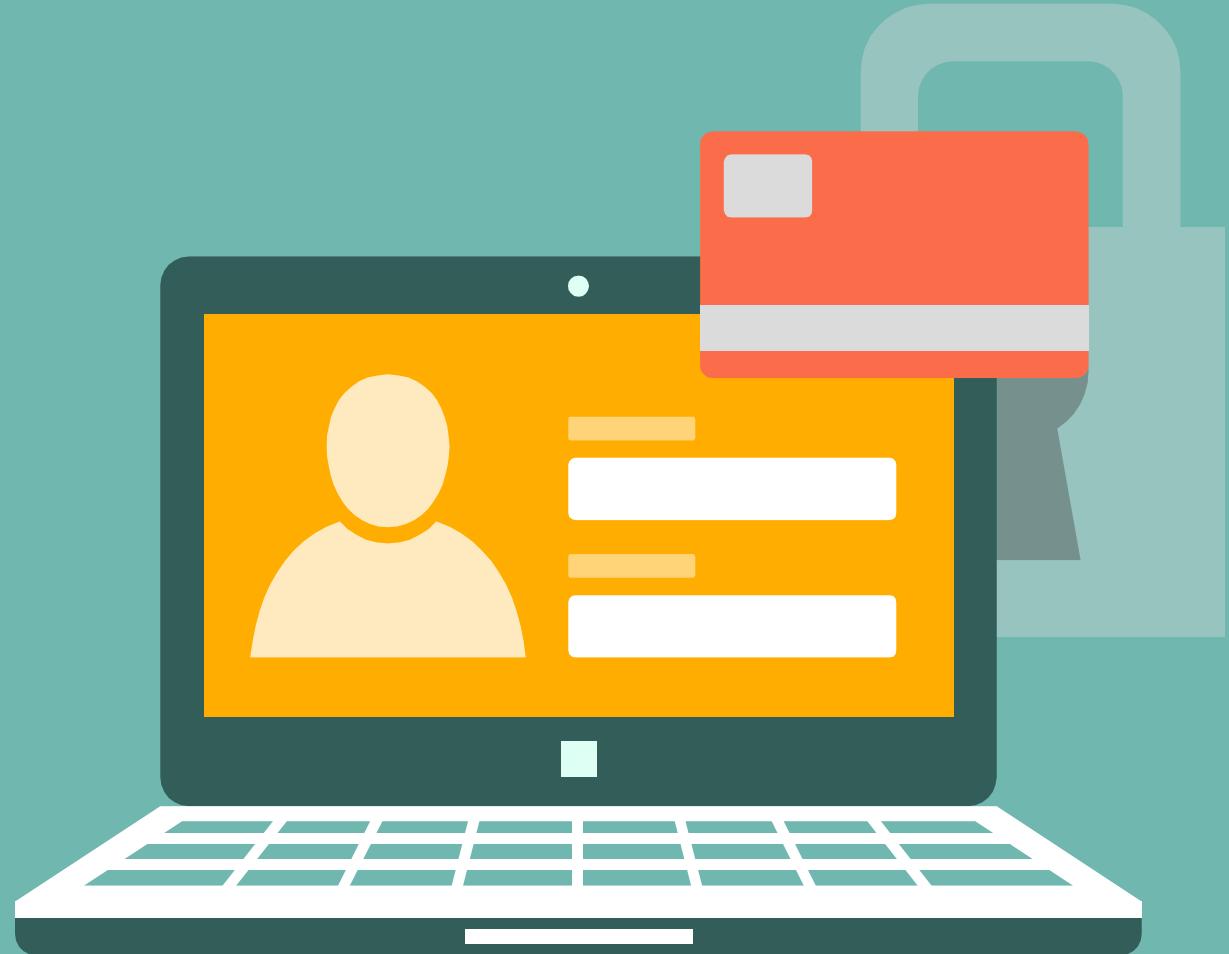
## Results

# Case Study – 4: A successful Environment Service Case Study for a Large Insurance Company in UK



# Case Study - Output

**Service Virtualisation and  
Test Environment  
Management Consulting**



# TEM & Service Virtualization Scope & Parameters

- ✓ Capgemini conducted an end to end study on the maturity of the test environments and the effectiveness of service virtualisation in addressing specific challenges faced by [CUST] with respect to end to end testing lifecycle.
- ✓ The key findings from the test environment management assessment are used to derive at high level dependencies and the interfaces that needs to be considered to be virtualised using service virtualisation.

GB / GF	Service Lines	Applications				Parameters for Assessment		
		GPS		GD		Service Virtualisation	Test Environments	
Payments	GPP	GPS		GD			Suitability of Applications	
	GLCM	GBS		GLE			Organisation & Process	
	RPP	EVPS					Dependent Systems	
	PS & M	GMG		WOLF			Environment Constraints	
	E-Channels	NET		Connect			Performance Testing	
CMB	GS	RRT					Infrastructure Services	
	GTRF	CSTF	GT	RF	SCS		Configuration Management	
	S&D	BMM		SFE			Change Management	
	Core Banking	HUB		RPS			Release Management	
ADM	Cards	Cards				Service Virtualisation	Metrics Analysis	
	Utilities	DPS	BPM	ICCM	CMOD		Environment Availability	
	Data Services	Utilities					High Level Interface	
							Environment Dependency	
							Operating Model	

# Executive Summary

## High Level View

### Test Environment Management

### Service Virtualisation

- Availability of Environments averages **75 - 85%** compared to practically achievable target of **90 - 95%**
- Inconsistent deployment automation penetration (**10 - 80%**) through application / service line specific approaches
- End to End Integrated environments are a challenge and especially the interdependency of applications are high

#### KEY CHALLENGES

- Currently, No Service Virtualisation implemented across all service lines within ADM (Core Banking, S&D, Utilities, Data Services & Cards)
- Very high dependency on multiple downstream applications (20 high impact downstream systems identified)
- 41% of Environments are Physical and 59% of the servers are virtual (server virtualisation)

- Recommend an end to end test environment management practice that is central to GB/GF's with internal federated ownership for ADM
- Service Virtualisation to be adopted and used within HUB, RPS, Cards & Data Services
- Deployment automation and Configuration management database to be adopted and implemented

#### RECOMMENDED STEPS

- Service Virtualisation to be adopted across S&D, Core Banking, CARDS and Utilities Service lines
- Downstream applications HUB, CI, PLM, POD, HOGAN to adopt service virtualisation and priority services to be virtualised
- Recommend a centralised Service Virtualisation function within the test environment management team (federated internally per SL)

- Environment rationalisation will have potential cost reduction of 15%
- Batch process reengineering will save 20% effort in monitoring and support
- Improve quality, Reduction in resource dependency through "single click deployments"

#### OPERATIONAL BENEFITS

- 20-30% Reduction in development, test and QA costs through automation of unit testing and improved testing through removal of dependency constraints
- 10-30% Reduction in costs of infrastructure environments by reducing the need to maintain multiple physical environments
- 30-40% savings from shifting defects to the left of SDLC and improved time to value for revenue generating applications

- Achieve up to approximately \$1.5 million cost avoidance through staff productivity savings by implementing an end to end test environment management function along with Service Virtualisation
- Avoid delay costs for up to 35 days through implementing Environment Lifecycle Ownership through an environment management service and Service Virtualisation

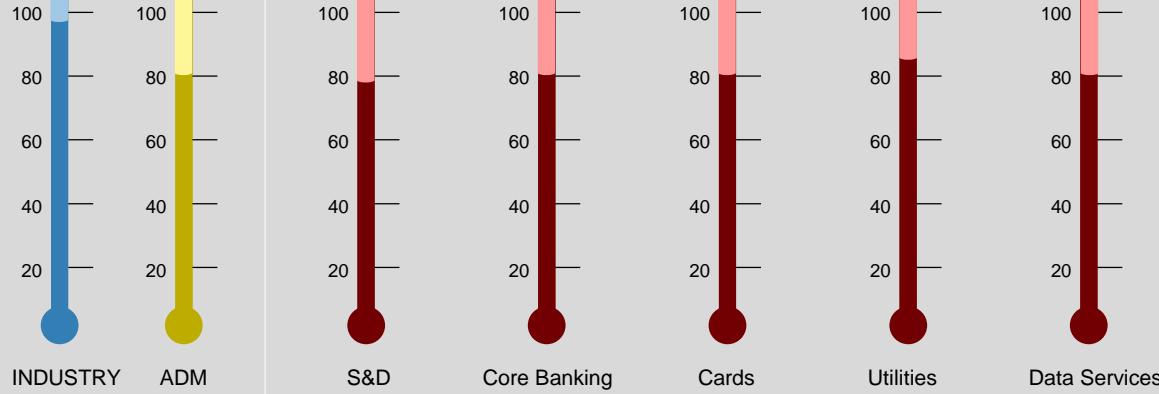
#### FINANCIAL BENEFITS

- Achieve up to \$132K cost savings in defect remediation costs through effective implementation of Service Virtualisation
- Achieve up to 20% savings on infrastructure costs through adoption of service virtualisation across ADM
- Achieve close to \$2.2 million worth value proposition through Service Virtualisation and Test Environment Management Service

# Key Findings Summary

## Test Environment Management

### Availability of Test Environments



- ✓ Average Environment Availability is approximately 70-80% compared to industry average of 90-95%.
- ✓ S&D (78%) have lower environment availability, however, end to end integrated environments is a major concern also driving the need for Service Virtualisation

### INTERMEDIATE

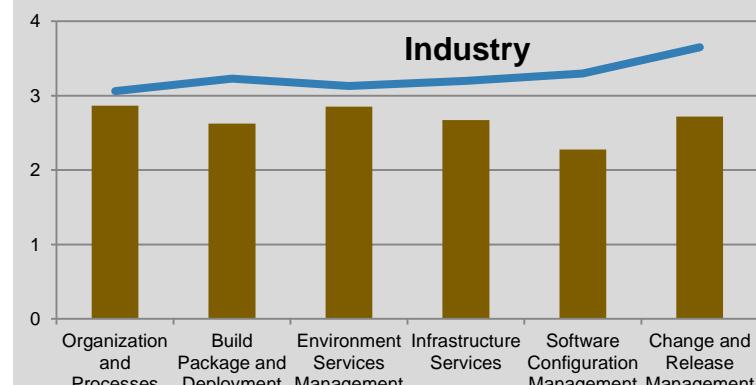
“Characterised for Projects, managed but often reactive”

**3.26 >> Industry Average**

**2.73  
(ADM)**

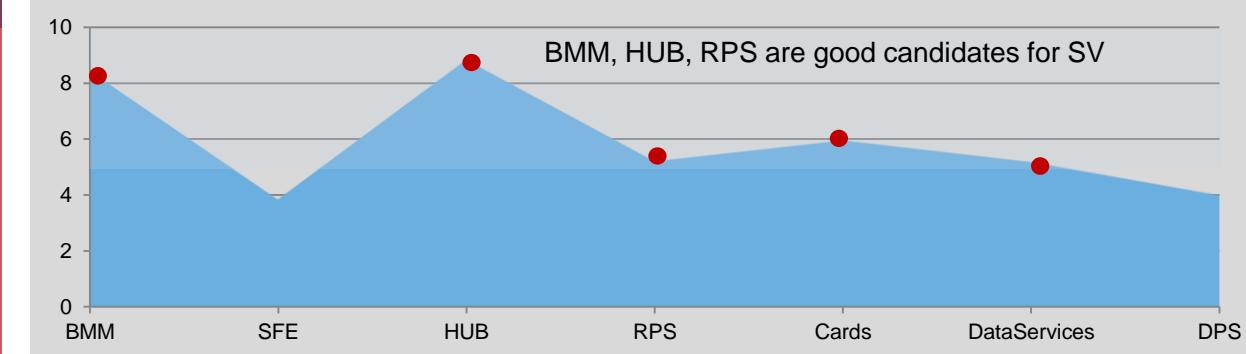
### Industry Positioning

### Focus areas to Improve through TEM

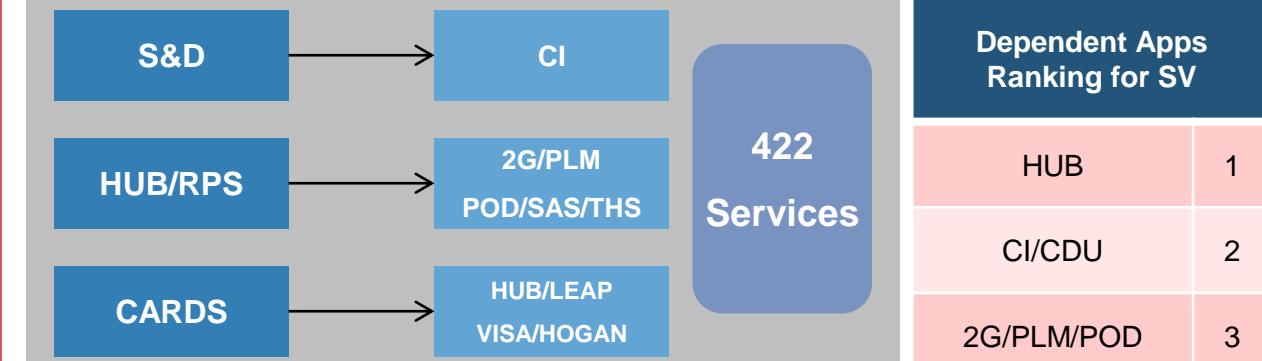


## Service Virtualisation

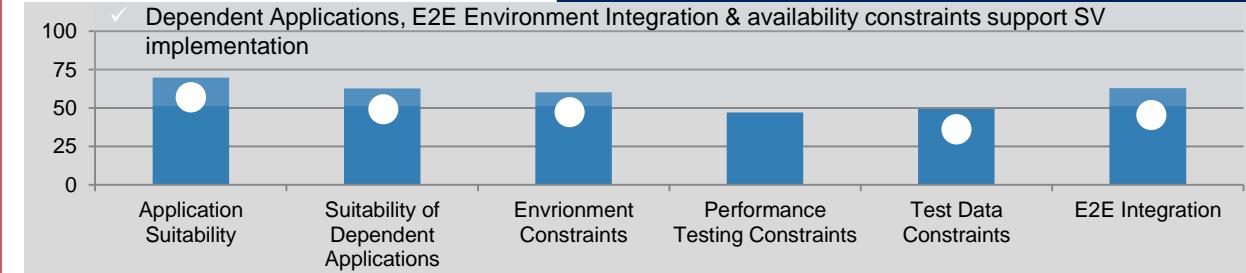
### Applications Qualifying for Service Virtualisation



### Service List Summary

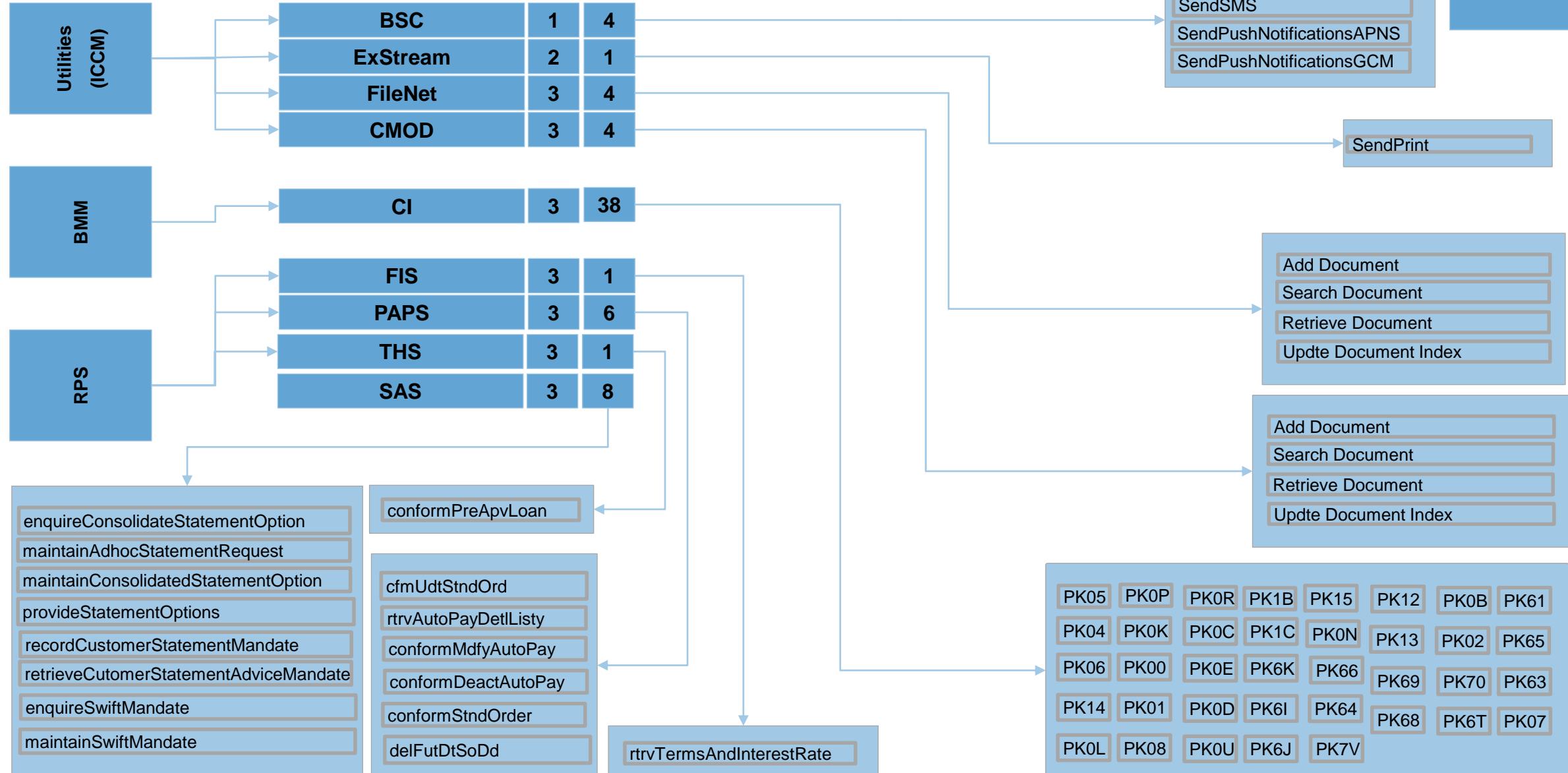


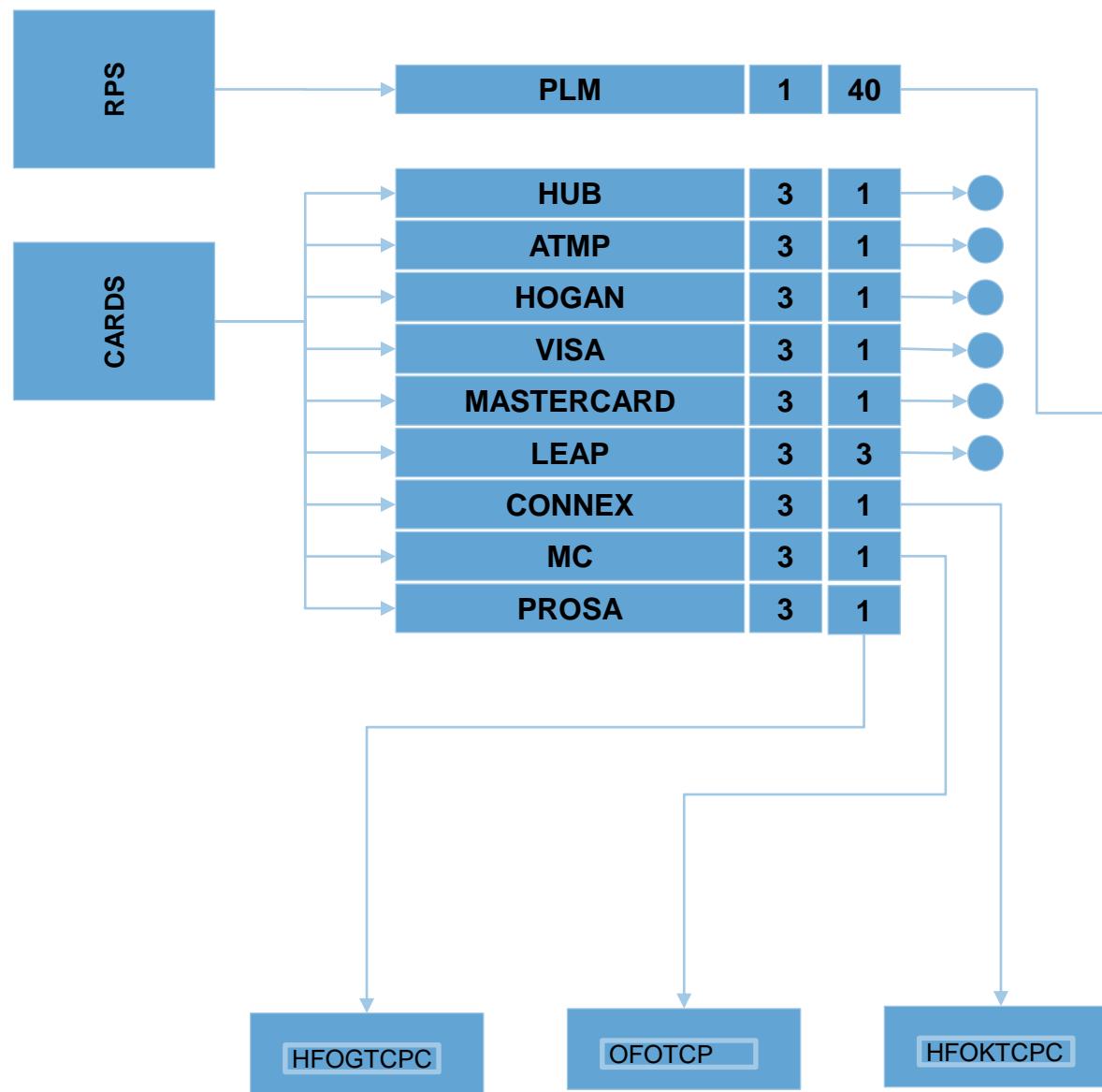
### Parameters Supporting Service Virtualisation



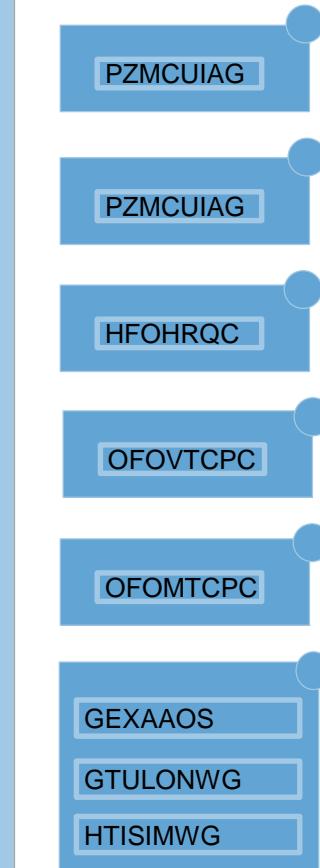
# ADM– Services List

67

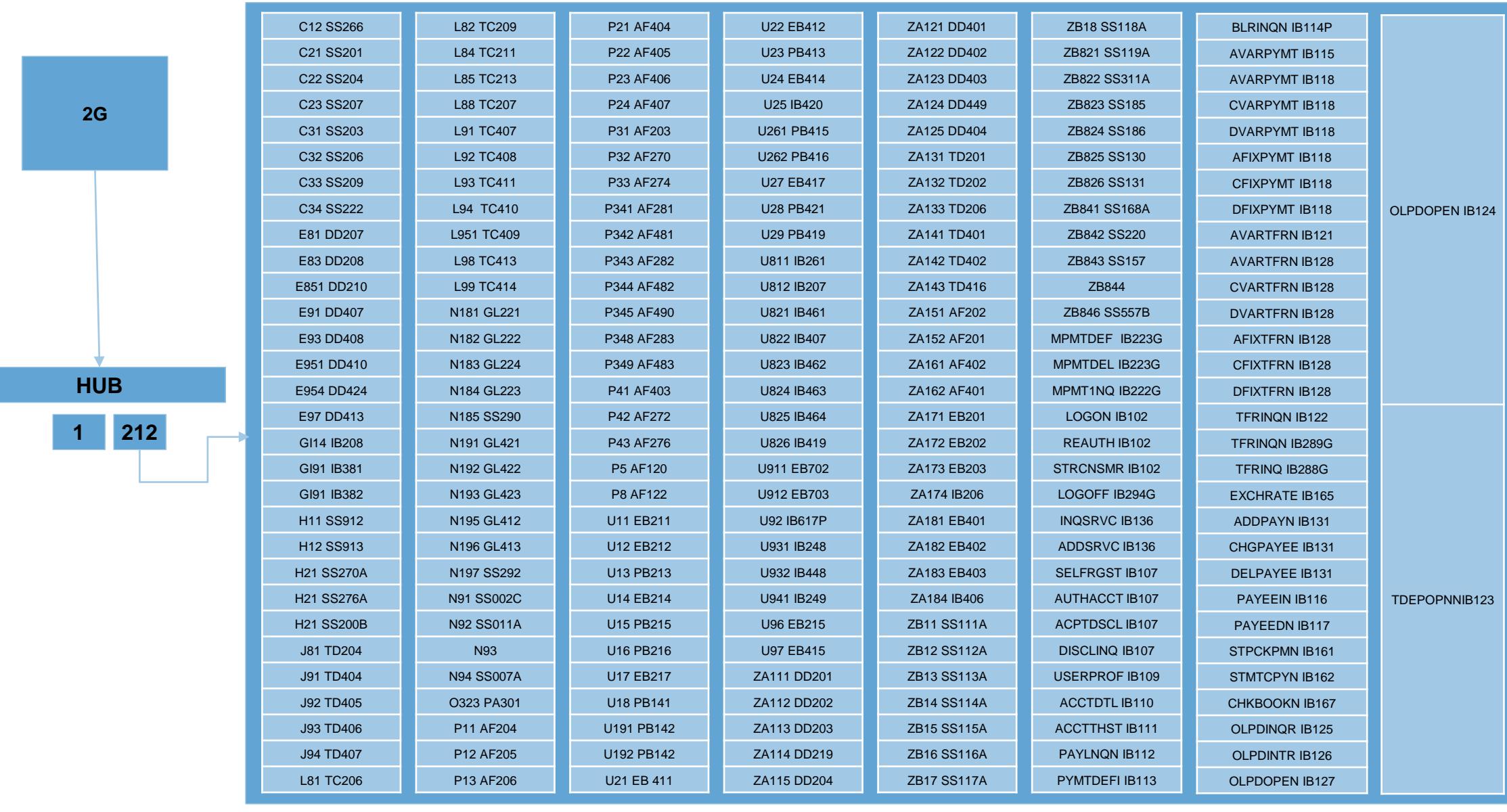




RANK	SERVICES
1	PLM
3	HUB
3	ATMP
3	HOGAN
3	VISA
3	MASTERCARD
3	LEAP
3	CONNEX
3	MC
3	PROSA
	rtrvMturlInstr
	updtActNickName
	rtrvScribAutoBillPayList
	updtInetBnkLmt
	rtrvScribAutoBillPayDeltl
	conformModifyBillPymt
	trmtAutoBillPay
	conformDmstPymt
	conformOneTimeElecBillPymt
	rtrvIntlPymtFxRate
	prpslOneTimeElecBillPymt
	rtrvTransactionFXRate
	enactCreditTransaction
	activAutoBillPay
	enactDebitTransaction
	maintainCashHold
	enactChequeDeposit
	rtrvPreApvLoanOv
	closePackageAccount
	rqstStopChq
	convertProductType
	cancelChequeBookOrder
	reactivateAccountArrangement
	maintainChequeBookIssueDetails
	openPackageAccount
	rtrvDDAcctDtl
	rtrvInetBnkLmt
	rtrvCBTxnSumm
	rtrvLoanAcctDtl
	openDemandDeposeteAccount
	maintainChequeBookStockDetails
	openTermDeposeteAccount
	retrieveChequeBookStockSummary
	prpslPreApvLoan
	confrmIntlPymt
	closeAccountArrangement





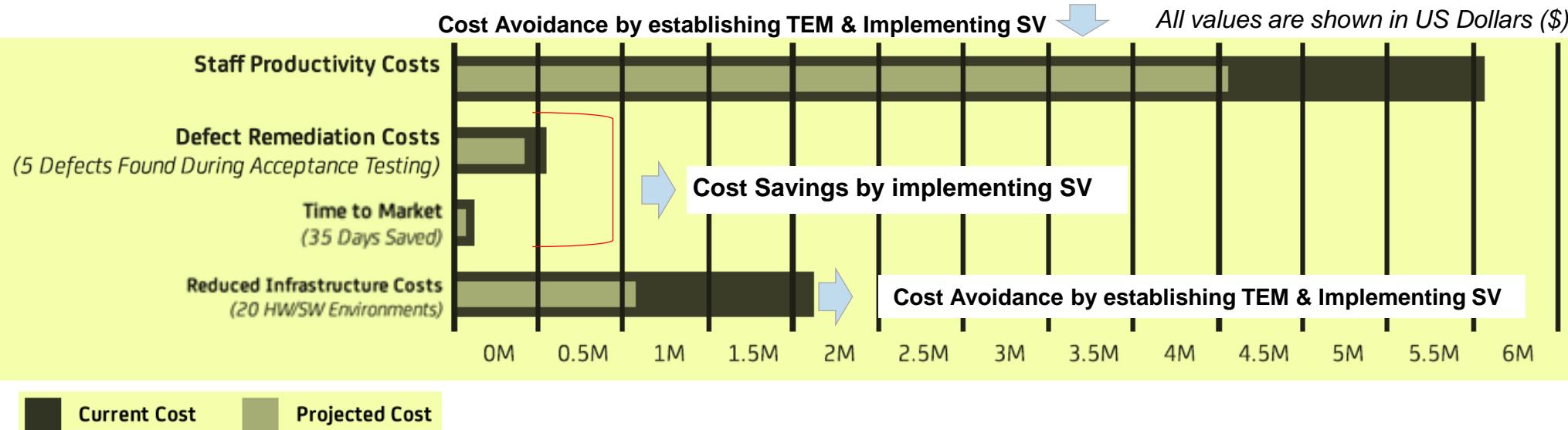


# TEM & Service Virtualization Value Proposition

## Estimated Benefits

Potential Y1 Savings

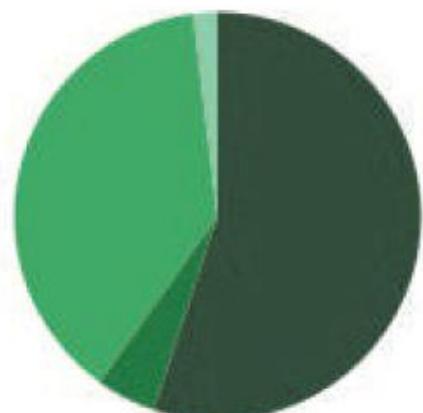
**Est. \$2.2 Million**



Staff Productivity Savings includes effort reduction and also decrease in idle time due to increased environment availability

To achieve increase in environment availability, a test environment management function (~\$500K Annual Investment) is required

How each area of savings contributes to overall savings:



- Staff Productivity Savings  
\$1,512,500 55.06%
- Shifting Defects Left Savings  
\$132,206 4.81%
- Reduced Infrastructure Savings  
\$1,050,000 38.22%
- Time to Market Savings  
\$52,500 1.91%

## Assumptions

According to Voke research, on average teams need access to 52 dependent components for development or testing but have unrestricted access to only 23. With Service Virtualisation, productivity for Dev/QA staff may increase by 25%

For purposes of this calculator, a blended rate of \$25/hr has been used (dev/QA)

Average costs to remediate defects are based on an IEEE study where costs range from \$4057 to \$7,136 from system to acceptance testing. The calculation assumes a 25% reduction in defect remediation costs

For purposes of this calculation, each environment is assumed to cost \$105,000 for the hardware, software and labour costs to set up an environment. This calculation assumes a 50% reduction in the need to spend resources on infrastructure that can be replaced via virtual services, synthetic data and dynamic data sets.

For the purposes of this calculation, the value of faster time-to-market is factored by 50% as a result of service virtualisation's ability to enable a reduction in the total days of development and testing within the production release cycle

# Detailed Test Environment Management Analysis



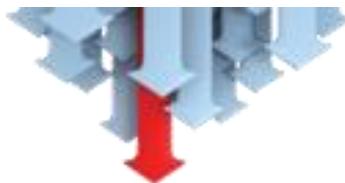
**People matter, results count.**

# Overall Test Environment Management Positioning Industry Benchmarks

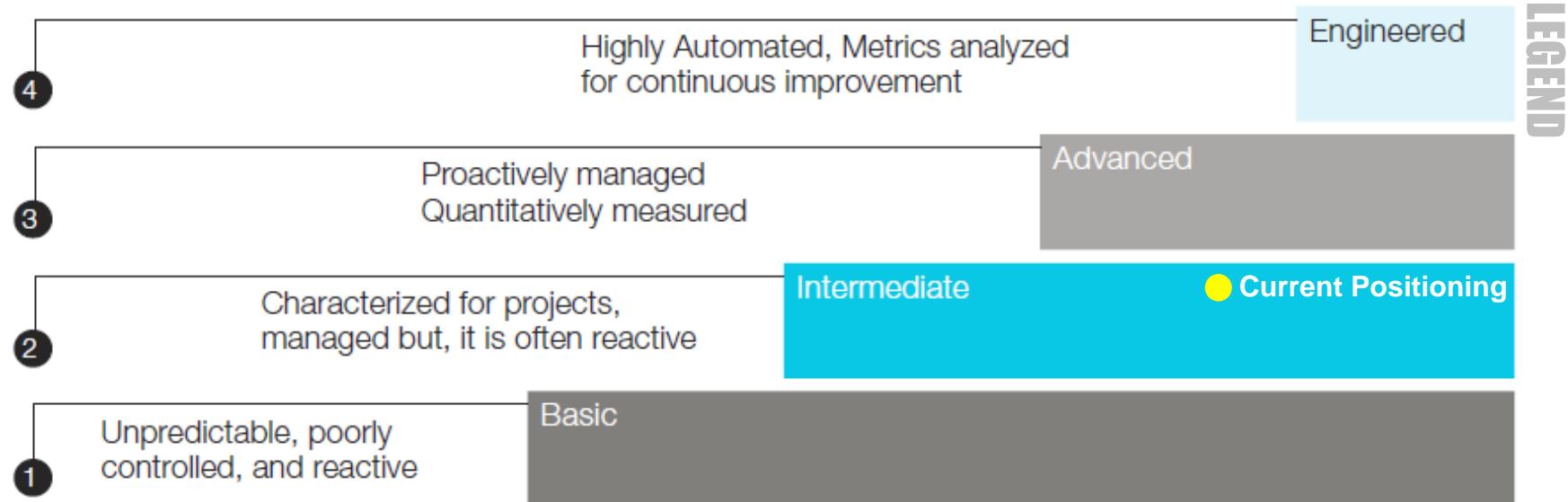
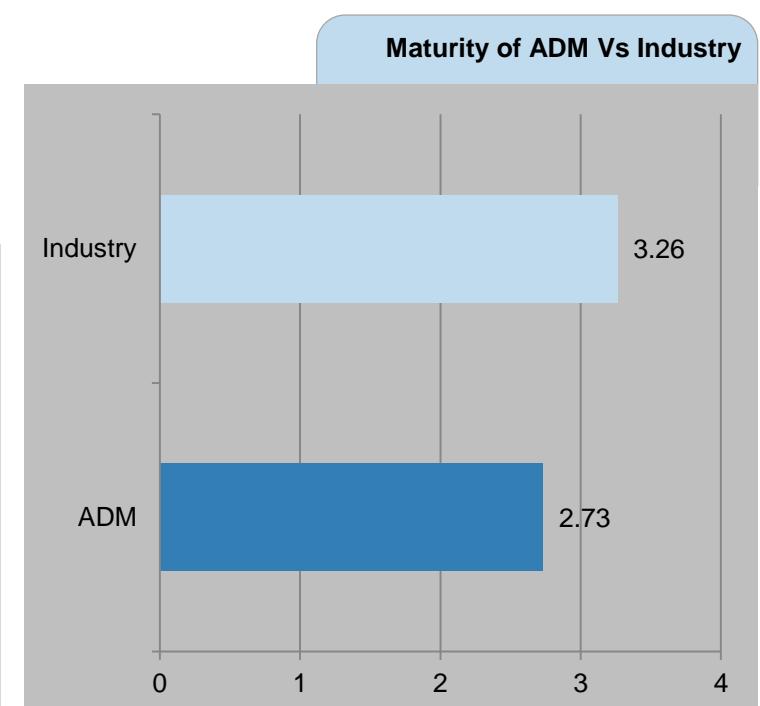
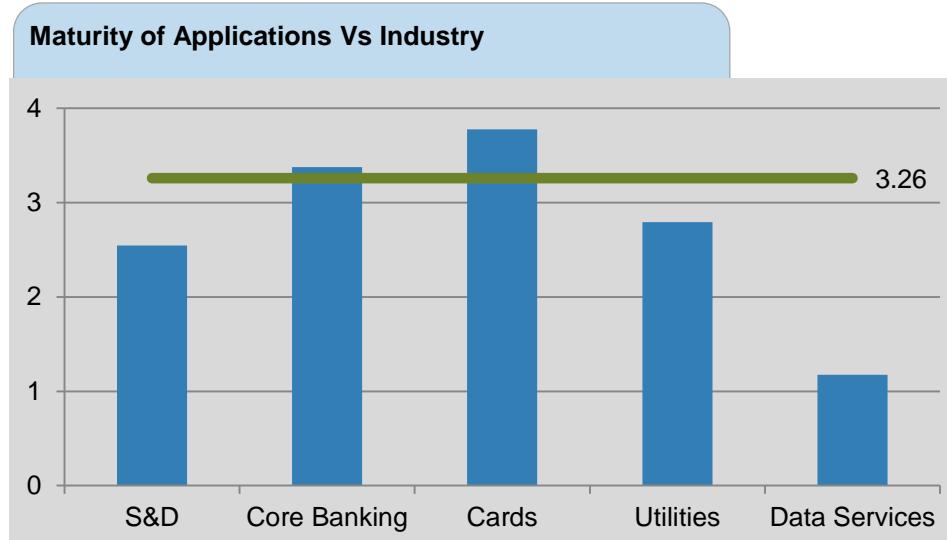
# 2.73

Overall Maturity Index

**INTERMEDIATE**  
“Characterized for  
projects, managed but, it  
is often reactive”  
**(Current)**



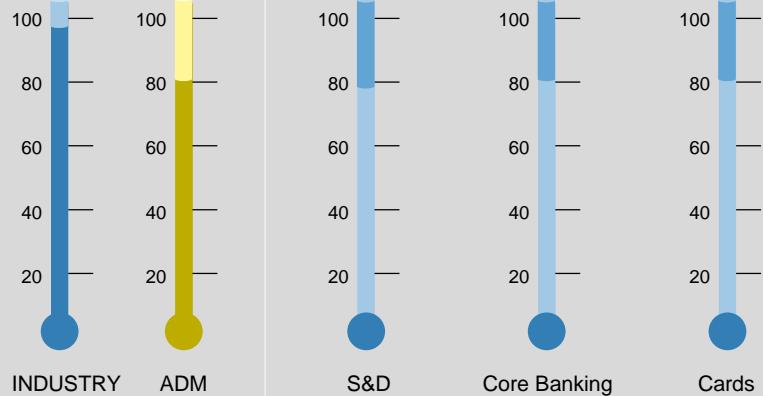
**PROACTIVELY managed &**  
**QUANTITATIVELY**  
**measured**  
**(Recommended)**



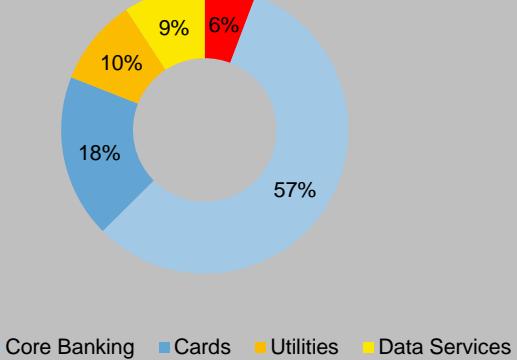
# Environment Availability and Landscape Analysis Per Service Line & Applications

Average Environment Availability is approximately 70-80% compared to industry average of 90-95%.

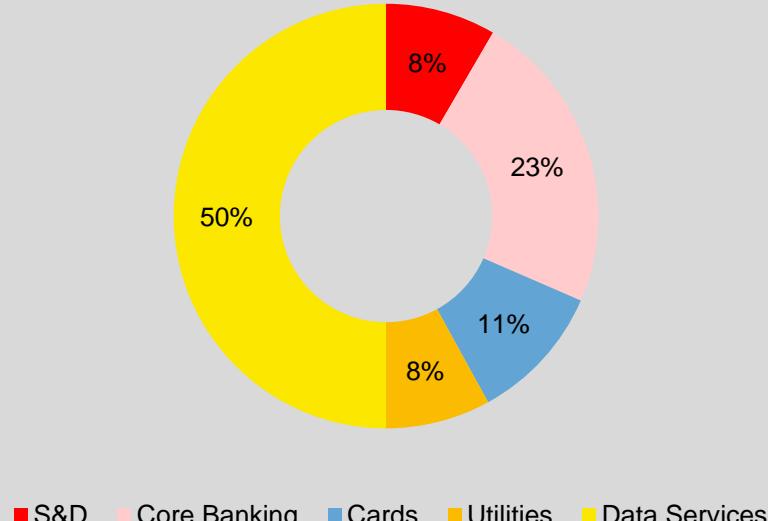
Availability of Test Environments



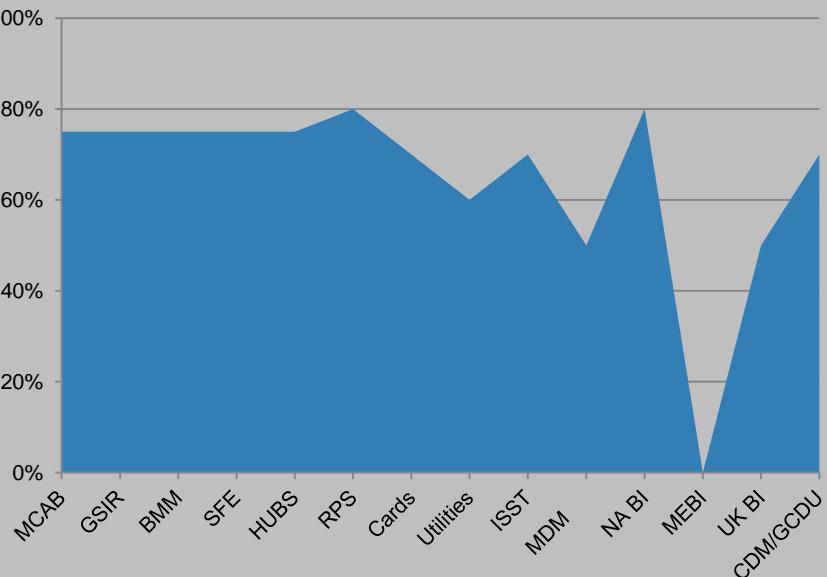
Environment Landscape Blueprint



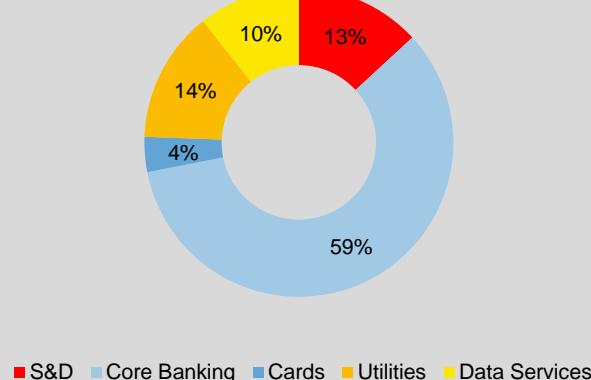
Environments Team Presence between applications



Maturity of Build/Deployment Automation



Resource Impact

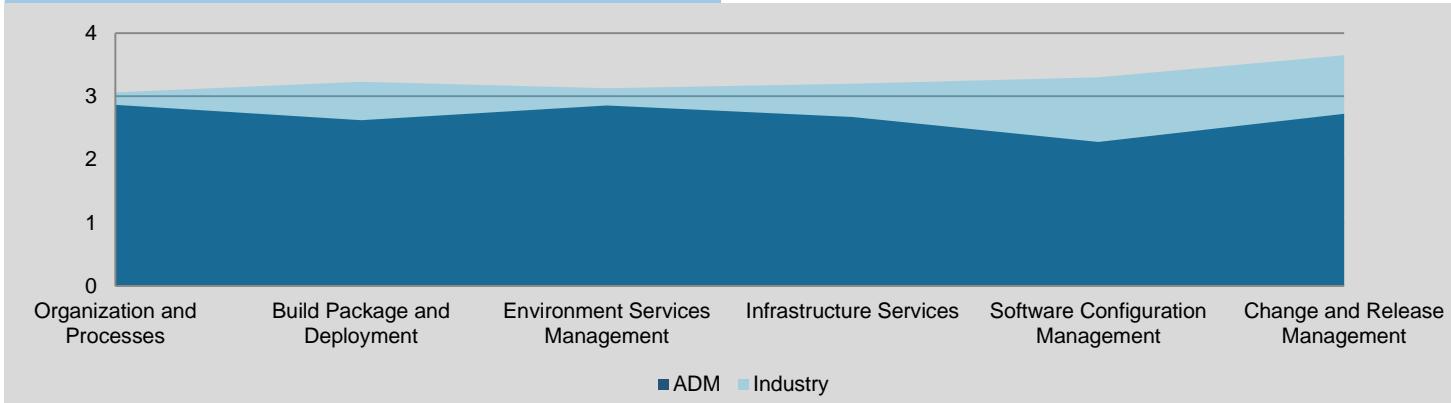


End to end integrated environments is a major concern also driving the need for Service Virtualisation

**CB has the maximum impact on resources due to environment issues while Data Services has the maximum environment management presence**

# Detailed Maturity Indices Per Environments Function Per Service Line

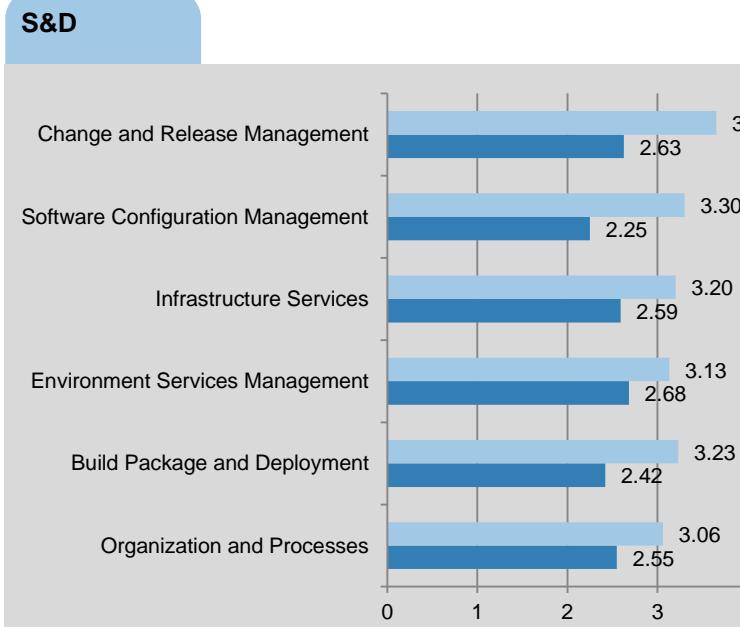
## Overall Gap Analysis Per Function



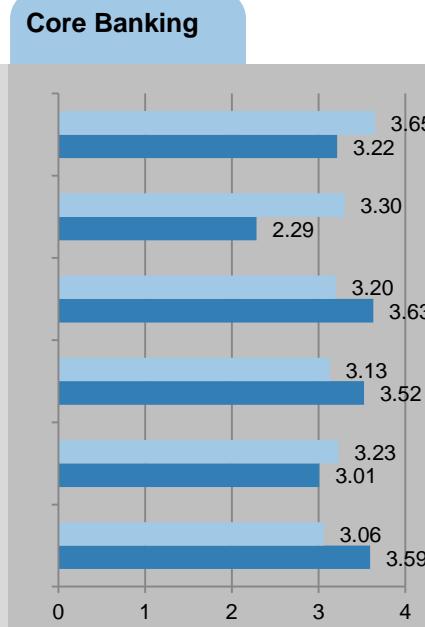
**Configuration Management, Infrastructure Services, Service Management & Build Package & Deployment** are the key areas that have gaps compared to other organisations in the industry

Overall this gap leads to ADM ensuring that there is an **End to End environment management service** in place to address some of the incident, problem management. Currently there is limited incident and problem management.

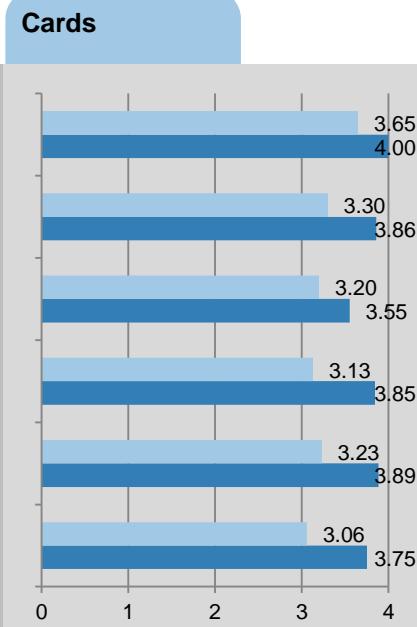
## S&D



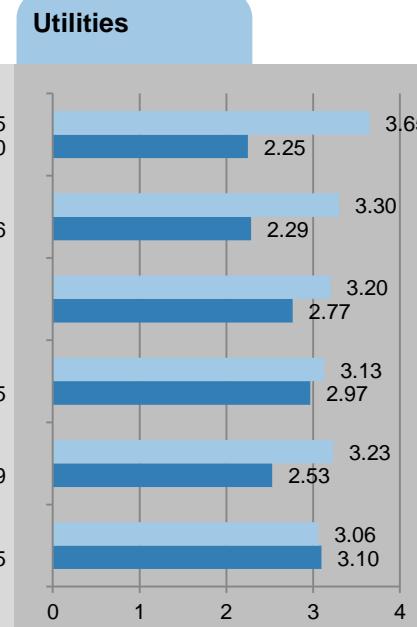
## Core Banking



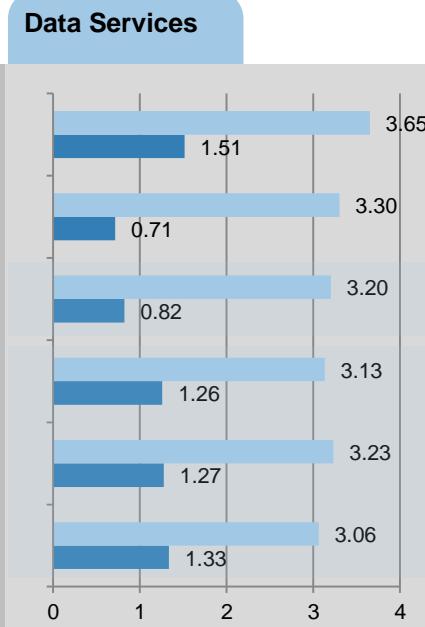
## Cards



## Utilities

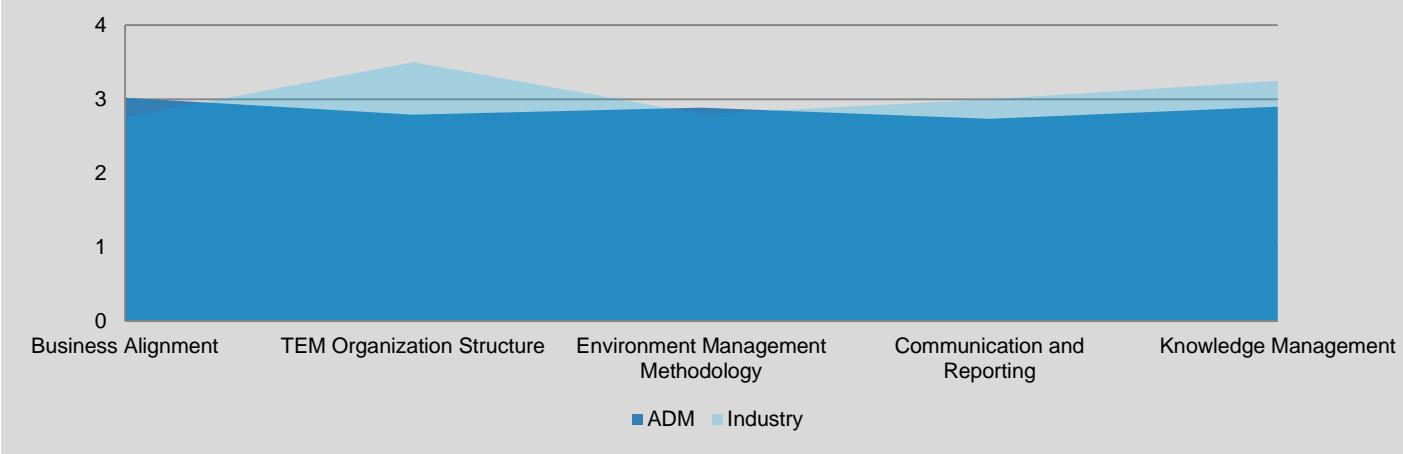


## Data Services



# Current Environment Management Organisation & Processes Per Service Line

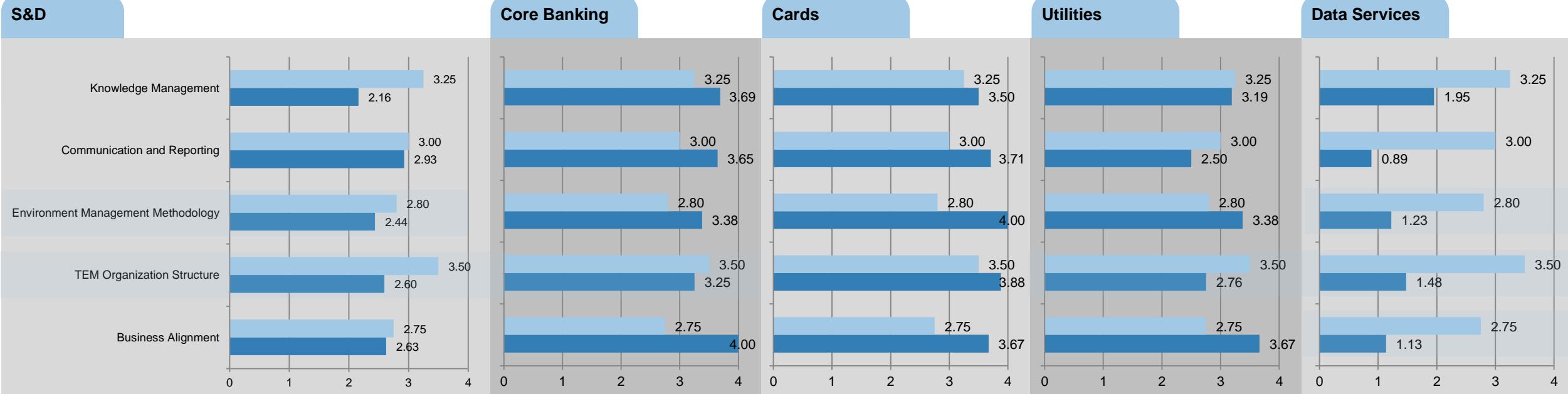
## Overall Gap Analysis Per Function



**Knowledge Management, Communication, Reporting & TEM Organisation Structure are the key areas that needs improvement in ADM**

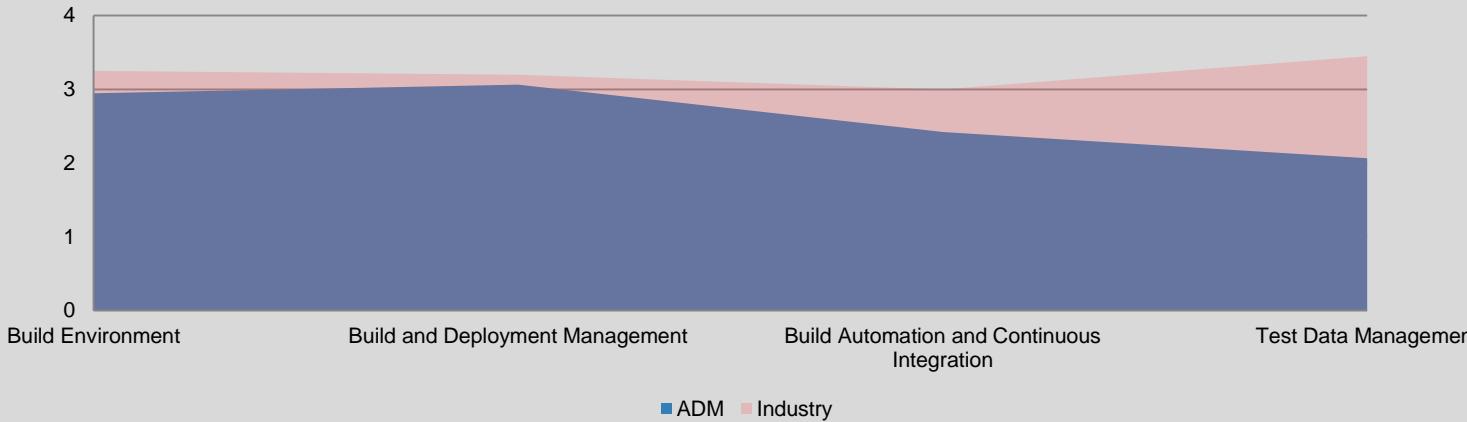
**The metrics, KPI's and communication related to environments in the form of dashboards & MIS is limited**

## S&D



# Current Build, Package & Deployment Analysis Per Service Line

## Overall Gap Analysis Per Function



**Build and Deployment Management along with TDM & Build Automation & CI are the key areas that needs improvement in ADM**

**The build and deployment automation varies from application to application and the adoption is vastly ad-hoc in ranging between 10% and 85%**

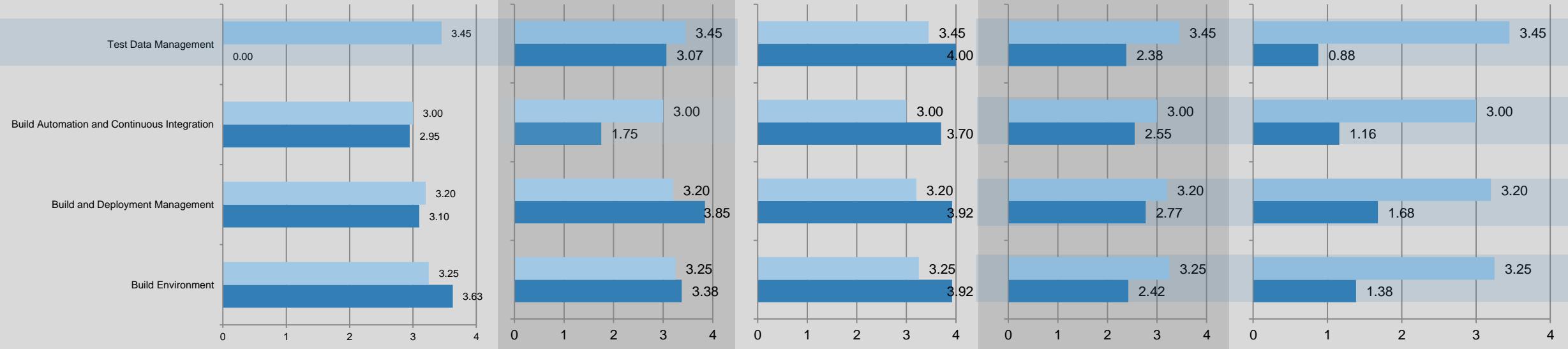
## S&D

### Core Banking

### Cards

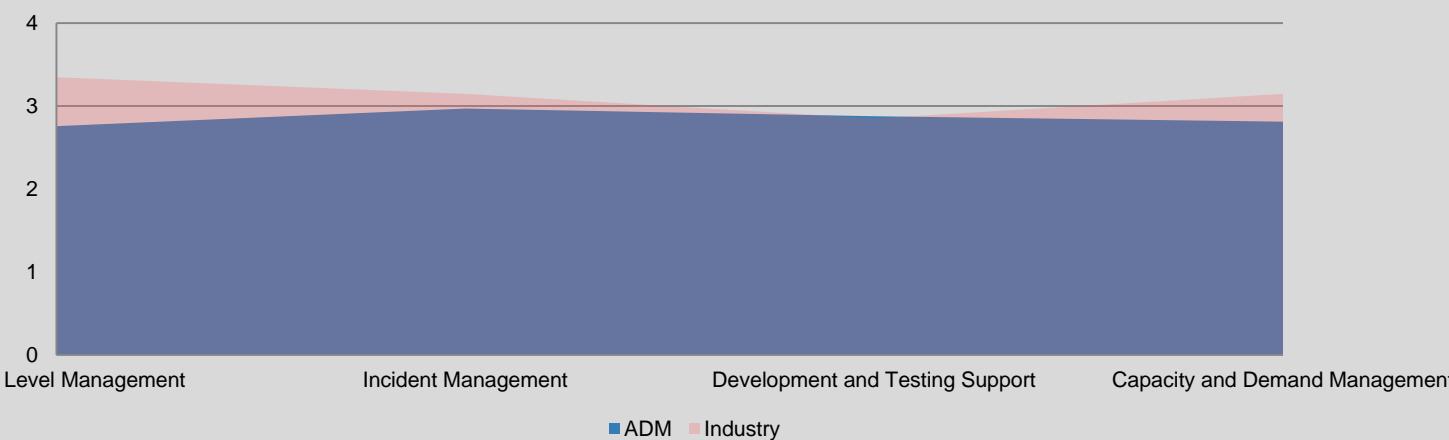
### Utilities

### Data Services



# Current Environment Service Management Analysis Per Service Line

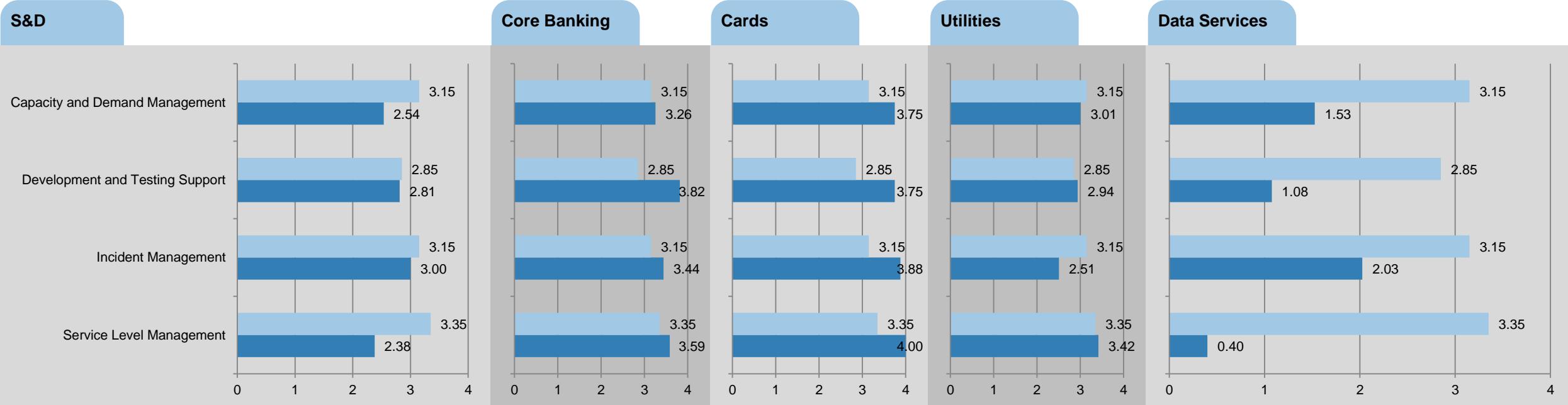
## Overall Gap Analysis Per Function



**Capacity & Demand Management, Incident & Service Level Management** are the key areas that needs improvement in CMB

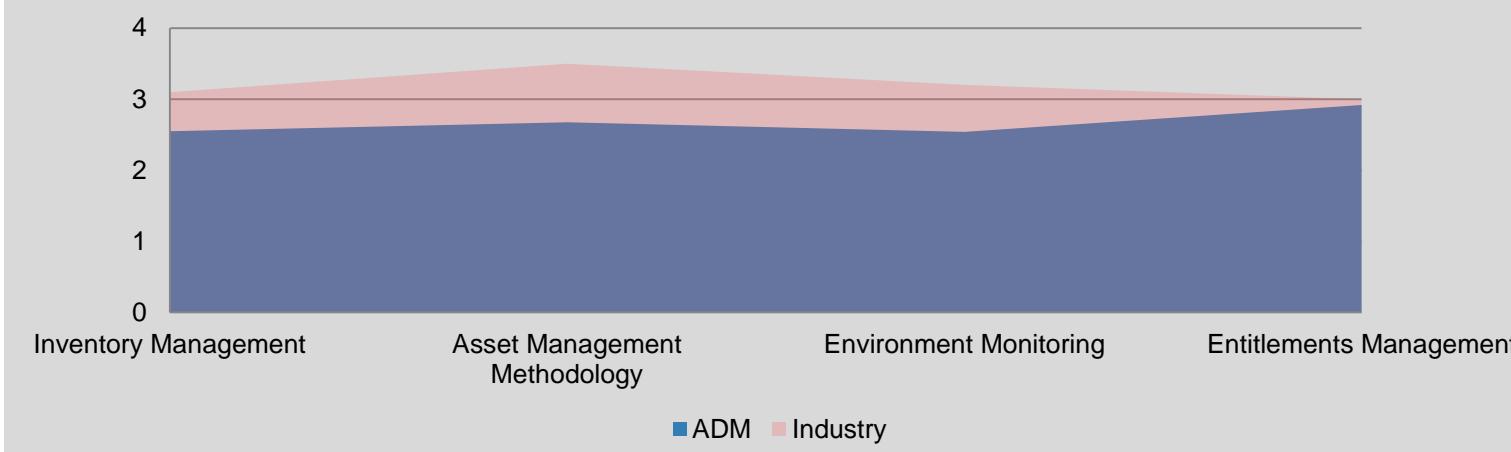
Although the capacity utilisation is near 100% for all of the environments, it needs to be validated against proper demand management. As there is no structured TEM function in place, there is limited Service Level and Incident Management processes.

## S&D



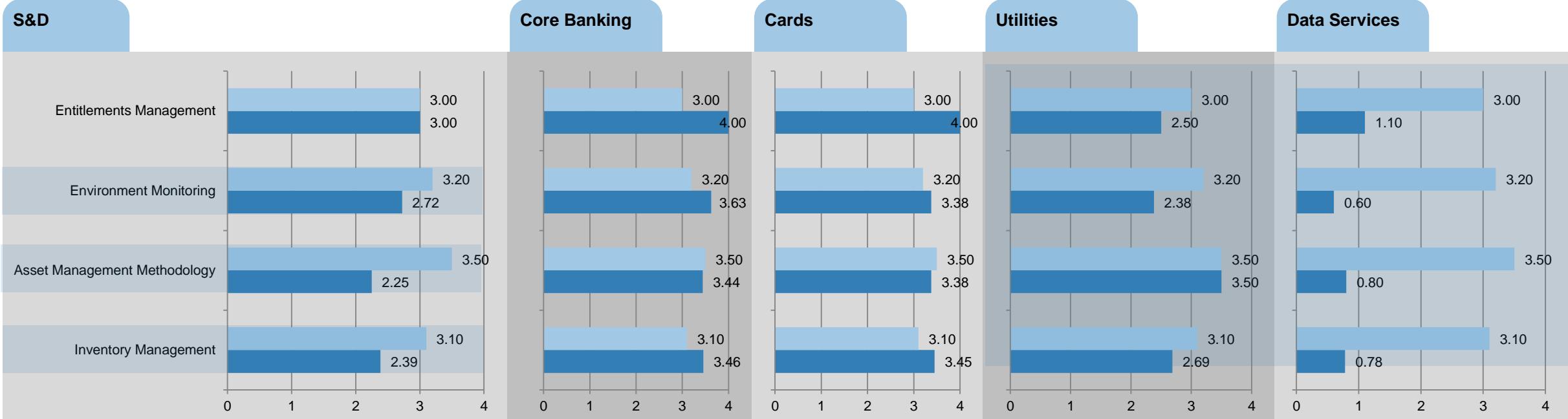
# Current Environment Infrastructure Services Analysis Per Service Line

## Overall Gap Analysis Per Function



**Environment Monitoring, Asset & Inventory Management** are the key gaps in the infrastructure services space within managing environments for CMB

**There is no proactive monitoring for test environments and CMDB exists but limited management**



# Test Environment Management Recommendations & Roadmap



**People matter, results count.**

# Recommendations

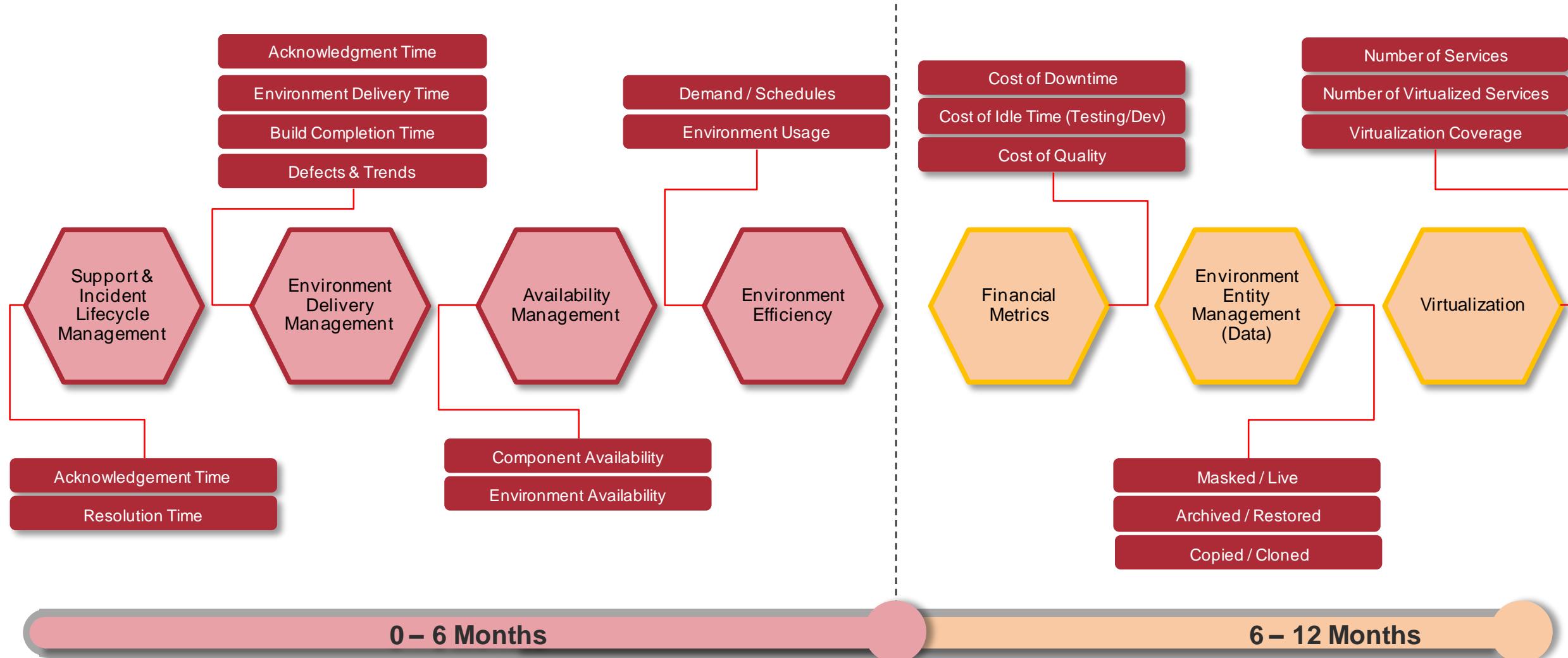
Areas of Improvement	Observations	Recommendations
Software Configuration Management	<ul style="list-style-type: none"> <li>▪ Configurable Items are version controlled and managed well in key applications. No major challenges reported due to configuration management</li> <li>▪ Environment configuration mismatch, retrofit issues sometimes delaying testing in Cards</li> <li>▪ Middleware components not version , change controlled in few environments. This leads to connectivity issues.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Environment configuration audit process to mature SCM</li> <li>▪ Automated retrofit , environment configuration comparison process implementation</li> <li>▪ Implement change management and configuration management process for middleware / integration components for high availability of integrated environments</li> </ul>
Build & Deployment Management	<ul style="list-style-type: none"> <li>▪ Occasional post deployment issues impacting testing</li> <li>▪ Environment cloning issues – e.g BU data from old environments</li> <li>▪ Opportunity optimise region build , deployment and refresh process in Cards, SFE</li> <li>▪ Deployment automation needs in utilities for DevOps readiness in Utilities and data services applications.</li> <li>▪ Environment downtime, effort increase due to frequent application patching</li> </ul>	<ul style="list-style-type: none"> <li>▪ Post deployment sanity automation and check lists rollout</li> <li>▪ Environment comparison frame work</li> <li>▪ Process re-engineering to increase automation in deployment, explore outside office hours deployment.</li> <li>▪ Deployment automation - Continuous deployment implementation</li> <li>▪ Patch deployment management framework for minimized test environment outage</li> </ul>
Environment Services Management	<ul style="list-style-type: none"> <li>▪ Environment Monitoring enhancement requirements for proactive incident management</li> <li>▪ Environment / server rationalisation, consolidation opportunity in HUB, RPS , Utilities, BI, GCDU and SFE</li> <li>▪ Batch processing optimisation opportunities in HUB, RPS, Cards</li> <li>▪ Need for automated Environment health checks and maintenance jobs</li> <li>▪ Environment slowness and outages impacting testing in BMM, Cards batch processing due to MQ, CICS, DB2, CPU issue</li> </ul>	<ul style="list-style-type: none"> <li>▪ Monitoring re-engineering for proactive test environment incident management for distributed and mainframe applications</li> <li>▪ Rationalise environments and servers to save infrastructure and maintenance cost</li> <li>▪ Service virtualisation to reduce dependency on HUB for GPS</li> <li>▪ Batch auto alerting, Pre-batch checks, RCA and fix for frequent failures</li> <li>▪ Automated health check, reporting and housekeeping jobs</li> <li>▪ Capacity review of system resources in test environments. Regular capacity management frame work.</li> </ul>
Organisation, Tools & Processes	<ul style="list-style-type: none"> <li>▪ Dedicated environment team with limited deliverables</li> <li>▪ Scope for improvement in Environment process - defect, incident, workflow management</li> <li>▪ Inadequate Environment asset register, configuration and knowledge management documentation</li> <li>▪ ITID SLA / support challenges</li> <li>▪ Capacity management challenges in non-production environments – e.g mainframe slowness</li> <li>▪ Environment Catalogues, dashboards, outage trackers and reporting requirements</li> <li>▪ Tools consolidation opportunities for ADM applications</li> </ul>	<ul style="list-style-type: none"> <li>▪ Centralized environment support team (Core/flex model) for end to end mgmt - group similar skills</li> <li>▪ Implement standard environment management process – Workflow, incident/defect management, communication plan, escalation matrix..etc</li> <li>▪ CMDB for ADM non production environment</li> <li>▪ Review support agreements, SLA with ITID and other supporting teams</li> <li>▪ Test environment metrics management frame work to report and track – defects, downtime, availability</li> <li>▪ Tools usage review and consolidation – ticket, incident, deployment management tools</li> </ul>

# Recommended Service and Operational Levels

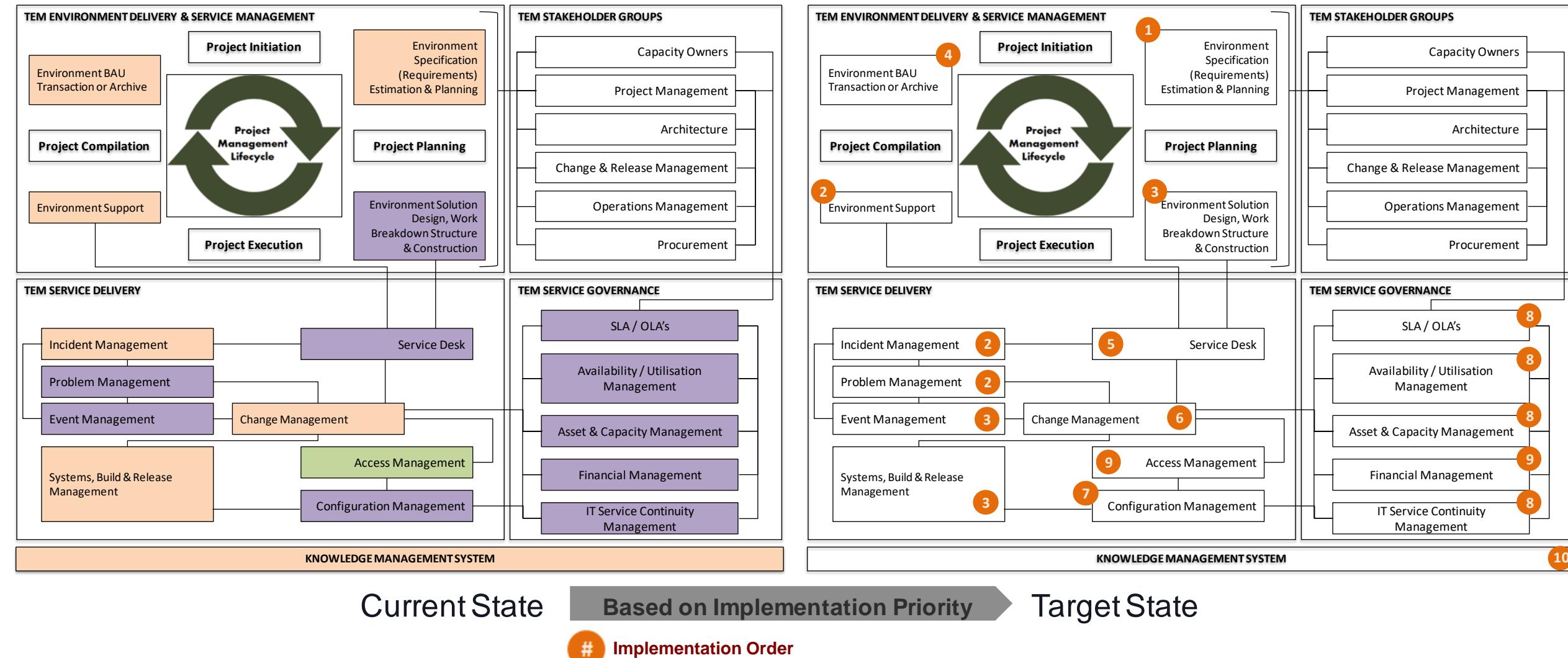
Operational Level Agreements			Service Level Agreements			
Delivery of Environments						
Type	Measure	Agreement	Type	Measure	Agreement	Goal
Acknowledgment Time	Time taken to acknowledge Environment Build Request	<= 1* Business hours	Build Completion Time	Time taken to build Functional Environment	As per project plan / release schedule	Achieve Milestones as per project plan
Environment Delivery Time Agreement	Time taken to respond with a agreed time to deliver the completely built environment	<= 4* Business hours				
Build Completion Time	Time taken to build Functional Environment	As per project plan / release schedule				
Support and Incident Lifecycle Management						
Acknowledgement Time	Time taken to acknowledge Severity 1/2/3 Ticket	<= 5*/10*/15* Minutes	Acknowledgement Time	Time to acknowledge Severity 1/2/3 Ticket	<= 5*/10*/15* Minutes	96%*
Resolution Time	Time taken to resolve Severity 1/2/3 ticket	<= 4*/24*/36* hours	Resolution Time	Time taken to resolve Severity 1/2/3 ticket	<= 4*/24*/36* hours	96%*
Environment Availability						
Component Availability	Total Time components supported by supplier during the service support hours for Environment excluding the build times	90%*	Component Availability	Total Time components supported by supplier during the service support hours for Environment excluding the build times	90%*	100% Compliance

\* - organization dependent

# Recommended Metrics for Environment Management



# Recommended TEM Framework



# TEM High level Implementation Roadmap – All Service Lines

TEM Transformation team	Benefits Realisation					
	Month 1 - 2	Month 3 - 4	Month 5 - 6	Month 7 - 8	Month 9 - 10	Month 11-12
Build and deployment acceleration	<ul style="list-style-type: none"> <li>Finalise applications</li> <li>Environment build and deployment effort baseline</li> </ul>	<ul style="list-style-type: none"> <li>HSBC tools access</li> <li>Build and deployment framework implementation</li> <li>Automate CMB applications – CSTF, Connect, GT, RF</li> </ul>	<ul style="list-style-type: none"> <li>Tranche 2 payments applications build and deployment acceleration</li> <li>Measure and report efficiency improvement</li> </ul>		<ul style="list-style-type: none"> <li>Tranche 3 ADM applications build and deployment acceleration</li> <li>Build and deployment for Mainframe apps</li> </ul>	
Stability enhancement/uplift (Environment monitoring & health checks)	<ul style="list-style-type: none"> <li>Identify strategic application</li> <li>Tools identification and integration</li> <li>Batch optimisation analysis</li> <li>Pilot centralized monitoring</li> </ul>	<ul style="list-style-type: none"> <li>Pilot completion and sign off</li> <li>Tranche1 application monitoring configuration – CMB</li> <li>Pilot end-to-end health check framework</li> </ul>		<ul style="list-style-type: none"> <li>Tranche 2 application monitoring – Payments applications , batch optimisation</li> <li>tranche1 application configuration for end to end health check – 5 CMB applications</li> </ul>		<ul style="list-style-type: none"> <li>Tranche 3 monitoring ADM applications, batch optimization</li> <li>Commerce tranche2 health check payments applications</li> </ul>
Service management framework enhancement	<ul style="list-style-type: none"> <li>Review and update Enterprise Policies/ principles</li> <li>Services Catalogues</li> </ul>	<ul style="list-style-type: none"> <li>Standards and Processes</li> <li>Setup service desk for non-production</li> <li>Process roll outs</li> <li>EMP, SCMP, ESP templates</li> </ul>		<ul style="list-style-type: none"> <li>Demand management (env bookings)</li> <li>Configuration management strategy</li> <li>Knowledge management</li> <li>Service desk enhancements</li> </ul>		<ul style="list-style-type: none"> <li>Review and mature process</li> </ul>
Consolidation and Rationalization	<ul style="list-style-type: none"> <li>Environment and servers data collection</li> <li>Environment CMDB build</li> <li>Baseline and report data</li> </ul>		<ul style="list-style-type: none"> <li>Publish environment usage</li> <li>Capacity analysis</li> <li>Commission /decommission recommendation</li> </ul>			<ul style="list-style-type: none"> <li>Execute rationalization plan</li> <li>Savings reporting</li> <li>Continuous environment capacity analysis</li> </ul>
Service virtualization	<ul style="list-style-type: none"> <li>Assessment Completion</li> <li>Team Mobilisation</li> <li>Implementation pre-planning</li> <li>Pilots &amp; PoCs</li> </ul>	<ul style="list-style-type: none"> <li>Operating Model Setup</li> <li>Implementation Rollout</li> <li>Phased handover to manage and maintain</li> <li>Implementation Completion</li> </ul>		<ul style="list-style-type: none"> <li>Manage and maintain</li> <li>Metrics and Dashboard</li> <li>ROI Tracking</li> </ul>		
Measurement, controls and reporting	<ul style="list-style-type: none"> <li>Finalise reports and metrics</li> <li>Analyze and baseline current data</li> <li>Finalize tools strategy</li> </ul>	<ul style="list-style-type: none"> <li>Pilot reporting framework</li> <li>Enterprise reporting format and template roll outs</li> <li>Data collection automation for reporting</li> <li>Finalise test environment dashboards</li> </ul>		<ul style="list-style-type: none"> <li>Publish environment dashboard</li> <li>Metrics reporting</li> </ul>		

# Detailed Service Virtualisation Analysis

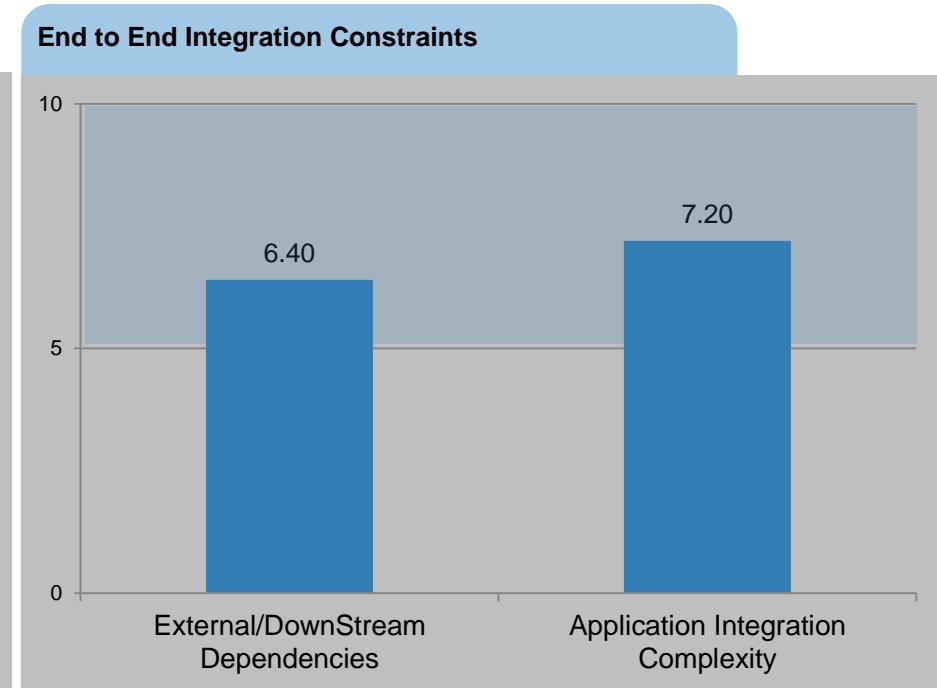
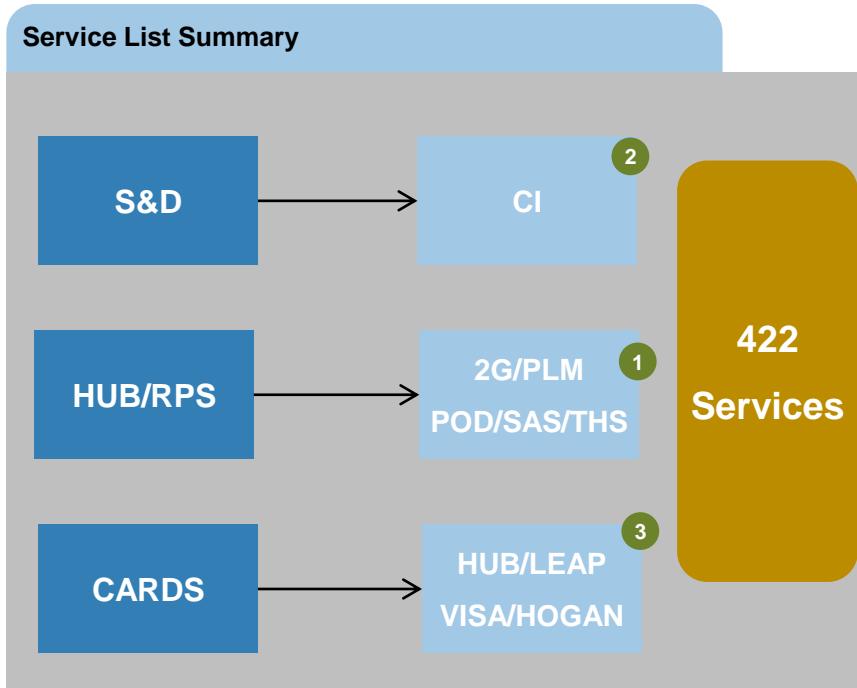
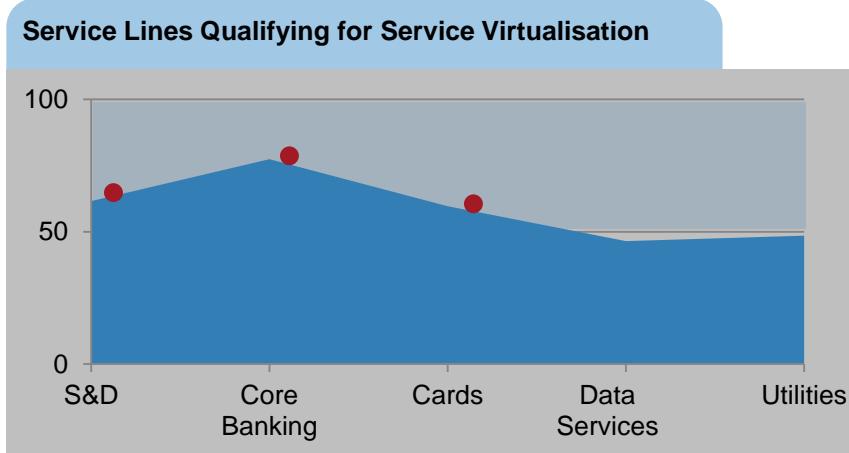
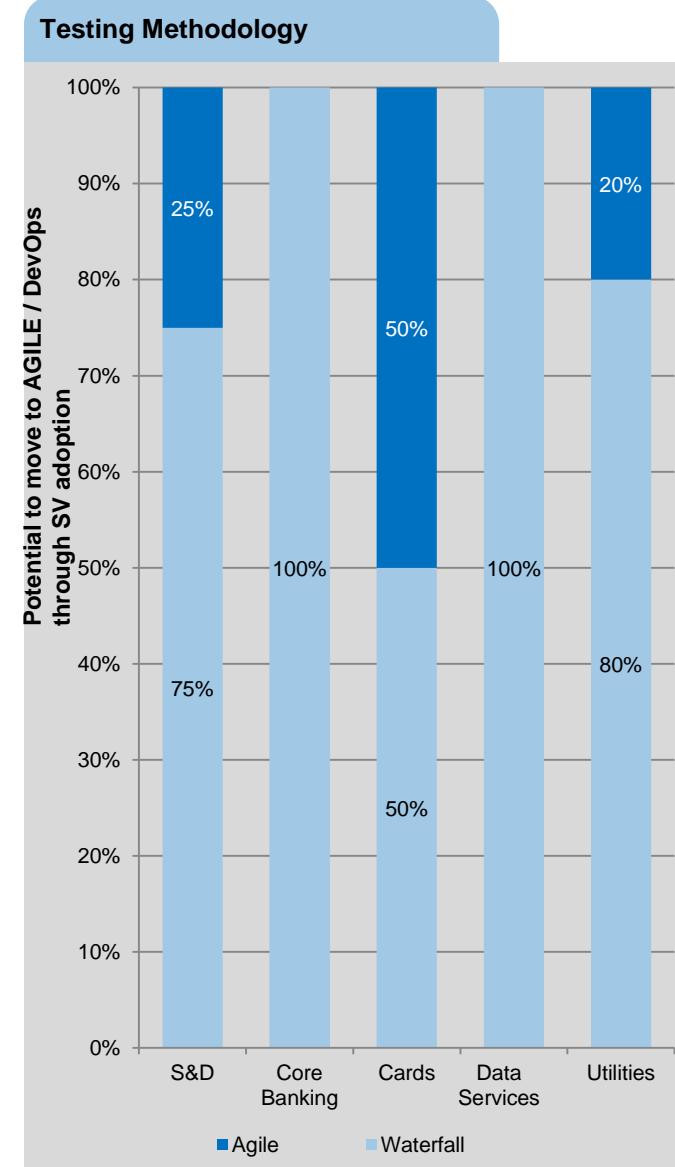


People matter, results count.

# Overall Service Virtualisation Assessment Summary

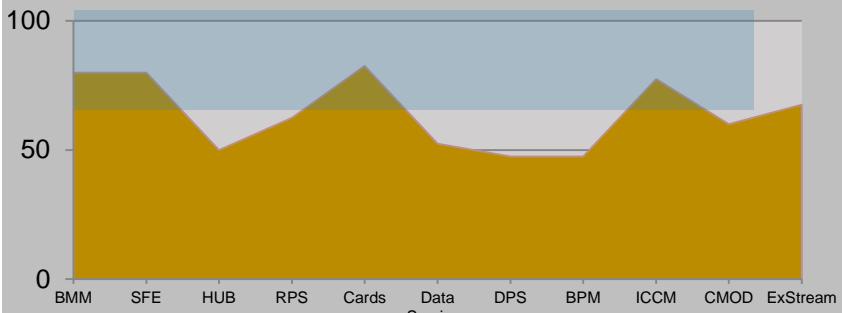
## Overall View

**422 Services identified – To be virtualised. HUB & RPS are the key priority dependent applications to be considered for virtualisation.**



# Analysis on Suitability of Application for Service Virtualisation Per Service Line & Applications

Suitability of Applications for SV



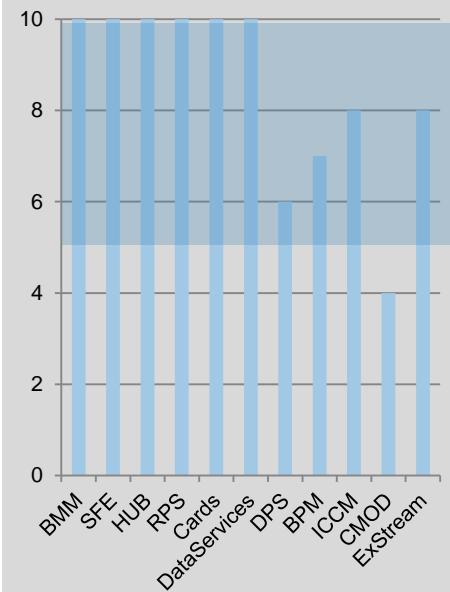
Suitability of Service Lines for SV



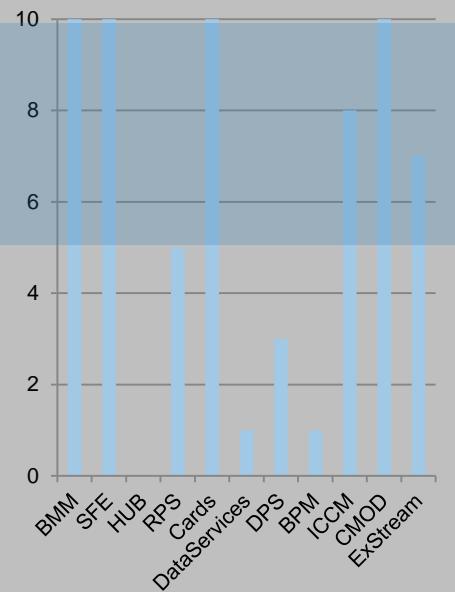
**BMM, SFE, HUB, RPS, ICCM, CMOD & ExStream** are suitable for SV adoption. Service Virtualisation adoption possibilities are high for **S&D, Core Banking, CARDS & Utilities** from a Service Line perspective.

**S&D, CARDS, Utilities** have dependency on large number of dependent applications and this makes it important for dependent applications to adopting service virtualisation.

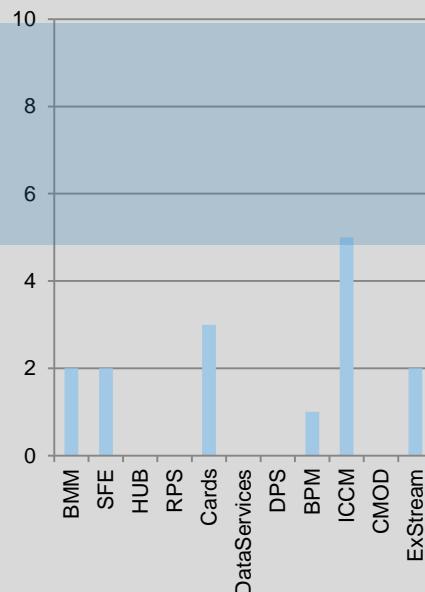
Complexity of Application



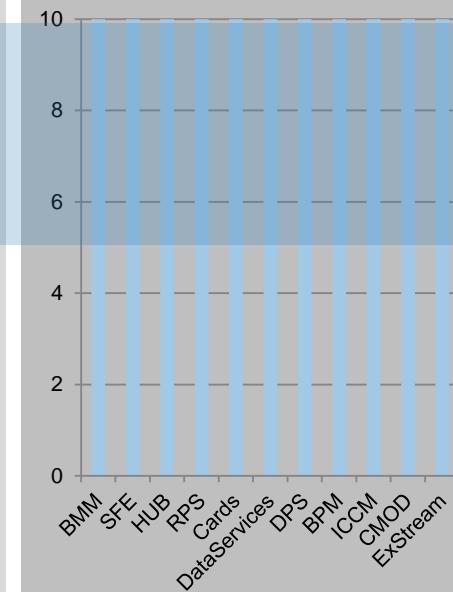
Dependent Applications



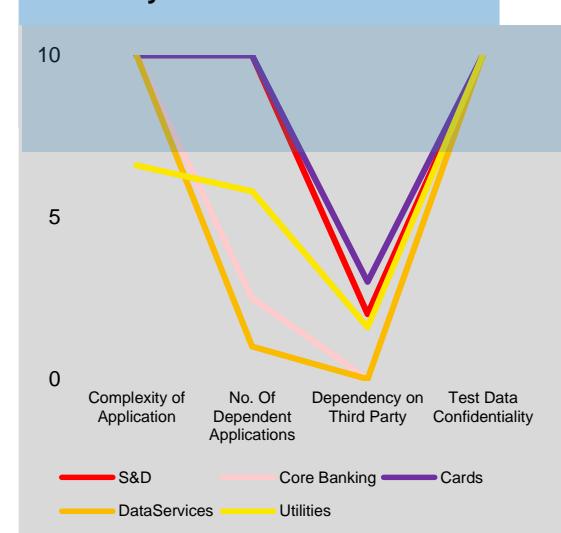
Dependency on Third Party



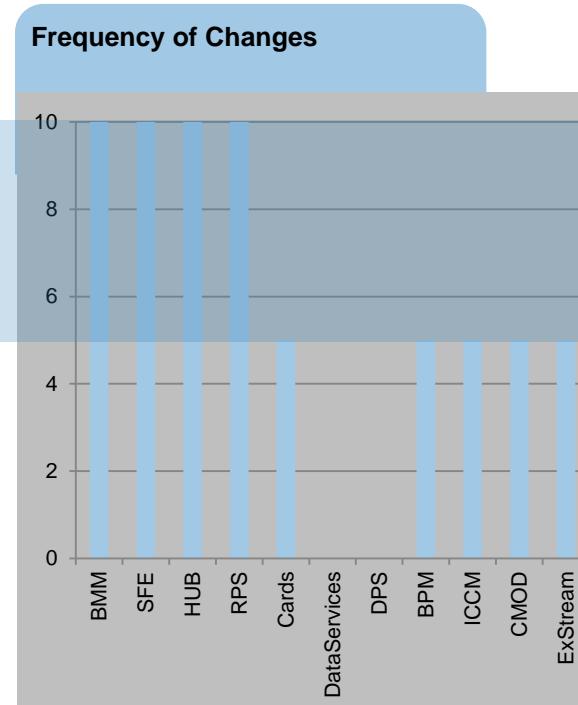
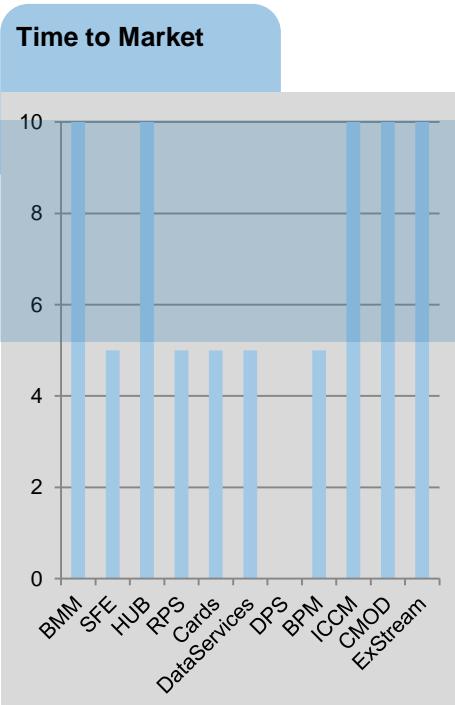
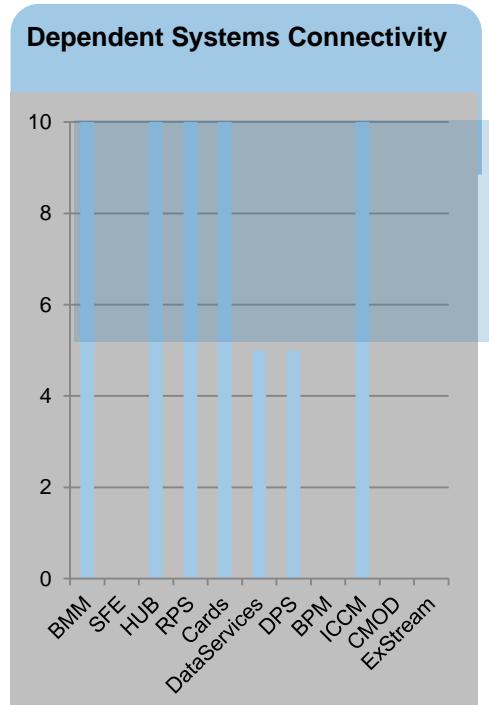
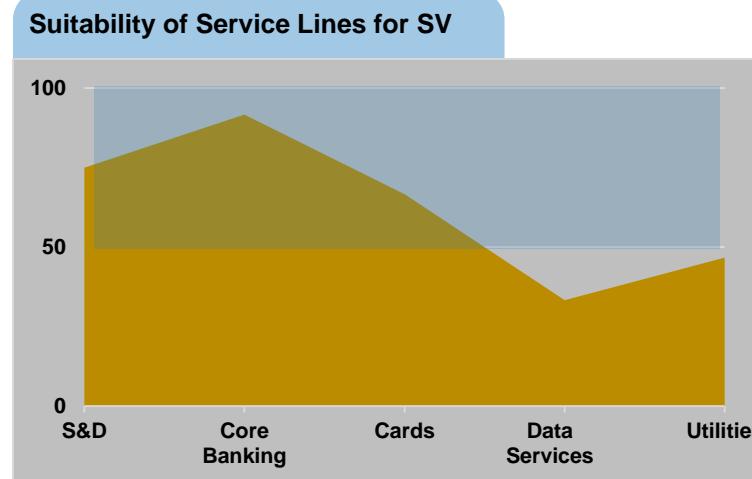
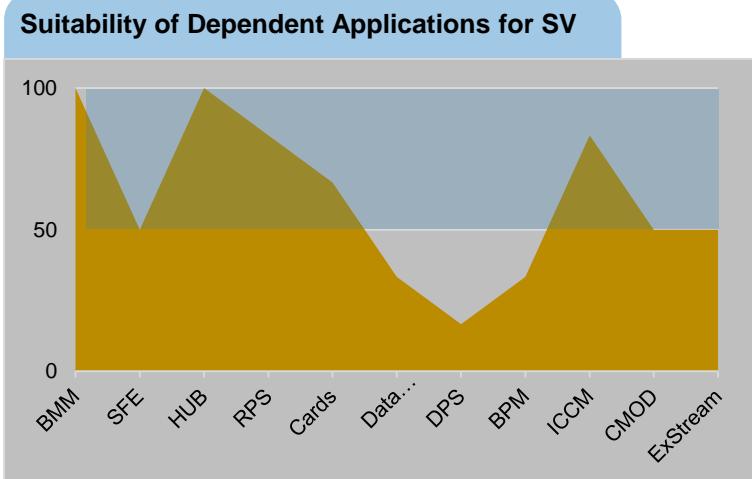
Test Data Confidentiality



Suitability Criteria Per Service Line



# Analysis on Suitability of Dependent Applications for Service Virtualisation Per Service Line & Applications

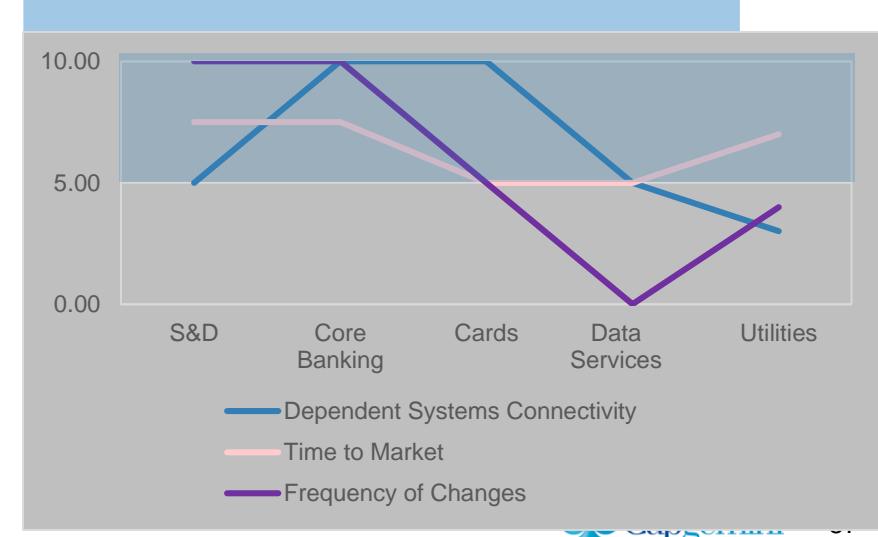


For BMM, SFE, HUB, RPS, Cards, BPM & ICCM the dependency on downstream application is high and the downstream applications have very high requirement for SV

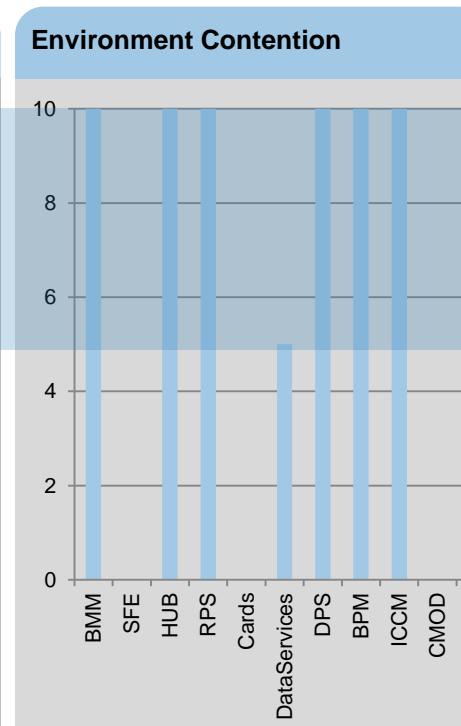
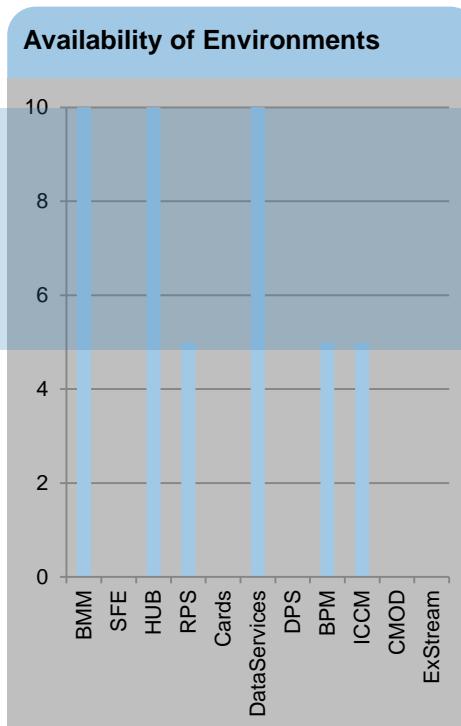
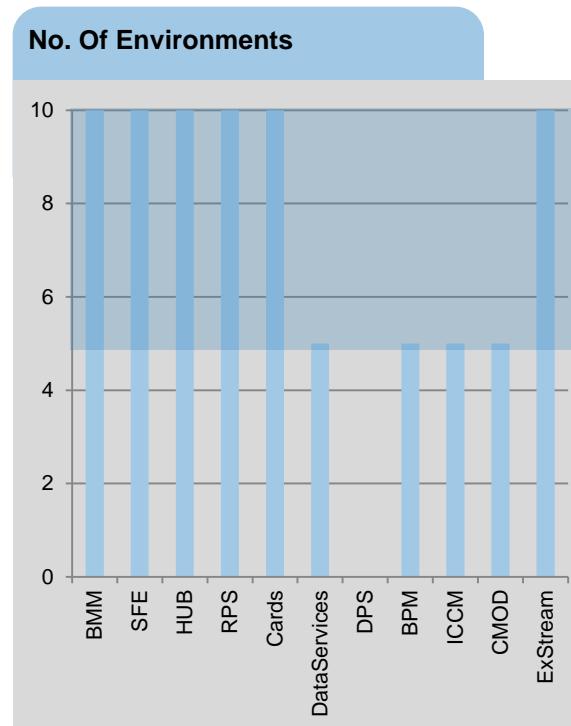
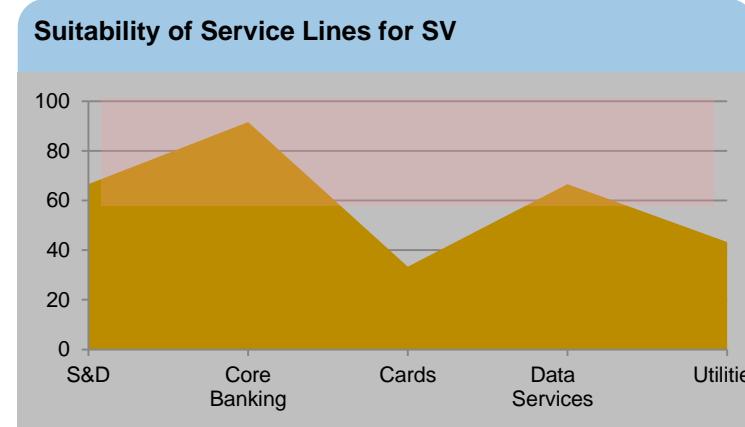
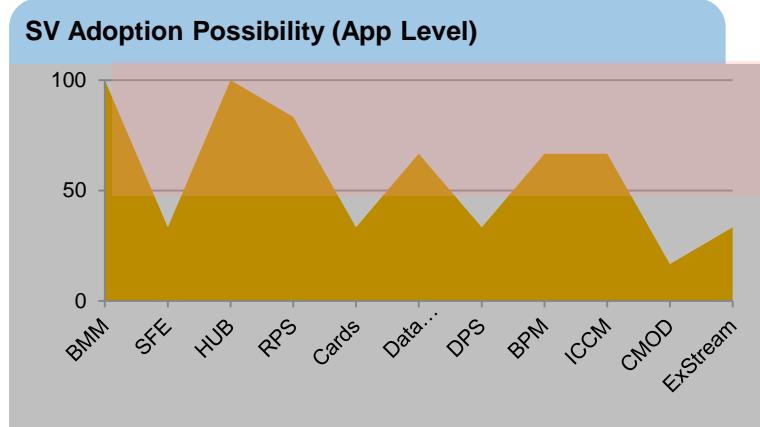
Time to Market & Dependency on downstream applications are the key considerations that ADM applications have to adopt Service Virtualisation.

Considering the aspects related to change, time to market and downstream system connectivity requirements, S&D and Core Banking has the maximum requirement for SV while Cards and Utilities are borderline.

## Suitability Criteria Per Service Line



# Analysis on Environment Constraints for Service Virtualisation Per Service Line & Applications

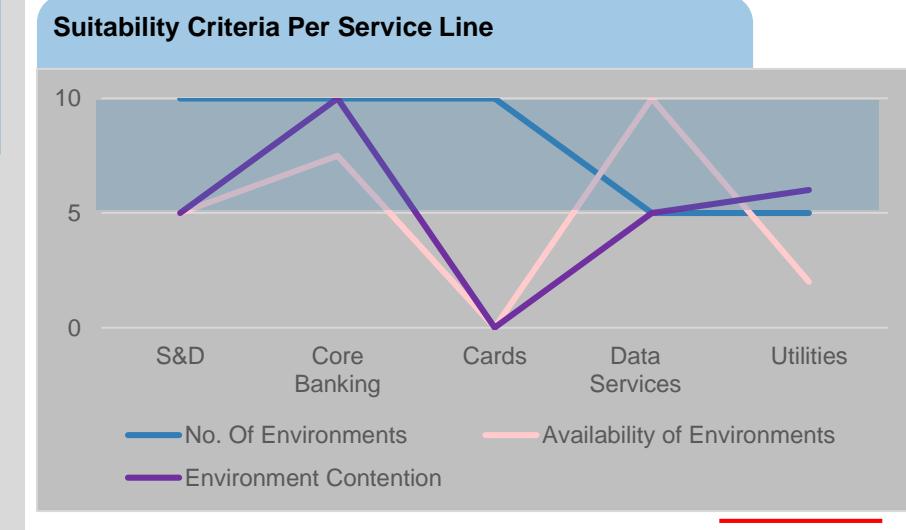


**BMM, HUB, RPS, BPM & ICCM are the key applications where SV can be adopted.**

**S&D, Core Banking and Data Services will require SV adoption as the need for SV from an environments perspective is high**

**CARDS & Utilities has the least requirement for SV from an environments perspective.**

**Environment Contention, & Environment Availability are the key areas that drive the requirement for SV in ADM**



# Requirements, Dependencies & Constraints for Implementation

## Process & People Needs

### Requirements

1. Access to knowledgeable SME's who understand applications and dependent systems.
2. Streamlined processes that enable swift insertion of SV.
3. Structured engagement to enable early scoping & analysis of project needs.
4. Alignment of Test approaches to include SV as a strategic element for testing

### Dependencies

1. Resources & legacy application teams able to devote time to discovery and learning SV solution first hand.
2. Speedy responses from resources when supporting debugging of application issues. Both SV and non SV related.
3. Support from TEM and SME's from existing test environments to record & create a virtual environments
4. Support from delivery leaders to pass on our success stories to other projects/releases for engaging service virtualization

### Constraints

1. People access has always been a constraint for the SV projects.

## Virtualization Needs

### Requirements

1. Alignment with project plans.
2. Integration with project teams (Stand-ups, Scrums etc).
3. In depth application knowledge and informed documentation from MCT/Legacy SME's.
4. Understanding of message protocols.
5. Access to development architects for overall architecture understanding
6. Infrastructure Architecture diagrams

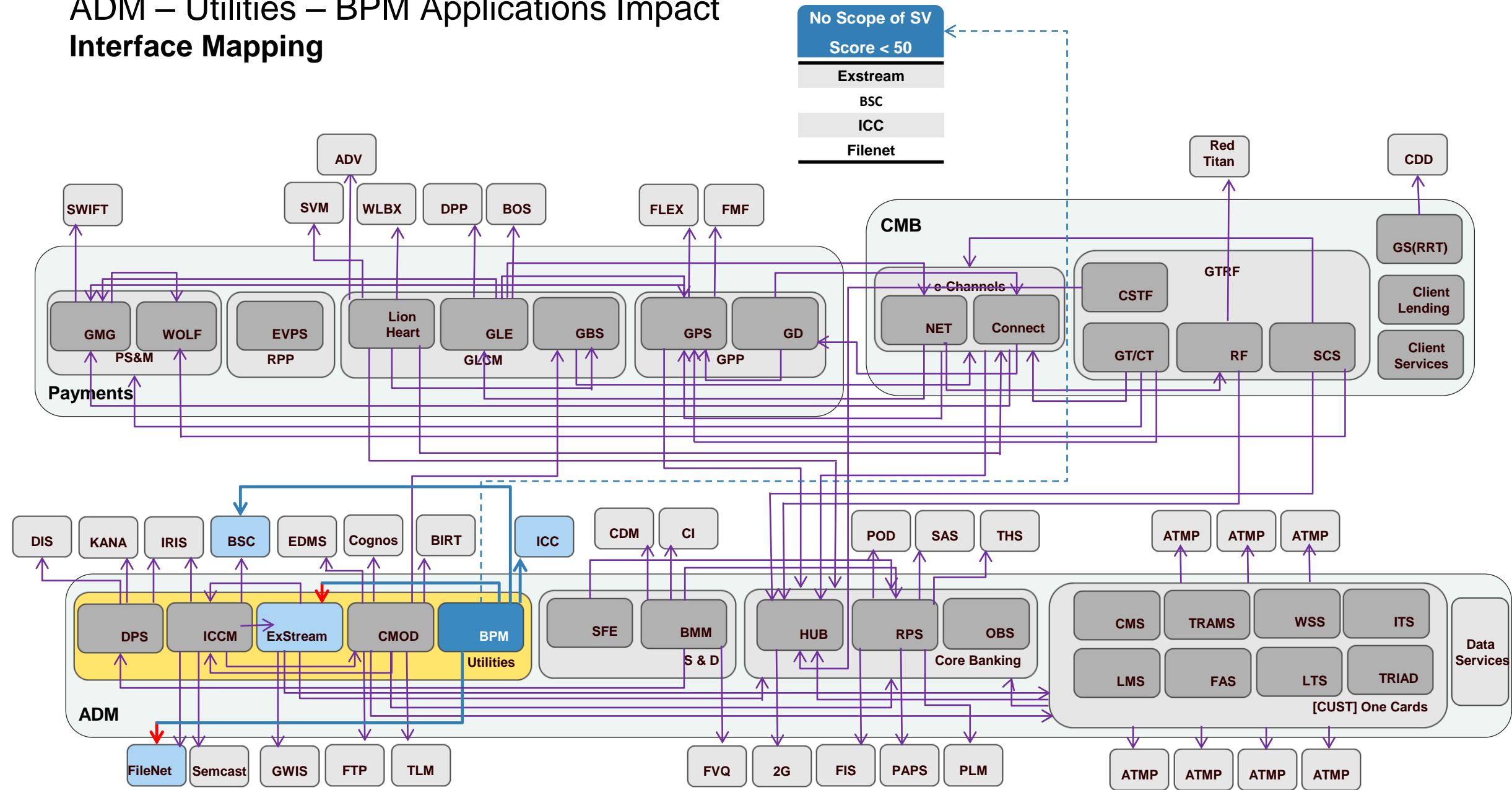
### Dependencies

1. Resources who can execute test cases for recordings & defined windows when this can happen.
2. Correct WSDL's, Service Design Documents, Integration Contracts and R/R pairs.
3. Clear direction from projects on test data needs.
4. Historical release date & capacity to sign-off SV benefits.

### Constraints

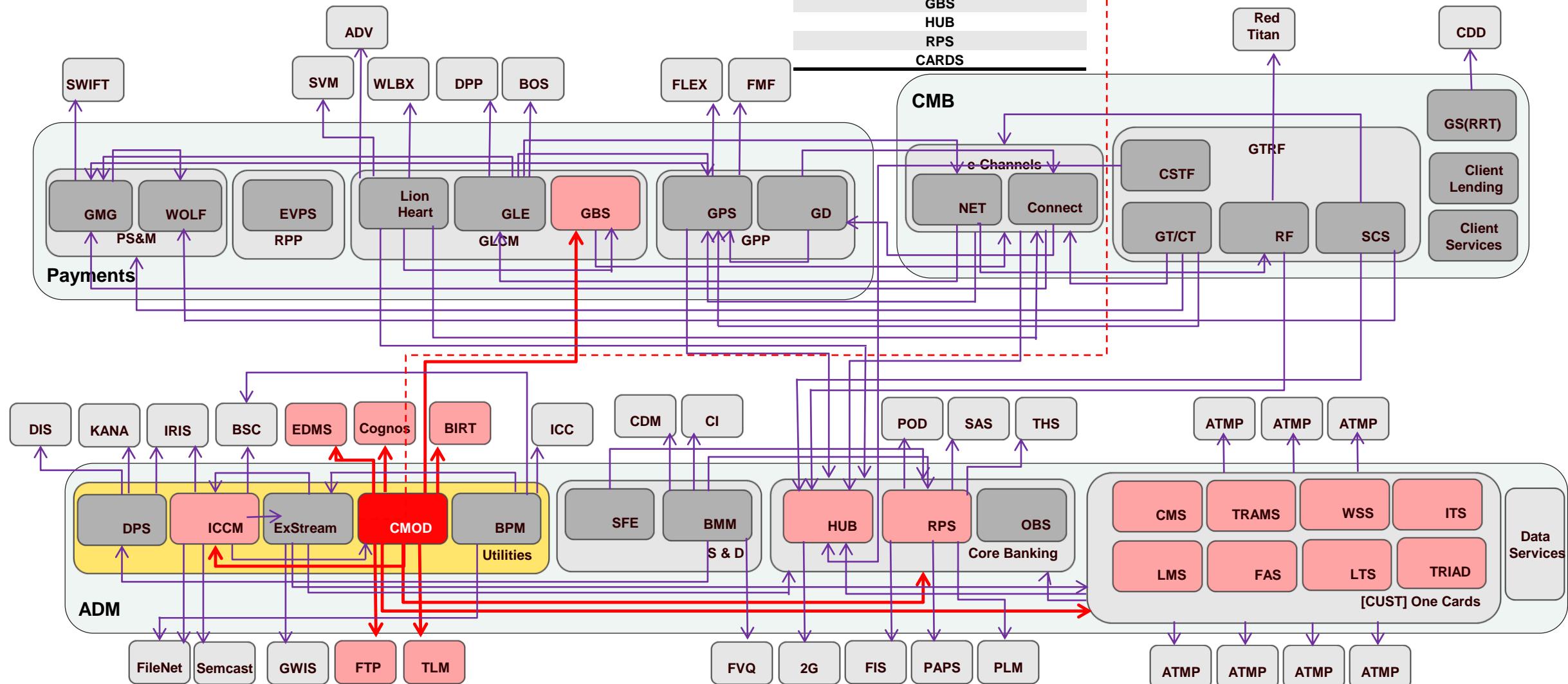
1. People access.
2. Time it takes to understand SUT.
3. SV Team could become a bottleneck, if MCT/Legacy resources do not wish to learn the toolset.

# ADM – Utilities – BPM Applications Impact Interface Mapping

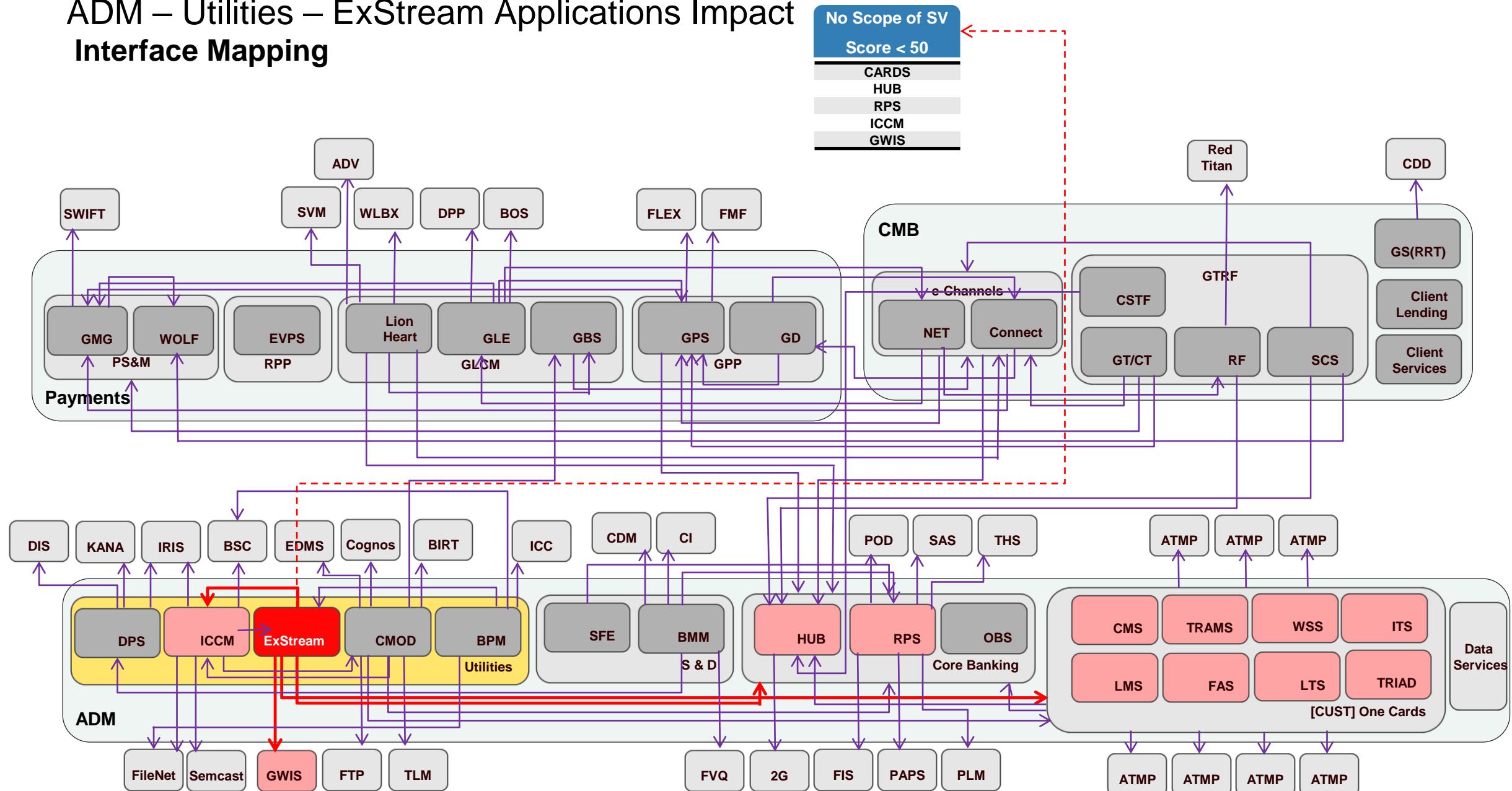


# ADM – Utilities – CMOD Applications Impact Interface Mapping

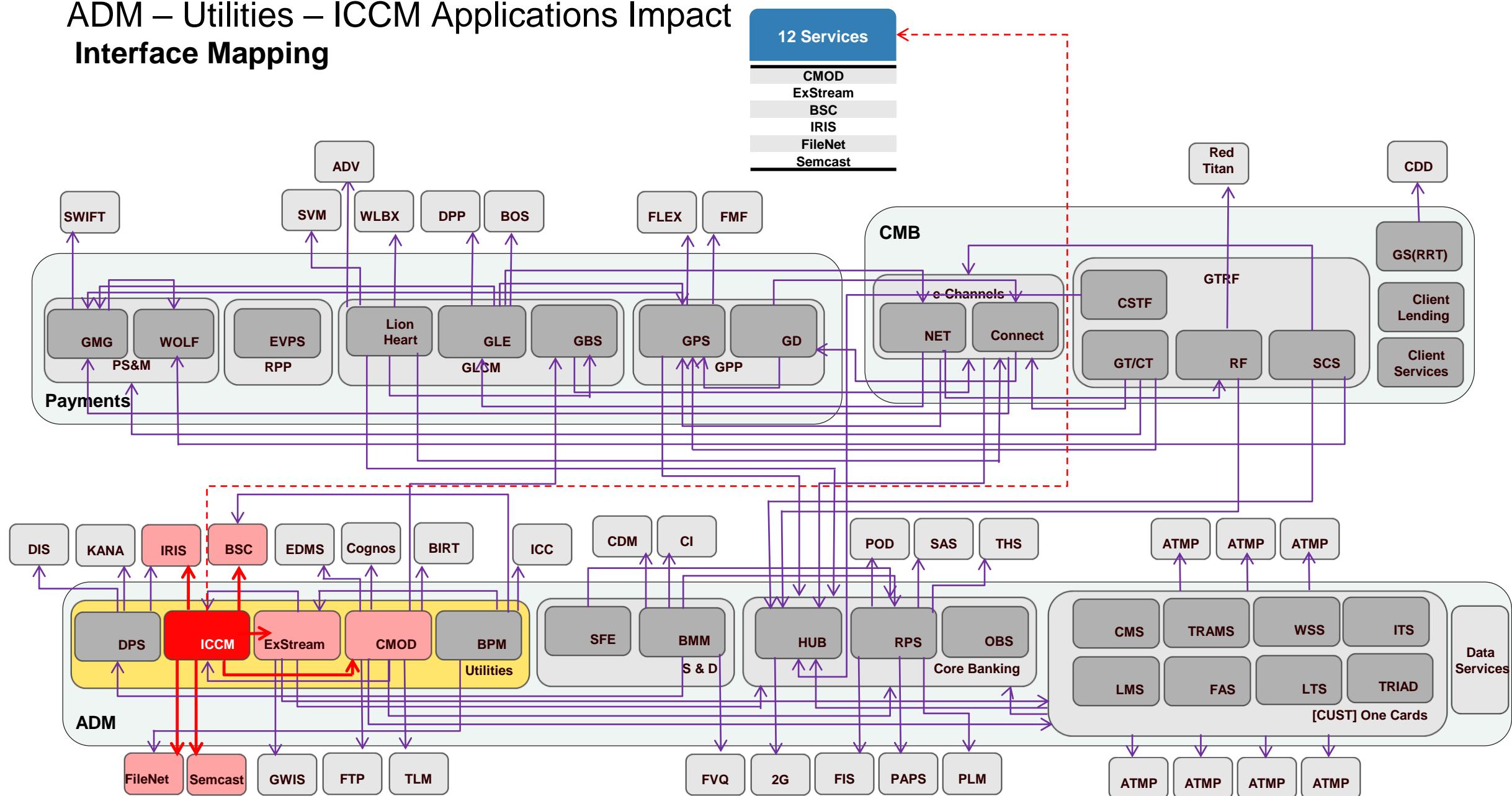
No Scope of SV Score < 50
BIRT
Cognos
EDMS
ICCM
FTP
TLM
GBS
HUB
RPS
CARDS



# ADM – Utilities – ExStream Applications Impact Interface Mapping

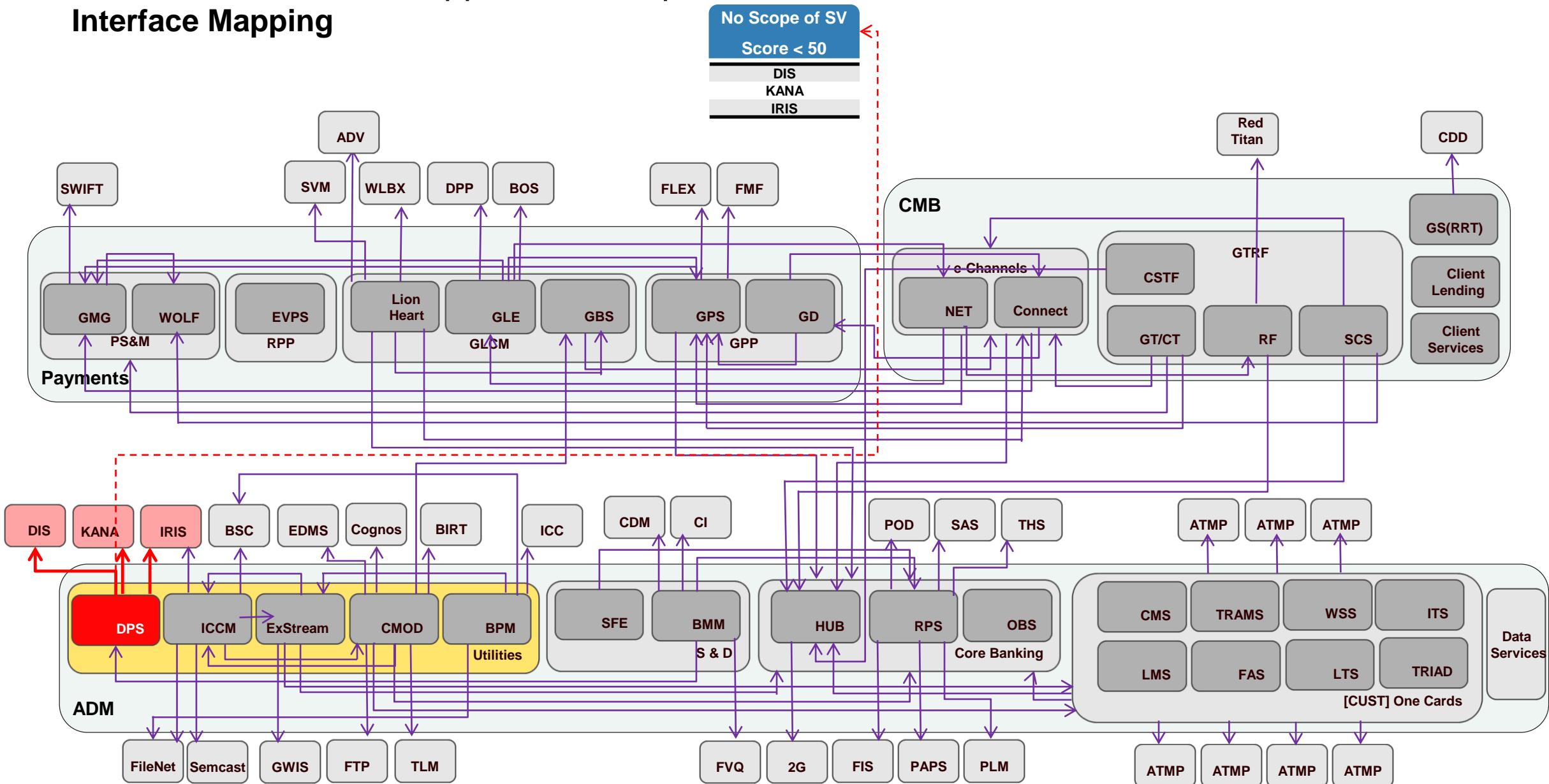


# ADM – Utilities – ICCM Applications Impact Interface Mapping

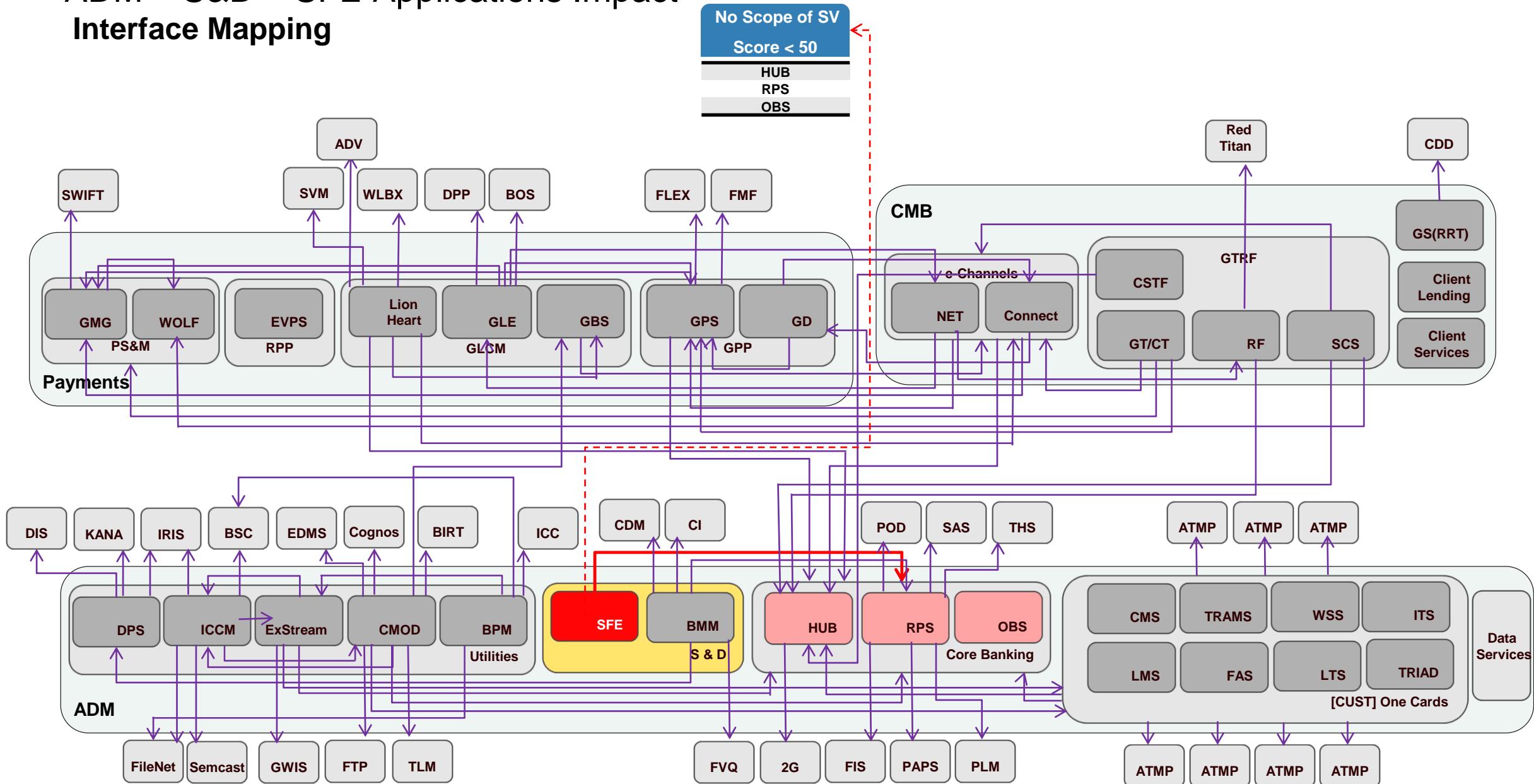


# ADM – Utilities – DPS Applications Impact

## Interface Mapping

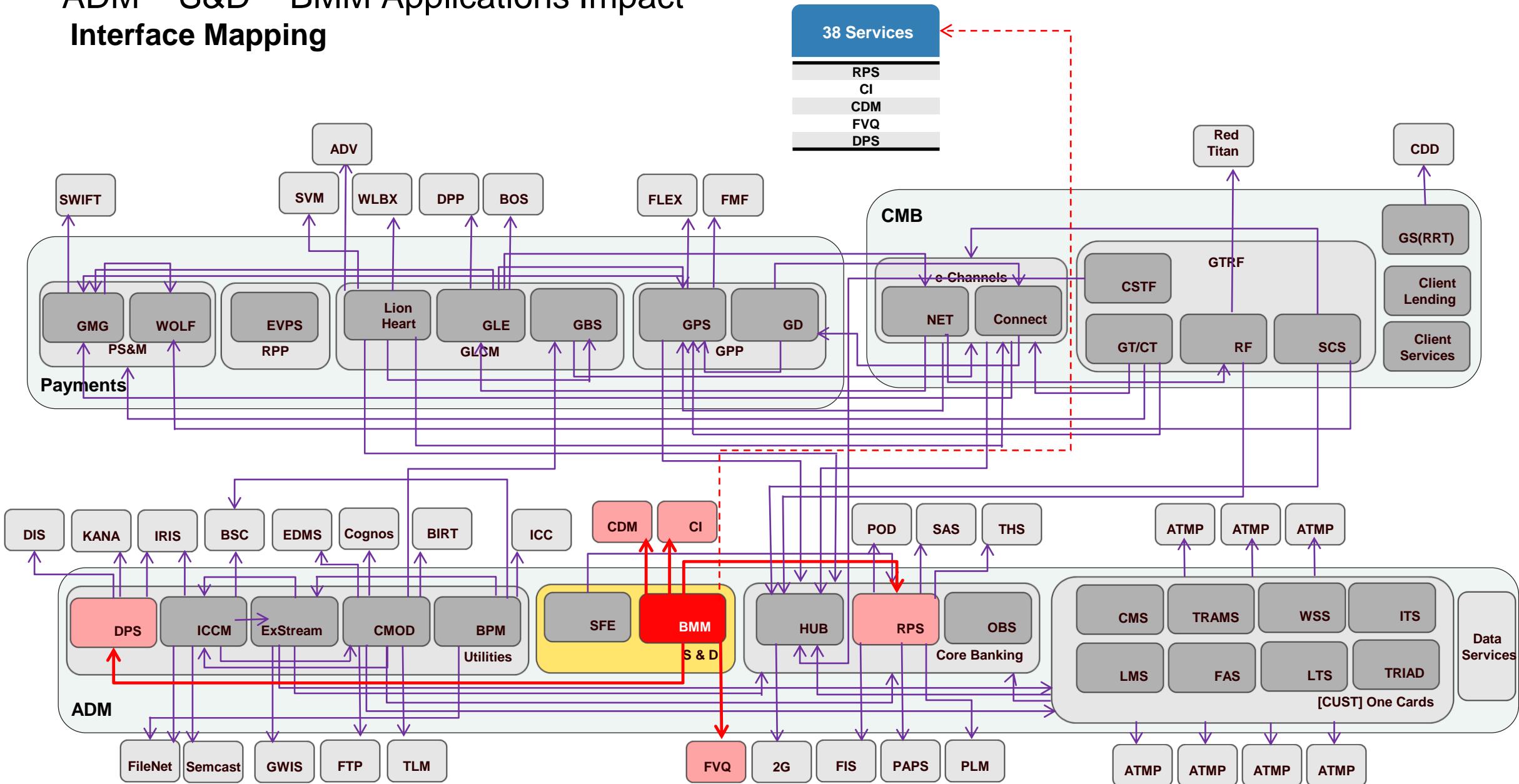


# ADM – S&D – SFE Applications Impact Interface Mapping



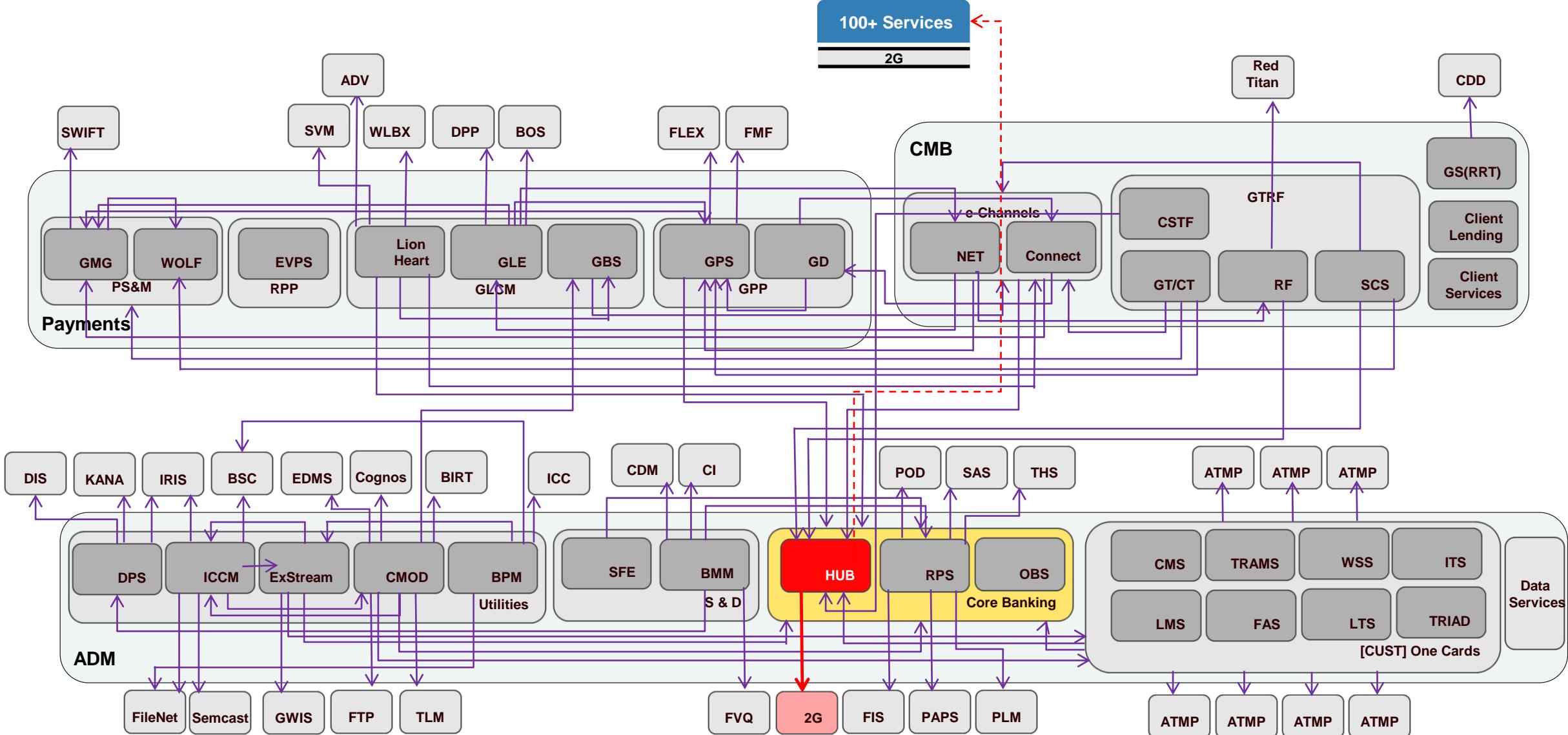
# ADM – S&D – BMM Applications Impact

## Interface Mapping



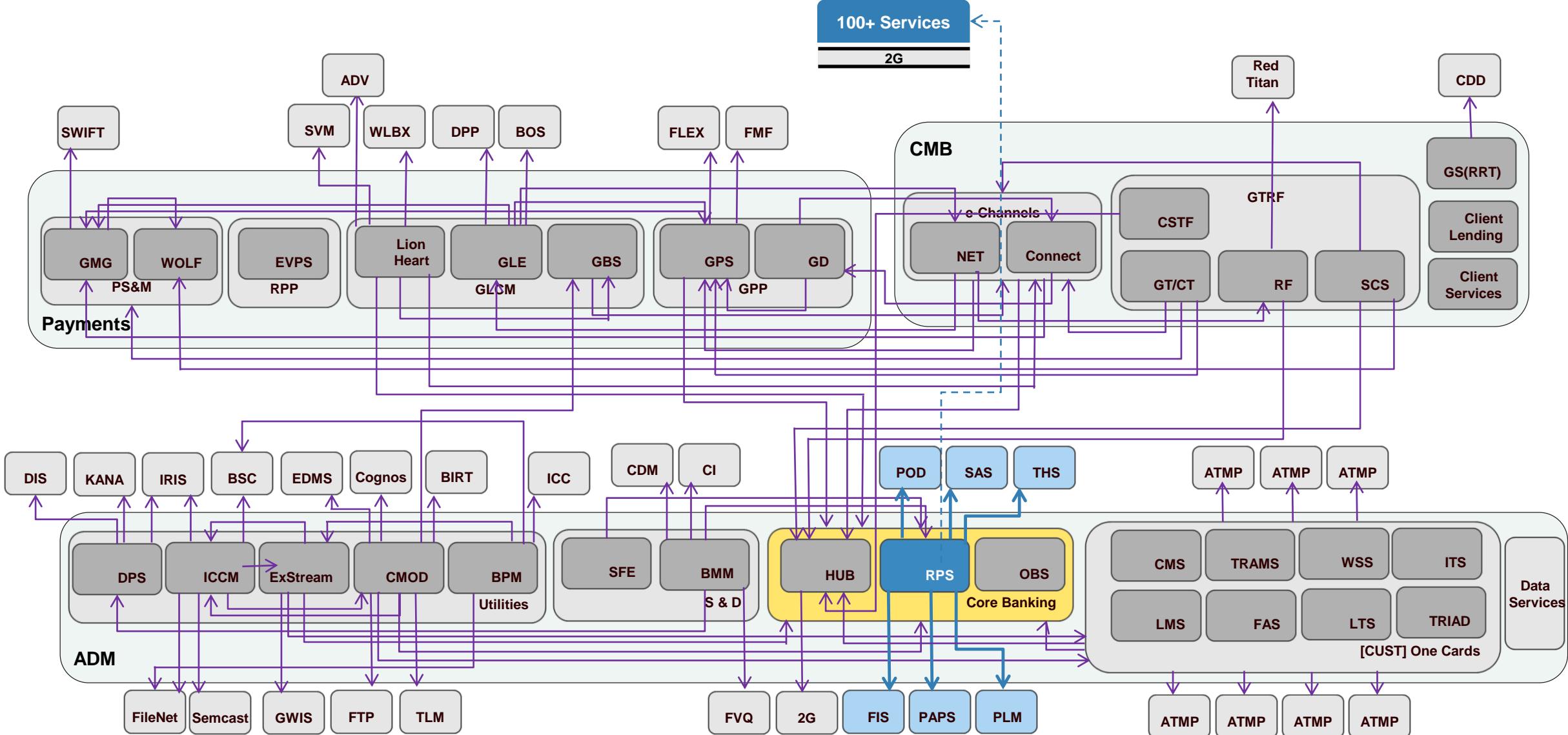
# ADM – Core Banking – HUB Applications Impact

## Interface Mapping

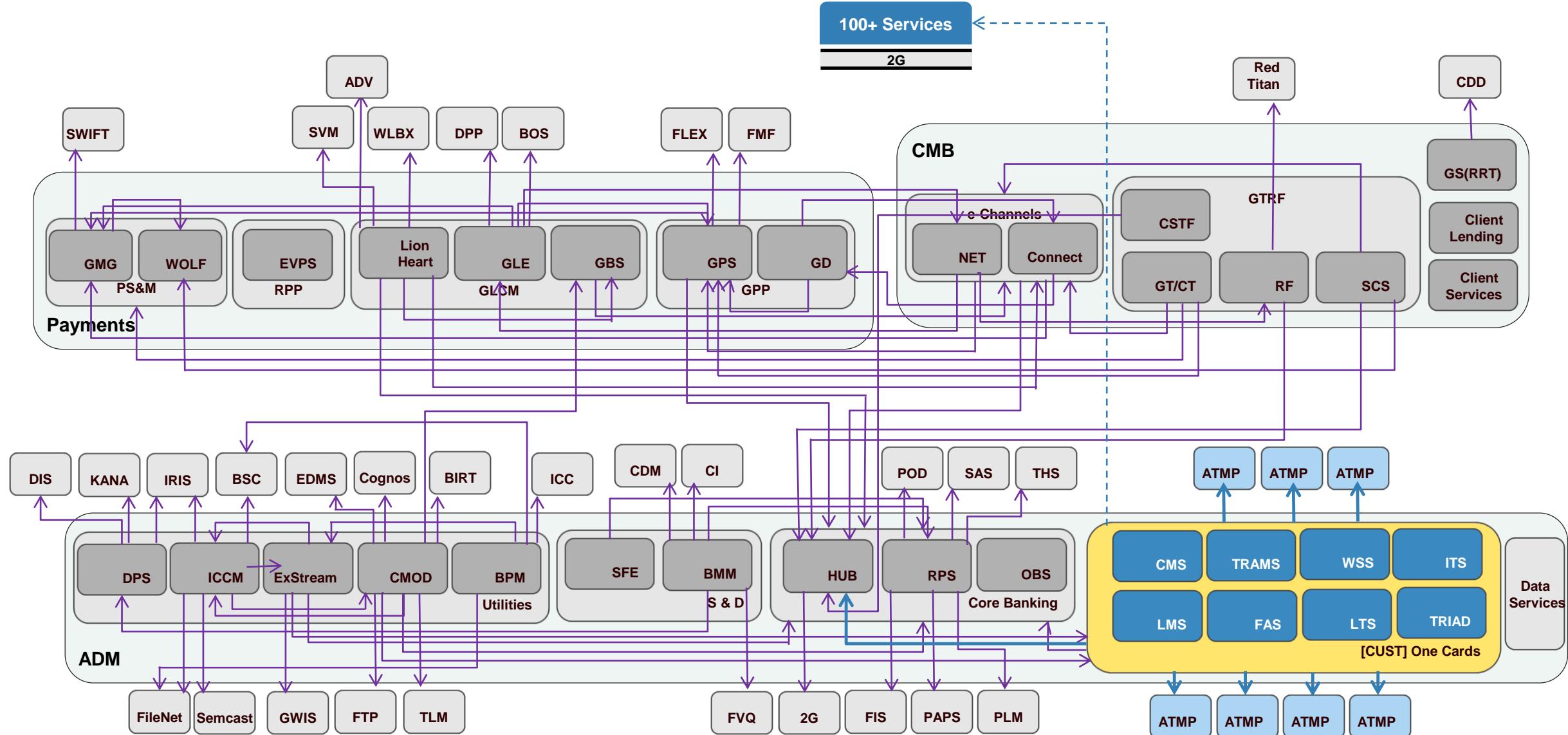


# ADM – Core Banking – RPS Applications Impact

## Interface Mapping



# ADM – CARDS – [CUST] One Cards Applications Impact Interface Mapping

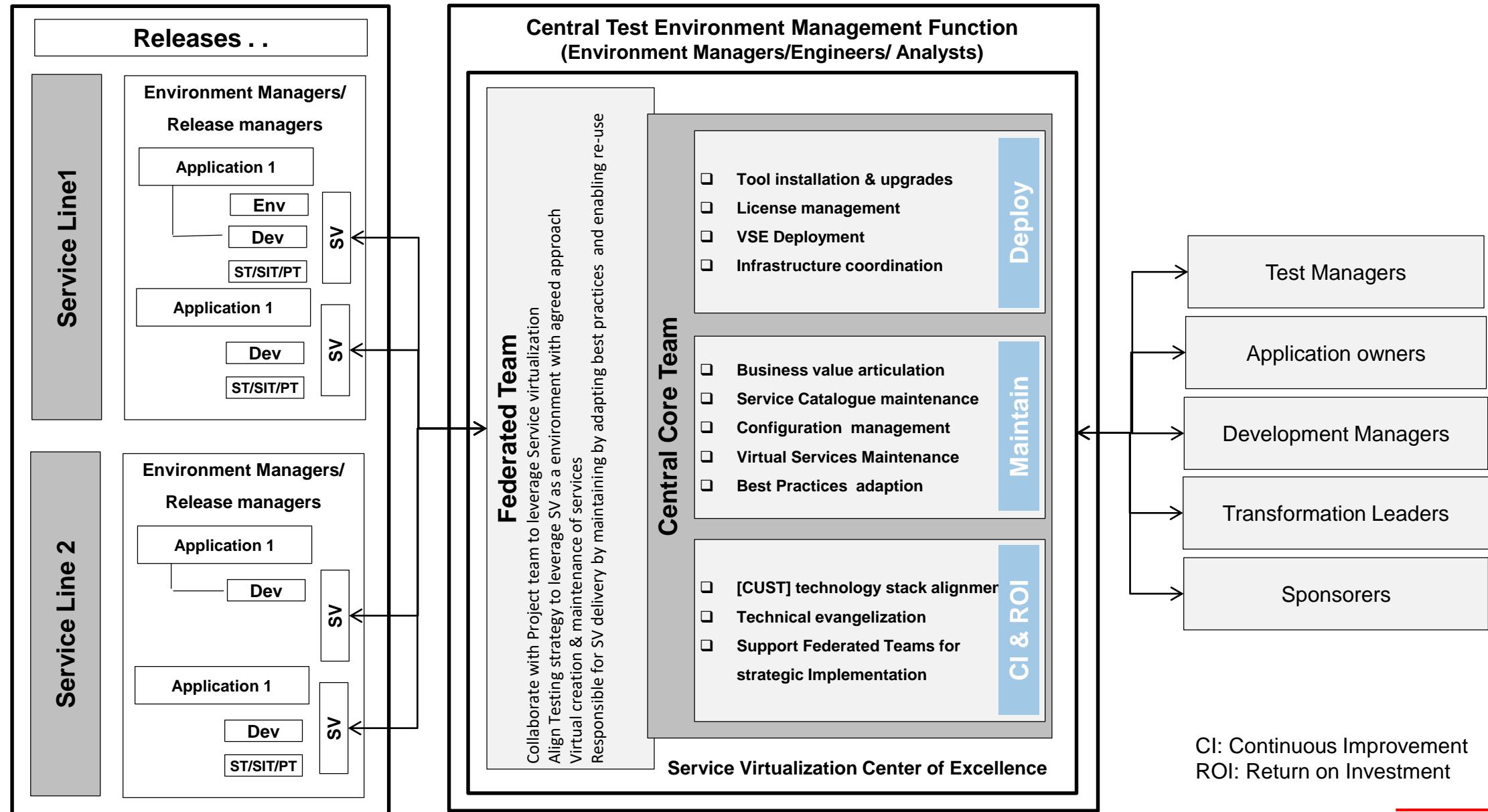


# Target Operating Model & High Level Implementation Plan



**People matter, results count.**

# Proposed Target Operating Model

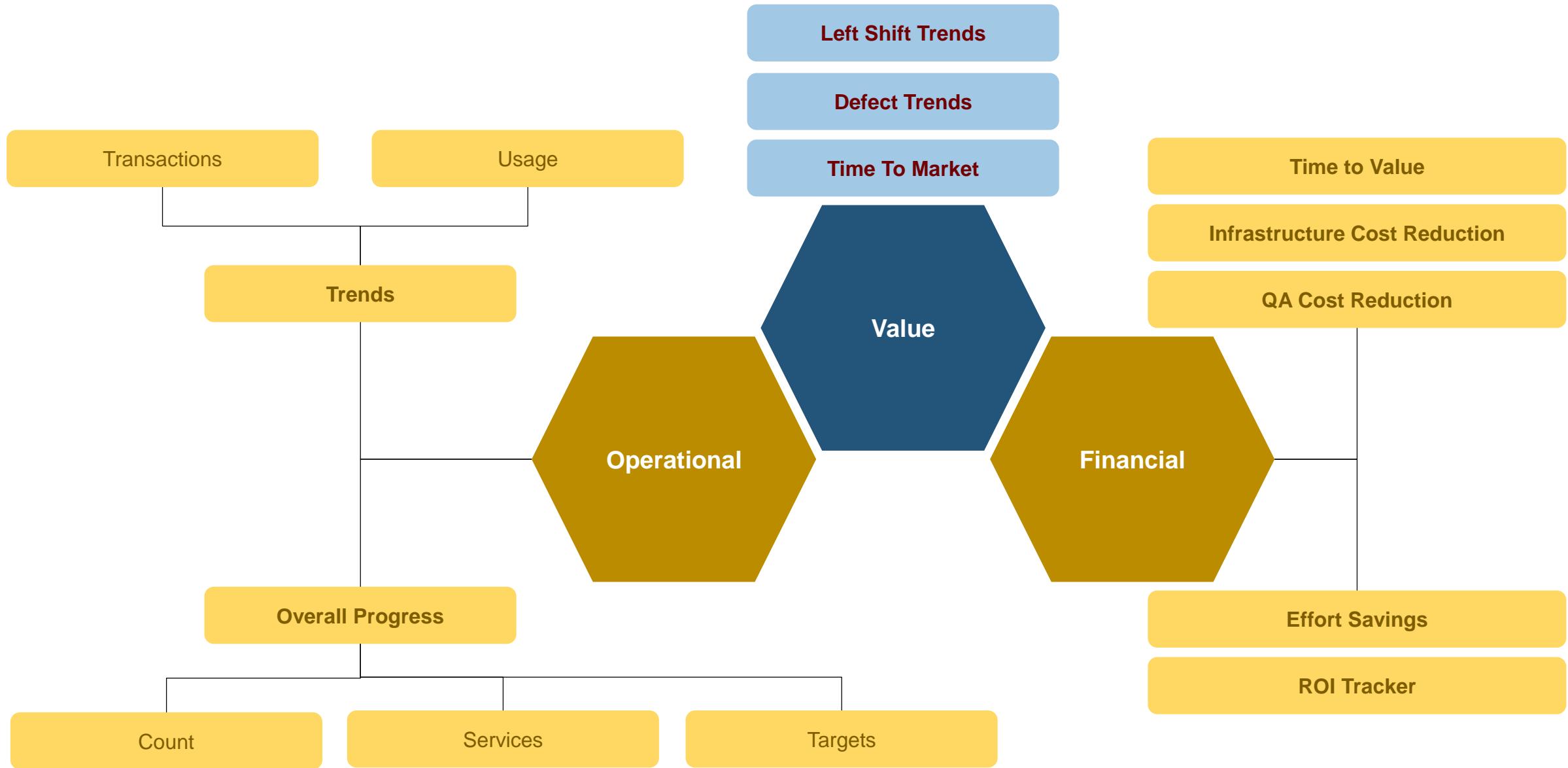


# Implementation Plan

	Pre-Planning				Pilot1				Wave 1				Wave2				Wave3				Wave4				Wave5																											
	Implementation Planning				Pilot1				April				May				June				July				August																											
	W1	W2	W3	W4	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14	W15	W16	W17	W18	W19	W20	W21	W22	W23	W24	W25	W26																						
	March – April				April - May				May-June				June - July				July - August				August - Sept				Sept - October																											
<b>Pre-Engagement</b>																																																				
Mobilize resources																																																				
Internal review of engagement with application/project teams																																																				
<b>Plan and Prepare</b>																																																				
Project Kickoff																																																				
Verify access to [CUST]-Application and LISA Environment																																																				
Review project charter																																																				
Build detailed project plan																																																				
<b>Pilot Phase</b>																																																				
<b>Requirement Review &amp; Design-Pilot Phase</b>																																																				
Collect request response and test Scenarios																																																				
Develop design/custom solution specification																																																				
Baseline metric gathering																																																				
<b>Build &amp; Configure Pilot Service from each of 15 services</b>																																																				
Build virtual services																																																				
Functional Validation of the Services																																																				
<b>SV Rollout Phase</b>																																																				
<b>Requirement Review &amp; Design-Detailed Rollout Phase</b>																																																				
Collect request response and test scenarios																																																				
Develop design/custom solution specification																																																				
Baseline metric gathering																																																				
<b>Build &amp; Configure</b>																																																				
Build virtual services																																																				
Functional Validation of the Services																																																				
<b>Continuous Integration</b>																																																				
<b>Final Review and Sign off</b>																																																				
Review call with the Application stakeholder																																																				
Align the Virtual services with planned/scheduled release plan																																																				
Mentoring/Knowledge transfer																																																				
Measure metrics against original baseline																																																				
Identify future expansion of the solution																																																				
Maintenance and Health checkup of the Virtual Services																																																				

This is an overall Plan.  
Based on the Implementation Planning & Pilot, ADM related services will be slotted for implementation

# Service Virtualisation - Proposed Metrics



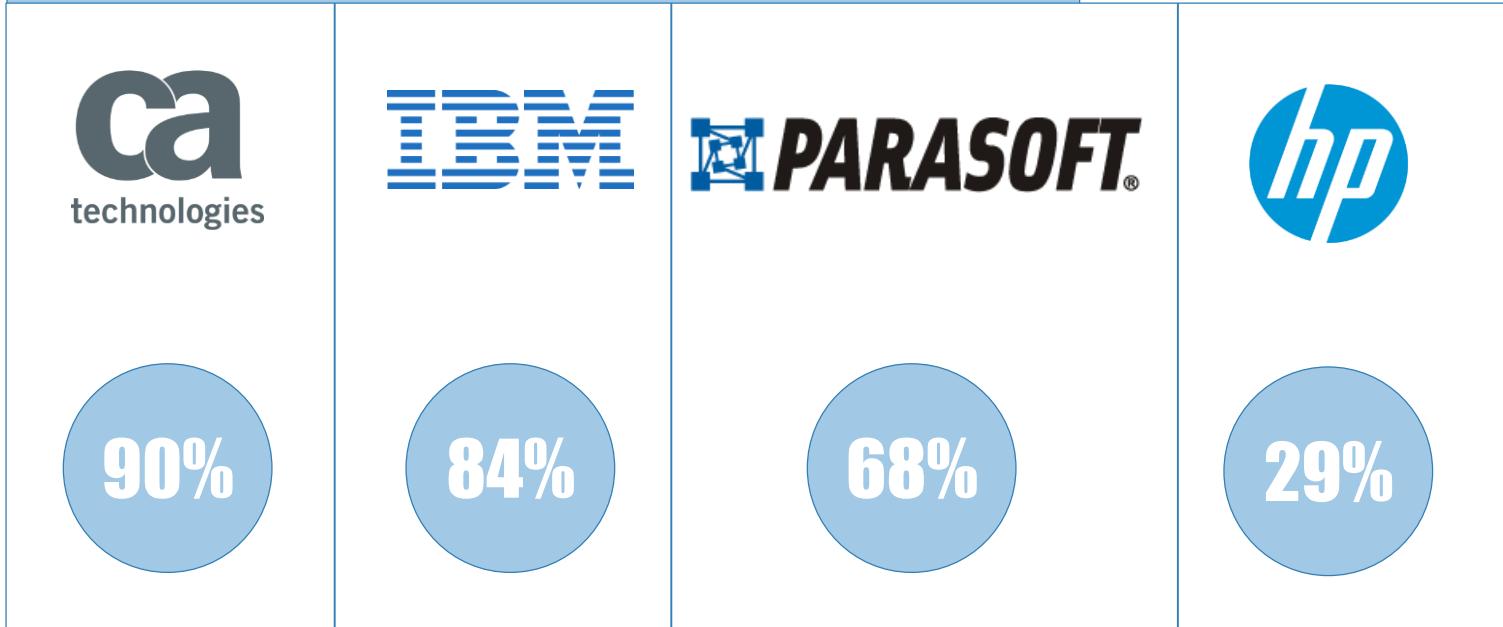
# Service Virtualisation Tool Comparison Case Study



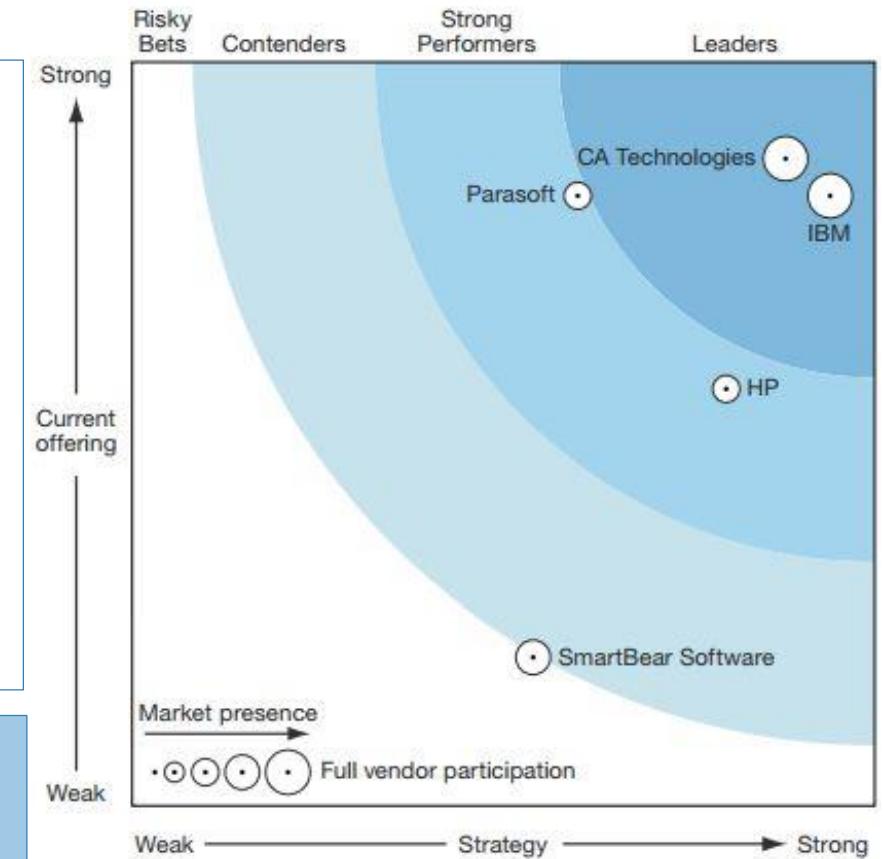
People matter, results count.

# [CUST] Service Virtualization Tools Comparison Summary

## Overall Alignment to [CUST] Technology Stack



Capgemini recommends “CA Service Virtualisation”  
to address the SV requirements at [CUST]



# [CUST] Technology Stack – Service Virtualization Tools Comparison

	[CUST] Technology Stack	Option 1 CA DevTest	Option 2 IBM RIT/RTVS	Option 3 Parasoft SV	Option 4 HPSV
Web Services	SOAP / HTTP(S)	Most Preferred	Most Preferred	Most Preferred	Less Preferred
	REST	Most Preferred	Most Preferred	Most Preferred	Less Preferred
	WSDL	Most Preferred	Most Preferred	Most Preferred	Less Preferred
	WADL	Most Preferred	Most Preferred	Most Preferred	Less Preferred
	RAML	Most Preferred	Most Preferred	Most Preferred	Less Preferred
JDBC Virtualization Enhancements	MY SQL	Most Preferred	Most Preferred	Most Preferred	Most Preferred
	ORACLE	Most Preferred	Most Preferred	Most Preferred	Most Preferred
	DB2	Most Preferred	Most Preferred	Most Preferred	Most Preferred
	MS SQL Server	Most Preferred	Most Preferred	Most Preferred	Most Preferred
Data Desensitization	SWIFT	Less Preferred	Most Preferred	Less Preferred	Not Preferred
	SAP	Most Preferred	Most Preferred	Less Preferred	Less Preferred
	Data Desensitization	Most Preferred	Less Preferred	Most Preferred	Not Preferred

## Legend

Not Preferred	The tool has no support or little usable capability for the functionality(s) mentioned
Less Preferred	The tool has limited support and capability for the functionality(s) mentioned
Most Preferred	The tool has good support and capability for the functionality(s) mentioned

# [CUST] Technology Stack – Service Virtualization Tools Comparison

[CUST] Technology Stack	Option 1 CA DevTest	Option 2 IBM RIT/RTVS	Option3 Parasoft SV	Option 4 HPSV
SOA & ESB Support	IBM WMB / IB	Most Preferred	Most Preferred	Most Preferred
	TIBCO Active Matrix	Most Preferred	Most Preferred	Less Preferred
	IBM Mainframe (z/OS)	Most Preferred	Most Preferred	Less Preferred
Application Servers	WAS	Most Preferred	Most Preferred	Most Preferred
	DOT NET	Most Preferred	Most Preferred	Most Preferred
	IIS	Most Preferred	Most Preferred	Most Preferred
JMS Providers	WAS MQ	Most Preferred	Less Preferred	Less Preferred
	ORACLE Advanced Queue	Most Preferred	Less Preferred	Less Preferred
	TIBCO EMS	Most Preferred	Less Preferred	Less Preferred
Mainframe	MQ	Most Preferred	Most Preferred	Less Preferred
	CICS	Most Preferred	Most Preferred	Less Preferred

## Legend

Not Preferred	The tool has no support or little usable capability for the functionality(s) mentioned
Less Preferred	The tool has limited support and capability for the functionality(s) mentioned
Most Preferred	The tool has good support and capability for the functionality(s) mentioned

# [CUST] Technology Stack – Service Virtualization Tools Comparison

[CUST] Technology Stack	Option 1 CA DevTest	Option 2 IBM RIT/RTVS	Option 3 Parasoft SV	Option 4 HPSV
Integration Capabilities	ALM	Most Preferred	Most Preferred	Most Preferred
	IDE	Less Preferred	Most Preferred	Not Preferred
	Code Repositories	Most Preferred	Most Preferred	Most Preferred
	Release Automation	Most Preferred	Most Preferred	Most Preferred
Peripheral Capabilities	Ability to access via Citrix	Not Preferred	Not Preferred	Not Preferred
	Integration with DevOps tools	Most Preferred	Most Preferred	Less Preferred
	Integration with testing tools	Most Preferred	Most Preferred	Most Preferred
	Global Presence	Most Preferred	Most Preferred	Not Preferred

## Legend

Not Preferred	The tool has no support or little usable capability for the functionality(s) mentioned
Less Preferred	The tool has limited support and capability for the functionality(s) mentioned
Most Preferred	The tool has good support and capability for the functionality(s) mentioned



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