

Schlage Infrastructure Outsourcing V2

Request for Proposal (“RFP”)

02 Schlage – Solution Document

Use this document to provide details of the solution being proposed by the SUPPLIER, including relevant staffing models, service delivery locations and any other material that will explain the proposed solution.

As part of the RFP response, the Service Provider should include details of the Proposed Solution. This should include relevant architecture diagrams, proposed hardware and software, service delivery locations and any other material that will explain the Proposed Solution. The Proposed Solution should be consistent with the Service Provider's response to the detailed requirements.

1. Executive Summary

2. Service Desk

3. US and European Based Hosting Centers

3.1 Introduction

Schlage currently leverages a service provider for a number of Infrastructure services, with an agreement that is up for renewal at the end of October 2019. Schlage would like to move all their existing workloads from existing DC and DR site to new service providers (TCS) DC and DR at USA, UK and Australia. Apart from migration services, Schlage is expecting new service provider to provide the operational services for 3+2 years. TCS is happy to consider this opportunity. As part of this RFP, TCS will provide the Hosting services, Migration services and Operations services and are detailed below.

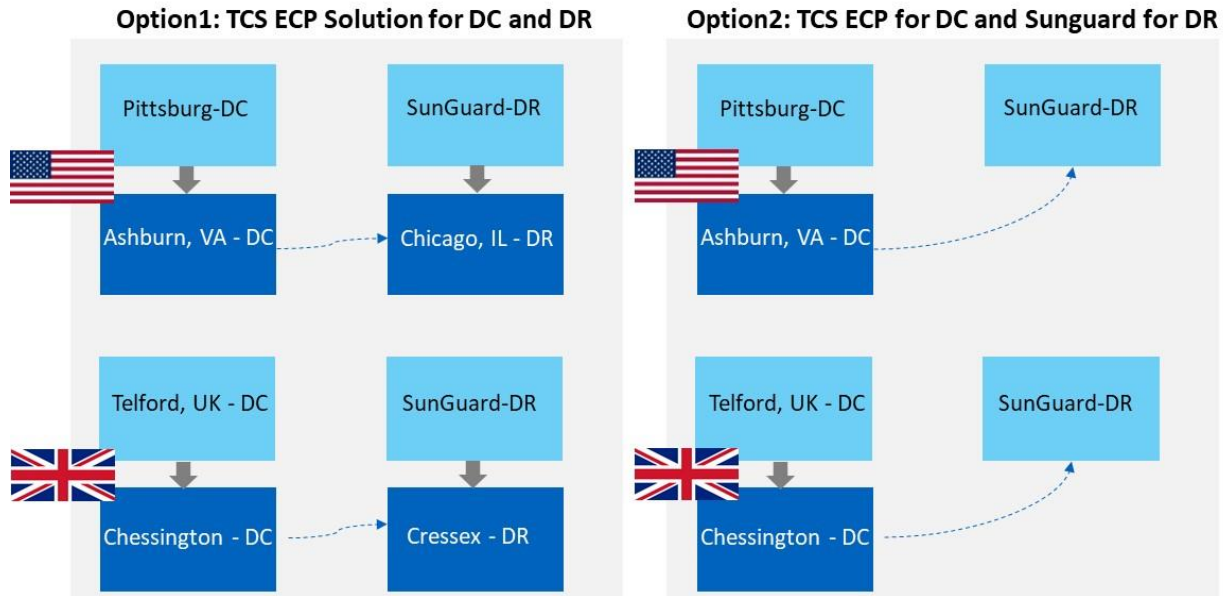
TCS proposed DC hosting solution with two options.

Option 1: TCS has provided TCS Enterprise Cloud for Primary and Secondary data centers as part of solution. TCS has included the Technical solution and commercial for this solution. Below are the solution components

- Considered Schlage provided DC and DR volumes to size the solution.
- DC to DR replication will be done using DB level replication (License provided by Schlage), VM level replication (vSRM) and Storage level replication
- Lift and shift Schlage DC and DR legacy systems (AS 400, AIX and HP_UX) to TCS DC and DR sites
- Considered monitor, operate and management of DC and DR site IT Landscape
- Provided the Pricing for DC and DR volumes as per Schlage Pricing format.

Option 2: TCS has provided TCS Enterprise Cloud for Primary data center only and make use of existing Sungaurd DR as Secondary data center by contract novation. Below are the solution components

- Considered Schlage provided DC volumes only to size the solution.
- DC to DR replication will be done using DB level replication (License provided by Schlage) and VM level replication (vSRM – only if DR site virtualization is VMware based)
- Lift and shift Schlage DC legacy systems (AS 400, AIX and HP_UX) to TCS DC sites
- Considered monitor, operate and management of DC site IT Landscape
- Provided the Pricing for DC volume as per Schlage Pricing format.



3.2 TCS Infrastructure Services and TCS Cloud capability

With 50+ years of experience in IT consulting services, TCS has capabilities in providing the Infrastructure services for the past 25 years and Cloud services for the past 8 years. Business 4.0™ provides the thought leadership framework that can help Schlage to tap the unprecedented opportunities presented by digital, with the help of Agile, Automated and Artificial Intelligent (AI) solution hosted on TCS Enterprise Cloud.

3.2.1 TCS Infrastructure Services and Cloud Capability

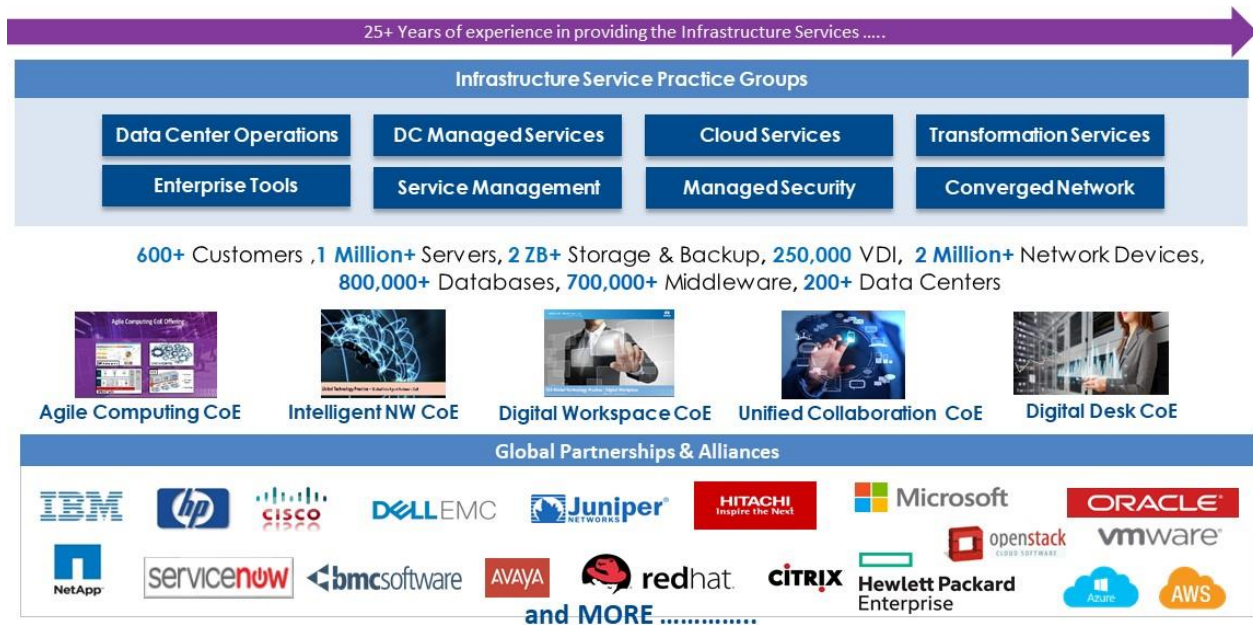
Tata Consultancy Services (TCS) helps to build and manage a highly available, reliable IT infrastructure that meets your dynamic business needs. Our IT Infrastructure Services leverage our expertise in new generation transformation models such as Hybrid Cloud's IaaS, PaaS, and SaaS, to transform your IT landscape and provide you with effective infrastructure management solutions.

Our comprehensive IS offerings are based on the 'Advisory, Assess, Build, Manage, and Transform' framework backed by our partner eco-system and analytics-led approach, we determine the 'as-is' and 'to-be' state, enabling you to seamlessly shift from traditional infrastructure outsourcing to new generation delivery models. With our offerings, you benefit from emerging services such as desktop virtualization, Data centre consolidation, green Data centre, environment-on-demand, utilization of remote infrastructure management, and global delivery models.

Our solutions adhere to consistent delivery standards across the globe. Our services are delivered through the TCS Global Network Delivery Model™ (GNDM™) and Machine First Delivery Model (MFDM™) consistently and seamlessly across offshore, near-shore, and onshore locations. We help you exceed customer service level agreements (SLAs)

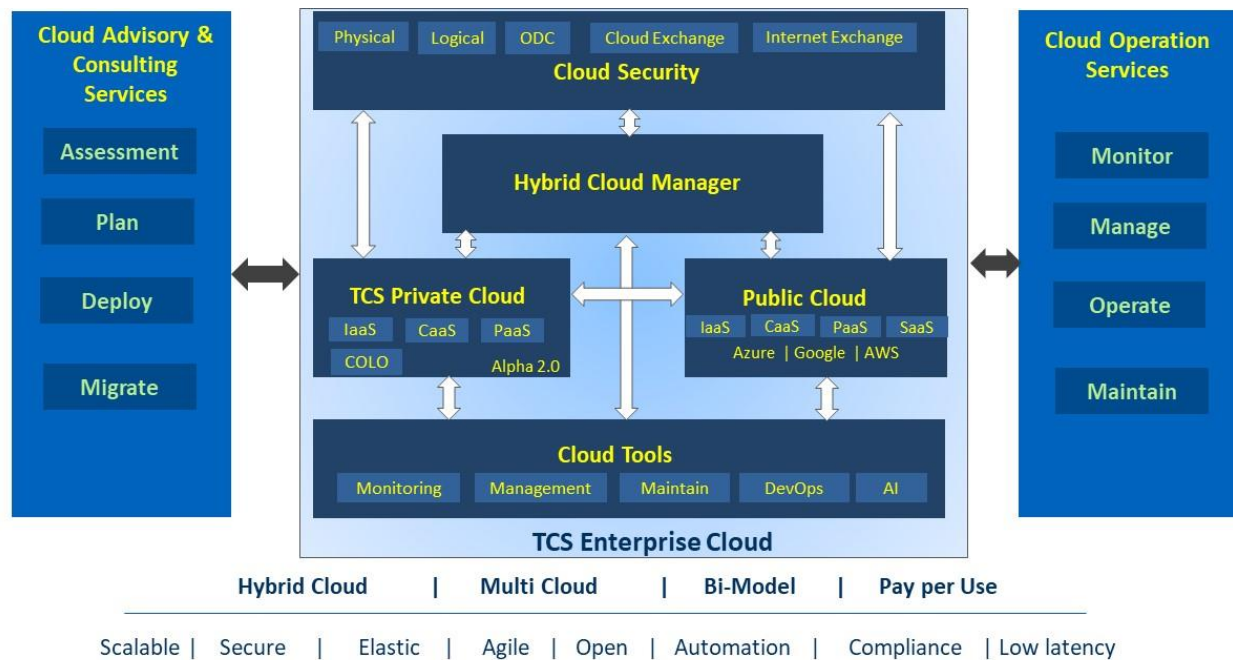
by adopting ITIL industry standards and Remote Infrastructure Management (RIM), with our round-the clock, multilingual services.

Our process excellence team drives innovation and continuous service improvement, leveraging systematic improvement plans and Lean Six Sigma initiatives to reduce incidents and problems. With our standardized global delivery processes, you accelerate implementation time, realize quicker return on investments (ROI), and achieve business goals.



3.2.2 TCS Enterprise Cloud Capability

TCS Enterprise Cloud support customer in digital transformation by providing end to end cloud services. It provides “Cloud Advisory and Consulting Services”, “Hybrid Cloud Services” and “Cloud Operations Services”.



TCS Cloud Advisory and Consulting service will help customer in taking digital transformation journey. It helps customer in qualifying their existing workload for cloud, assess and analyzing the possible risk and finding the mitigations. This services will also help customer in selecting the workload migration tools, migration strategy, planning the migration and executing the migration tasks. Below are the TCS Cloud Advisory and Consulting Services.

- ✓ Workload assessment and analysis to identify the cloud readiness.
- ✓ Cloud planning and build services
- ✓ Workload migration and test services

TCS strongly positions Enterprise Cloud Platform as reliable Hybrid cloud platform to run the various kinds of workloads (IO-intensive workloads, CPU intensive workloads, Memory intensive workloads) and various environments (Production and Non-production) without compromising for Performance. TCS ECP provides assured Business Services SLA and enables the Schlage to offload IT management and focus on their core business and innovation. Thereby reduce the overall Total Cost of Ownership (TCO) and maximize the Return on Investment (ROI). The Reliable, Scalable, Automated and Secured TCS Enterprise Cloud's Hybrid Cloud Solution is built on below major building blocks as shown below.

- a) TCS Hybrid Cloud Management System
- b) TCS – SUSE Openstack Private Cloud System with Alpha Architecture
- c) Enterprise Tools System
- d) Enterprise Cloud Security System

TCS, not only help customer in taking the digital transformation journey but also manage the Hybrid Cloud Infrastructure. It includes the Hybrid cloud hosted IT infrastructure, Operating systems, Database, storage, network, backup and tools systems.

TCS Enterprise Cloud Key Characteristics and Features

The following figure shows the TCS Enterprise cloud key Characteristics and features.

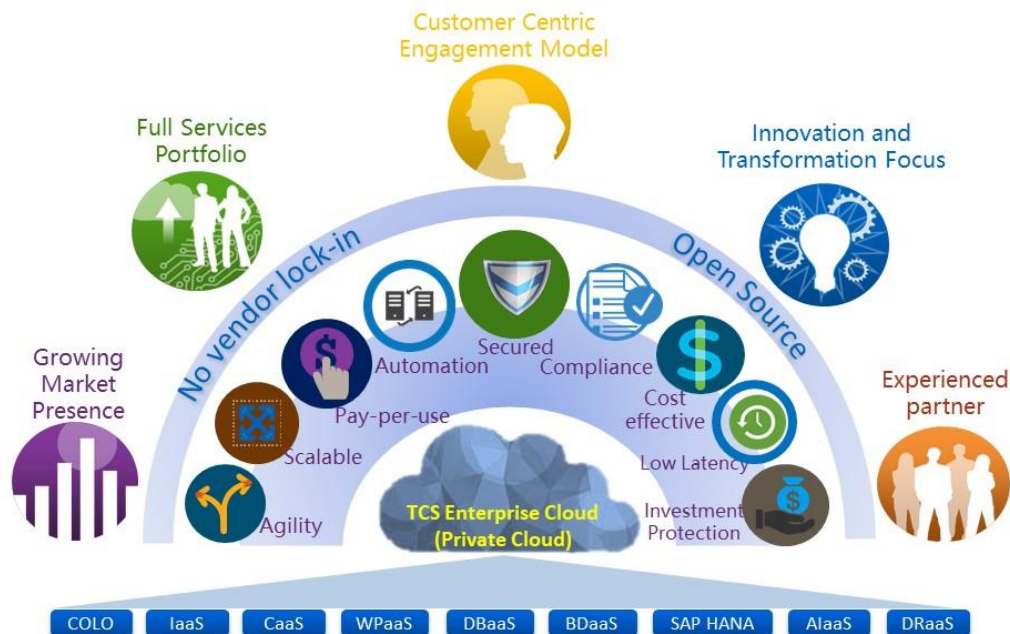


Figure 1: Proposed TCS Enterprise Cloud Features

TCS ECP Private Cloud key Characteristics are listed below:

- TCS targets datacentres equipped to support both Infrastructure as Service and Platform as Service.
- SDN architecture at TCS Enterprise Cloud Datacentres or Zones are scalable supporting DevOps and Container based deployments.
- Option of retention of the same IP address at TCS Enterprise Cloud Datacentres or Zones during VLAN extension from Source Datacentres.
- Logical segregation for Tenant level at VLAN level, firewall level and Load balancer level to support secured applications.
- TCS Enterprise Cloud Datacentres or Zones build at various geographies in clusters support clients globally.

- Active/Active Datacentres to enable production of application at both Datacentres to support client requirement for scalability and reliability.
- 100 percent automation in image build ensures quick turnaround of additional servers to align with business demands during peak times.
- True Hybrid Cloud Management tool with the integration of Open stack with Cisco Application Centric Infrastructure (ACI) architecture and interfaced with Public Cloud Partners through customized APIs.
- Automated metering for usage of workloads to charge back to the client.

TCS ECP Private Cloud key features are listed below:

TCS ECP Private Cloud Features Detail	
Agility	TCS uses Agile methodology in Cloud build, migration, deployment and management process and projects. Which will help customer to realize the “faster go to market” and “reduced risk”.
Scalable	TCS Enterprise Cloud Private Cloud is capable to scale horizontal and vertical due to Programmable infrastructure or Infrastructure as Code feature.
Elastic	TCS Private Cloud is capable to provision and de-provision the instances or cloud resources rapidly to fulfil the on-demand requirements
Automation	TCS Enterprise Cloud Private Cloud is automated at every level which helps to automatically provision and manage cloud resources.
Secured	TCS Enterprise Cloud is secured at physical and logical level to protect data and policy based accessibility.
Compliance	All TCS Enterprise Cloud Zones are built with Tier 3 standards and also enabled with DC facility compliance (ISO, SCO2, PCI DSS, FISMA..). Additional compliance get enabled based on customer requirements.
Low Latency	DCs within a region are interconnected through a higher throughput lower latency link. Throughput allocated to each virtual machine is 10-Gbps to improve network performance including latency
Investment Protection	Colocation for Legacy systems includes RISC based systems, Appliances, non-x86 workloads.
Open and No Vendor Lock in	TCS Enterprise Cloud components are build based on Open Source. This provides the API to customize and integrate with other by which it helps us to avoid get locked in with proprietary hardware/software vendor lock in.
Customer Centric Engagement model	Aligning to Customers’ business goals Flexible delivery and financial models
Full Service Portfolio	Single source for Cloud services portfolio, backed by TCS intellectual property
Growing Market Presence	Fastest growing IT Services and Cloud Brand. 50+ years of experience.
Innovation and Transformation Focus	Investing in innovation to enable clients to create customer centric and focused business models Enabling Transformation through certainty and predictable outcomes
Experience Partner	Already supporting 35+ Private cloud clients

	In-depth knowledge of Cloud, Infra & Application Business relevant Infra Solution
Reduced Operations cost	Operation cost will get reduce due to - Data foot print reduction (Virtualization and Deduplication), Cloud Elasticity (De-commission of unused instance), Resource utilization balancing, Shared Cloud operations team, Reduced power and cooling consumption.

TCS Enterprise Cloud Catalog:

TCS Enterprise Cloud has standard catalog for Virtual cloud instances, Physical cloud instances, Storage and backup volumes. Customer can choose required instance, storage and backup from standard catalog or request for customized instance. Table below shows TCS Enterprise Cloud standard catalog.

TCS Cloud Standard Service Catalogue Compute Service					
	Virtual servers				
	Small	Medium	Large	Extra large	Extra Extra Large
Configuration	1 vcpu , 2 GB RAM, 20 GB	2 vcpu, 4 GB RAM, 40 GB	4 vcpu , 8 GB RAM, 80 GB	8 vcpu , 16 GB RAM, 160 GB	16 vcpu , 32 GB RAM, 320 GB
TCS Cloud Standard Service Catalogue Compute Service					
	Physical servers				
	Small	Medium	Large	Extra large	Extra Extra Large
Configuration	4 core 32 GB RAM, 50 GB	8 core 64 GB RAM, 50 GB	16 core 128 GB RAM, 50 GB	24 core 192 GB RAM, 50 GB	32 core 256 GB RAM, 50 GB
TCS Cloud Standard Service Catalogue Storage Service					
Flavors -->	Ultra Performance (all-flash)	Premium performance	High performance	Standard performance	Bulk Capacity
Configuration	2000 IOPS/TB	1000 IOPS/TB	500 IOPS/TB	200 IOPS/TB	20 IOPS/TB
TCS Cloud Standard Service Catalogue Backup Service					
TCS Cloud Catalog	Premium D2D2T backup	D2D2T backup	Tapeless(One month)	Tapeless (14 Days)	
Configuration	Data protection to disk, holds, - 15 Daily incremental - 4 Weekly full - 1 Monthly full - Backup data on disk replicated to remote site via Backup components (complete cycle) - Tape-out, holds, 11 monthly full and 5 annual backups on tape	Data Protection to disk, holds, - 15 Daily incremental - 4 Weekly full - 1 Monthly full - Tape-out, holds, 5 monthly full backup on tape	Data Protection to disk, holds, - 15 Daily incremental - 2 Weekly full - 1 Monthly full backup	Data Protection to disk, holds, - 15 Daily incremental - 2 Weekly full backup	

TCS Enterprise Cloud Point of Presence:

TCS Enterprise Cloud is spread across globe in eight regions and Currently Thirteen (13) TCS Enterprise Cloud Zones or Points of Delivery (PoDs) are fully functional to on-board global customers into private or hybrid cloud.

The locations are strategically chosen typically Tier-III, ISO Security standards compliant facilities and are serviced by Tier-1 Carriers, ISPs (Internet Service Providers) and Internet Exchanges (select locations) which offers low latency, high bandwidth Network Service. This also enables the rapid interconnection to Enterprise Networks, the Internet and Tier-1 Cloud Providers like AWS, AZURE.

The following figure shows the TCS Enterprise Cloud locations across the globe:

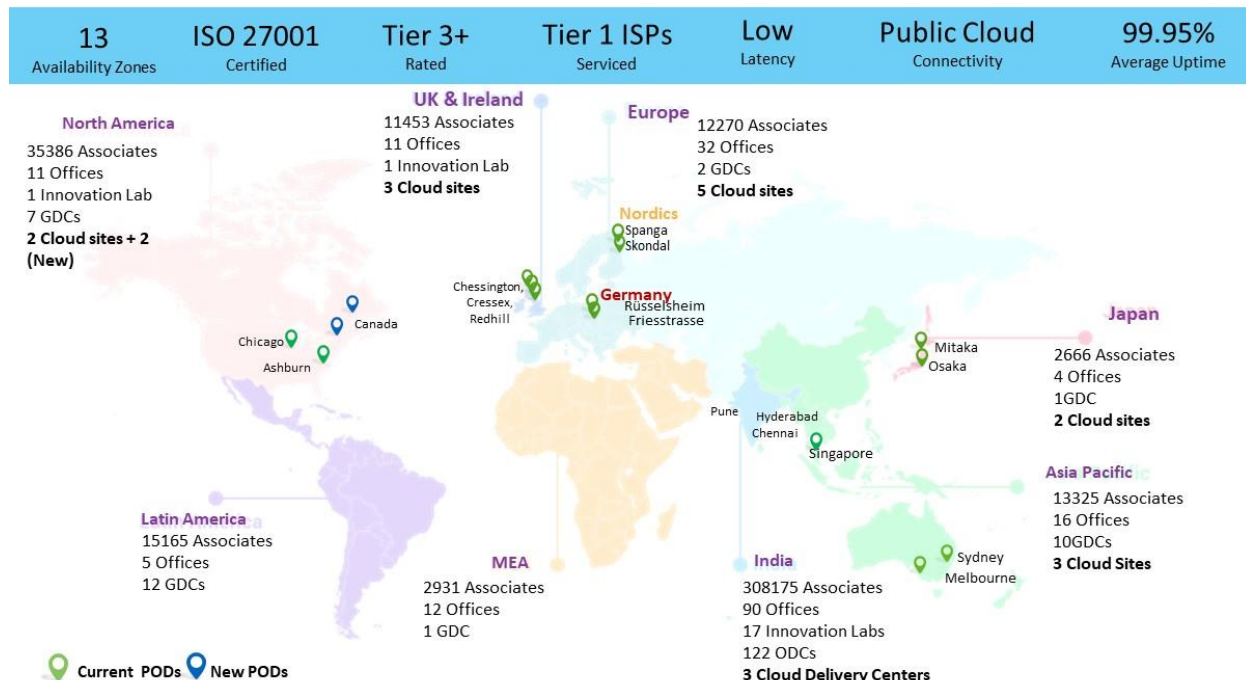


Figure 2: TCS Enterprise Cloud Zones across Globe

TCS ECP Availability Zones (Data Centers/PoDs) will provide the secured, scalable and highly available, Colocation and Private Cloud services to our Customers. The following physical controls, compliance and other features are implemented at each TCS Availability Zones.

- Data hall protected with access control, all facility access points are access controlled and alarmed
- Very Early Smoke Detection Apparatus (VESDA)
- High fog fire suppression system
- Bio-metrics, man traps and proximity badge access
- 24x7 CCTV surveillance with manned guards and with Security Management Systems
- 24x7 Monitoring of Utilities with Building Management System
- Dual perimeter fencing around the facility
- Default Quality certifications:
 - ISO Standards: ISO 27001 (Information Security Management),
 - ISO 9001 (Quality Management) and
 - ISO14001 (Environmental Management).
 - ISO 50001 (Energy Management, Security use and control)
 - SOC 2 Certified facility (Security Organization Control 2)
 - NIST SP 800: 53 Compliant (Federal Information Security Management Act – FISMA)
 - Customized and Industry Specific Quality Certifications – on customer demand (Example: PCI DSS)
- Availability Zone location and power specifications

- Seismic Zone 1
- 500-year flood zone
- Redundant power distribution

3.3 TCS Understanding:

TCS has gone through the Schlage provided RFP document, Inventory sheet, Query responses and all attachments and exhibits to understand the requirements, AS-IS Infrastructure architecture, IT landscape and In-scope activities.

3.3.1 AS IS Infrastructure Architecture and volumetric understanding

In Scope Schlage IT landscape is spread across two data centers in USA, two data centers in UK and One data center in Sydney. Each data center is hosted with

a) Cloud environment: It includes VMware virtual machines with Windows Operating system and Linux Operating system attached to Tier 1 and Tier 2 Cloud storage.

b) Non-cloud Environment: It includes

- ✓ Windows and Linux Physical servers
- ✓ HP N Class, L Class Servers with HP_UX Operating system,
- ✓ IBM Power 9 and Power 8 servers (I Series) with AS 400 Operating system and
- ✓ IBM Midrange servers with AIX Operating system. All these physical servers are attached to Tier 0, Tier 1 and Tier 2 Storage as shown below.

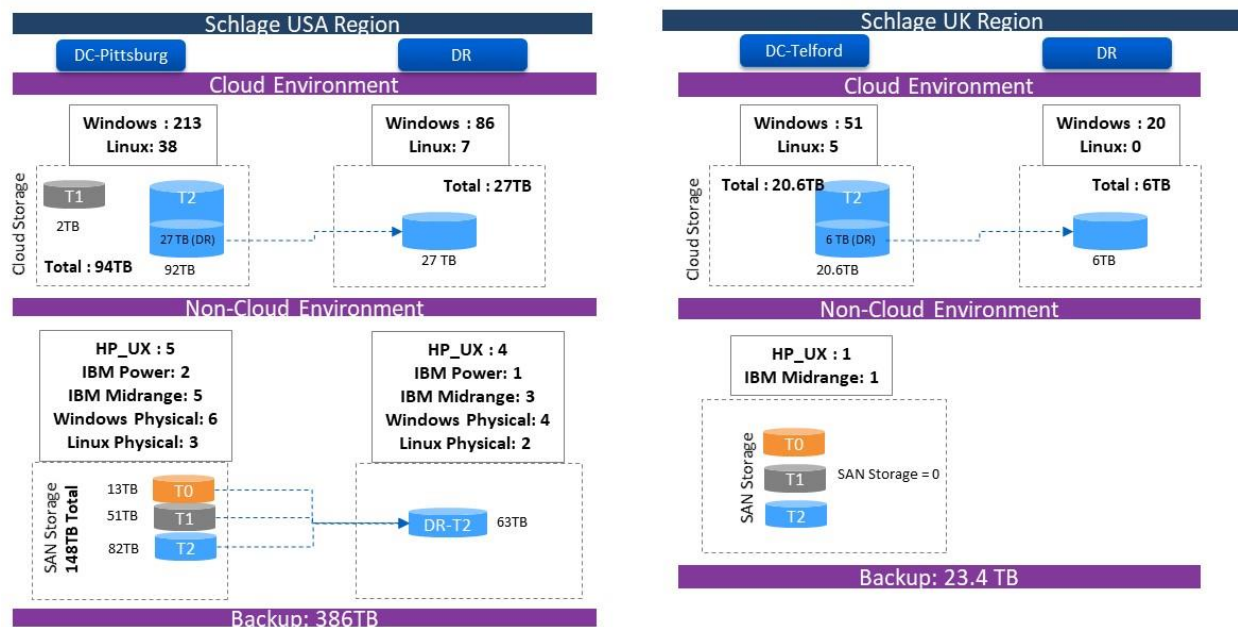


Table below shows the Schlage IT landscape for Cloud Environment:

Cloud Capacity	Total Count	USA Count	UK Count
Windows Small VM (1 VCPU + 2 GB Mem.)	11	11	0
Windows Medium VM (2 VCPU + 4 GB Mem.)	113	95	18
Windows Large VM (4 VCPU + 16 GB Mem.)	99	73	26
Windows Extra Large VM (8 VCPU + 32 GB Mem.)	41	34	7
Linux Small VM (2 VCPU + 4 GB Mem.)	29	27	2
Linux Medium VM (4 VCPU + 8 GB Mem.)	13	10	3
Linux Large VM (8 VCPU + 24 GB Mem.)	1	1	0
Linux Extra Large VM (8 VCPU + 64 GB Mem.)	0	0	0
Windows Small VM (1 VCPU + 2GB Mem) - DR	5	5	0
Windows Medium VM (2 VCPU + 4GB Mem) - DR	47	42	5
Windows Large VM (4 VCPU + 16GB Mem) - DR	32	24	8
Windows Extra Large VM (8 VCPU + 32GB Mem) - DR	22	15	7
Linux Small VM (2 VCPU + 4 GB Mem.) - DR	0	0	0
Linux Medium VM (4 VCPU + 8GB Mem) - DR	7	7	0
Linux Large VM (8 VCPU + 24 GB Mem) - DR	0	0	0
Linux Extra Large VM (8 VCPU + 64 GB Mem) - DR	0	0	0
	420	344	76
Tier 0 Storage (FLASH) – TB		0	0
Tier 1 Storage – TB		2.15	0
Tier 2 storage – TB		91.928	20.692
DR Storage - TB		27.036	6.025

Table below shows the Schlage IT landscape for Non-Cloud Environment:

	USA			UK			Total	
Allegation Requirements	DC	DR	USA Total	DC	DR	UK Total	Total DC	Total DR
Windows								
40 Cores/ 128 GB RAM	1	1	2	0	0	0	1	1
64 Cores / 256 GB RAM	5	3	8	0	0	0	5	3
	6	4	10	0	0	0	6	4
LINUX								
8 Cores/32GB RAM	1	0	1	0	0	0	1	0
16 Cores/ 36GB RAM	1	1	2	0	0	0	1	1
20 Cores/ 32GB RAM	0	0	0	0	0	0	0	0
32 Cores/ 64 GB RAM	1	1	2	0	0	0	1	1
	3	2	5	0	0	0	3	2
Legacy Systems								
HP_UX Servers	5	4	9	1	0	1	6	4
IBM Server for AS400	3 (7 LPAR)	1 (4 LPAR)	3	0	0	0	2	1
IBM Servers for AIX	4 (20 LPAR)	3 (7 LPAR)	8	1	0	1	6	3
	12	8	20	2	0	2	14	8
SAN Storage								
Tier 0 (GB)	13811		13811	0	0	0	13811	
Tier 1 (GB)	51794		51794	0	0	0	51794	
Tier 2 (GB)	82302		82302	0	0	0	82302	
DR Server Storage (GB)		63228	63228	0	0	0		63228
	147907	63228	211135	0	0	0	147907	63228

Schlage is expecting below services from TCS

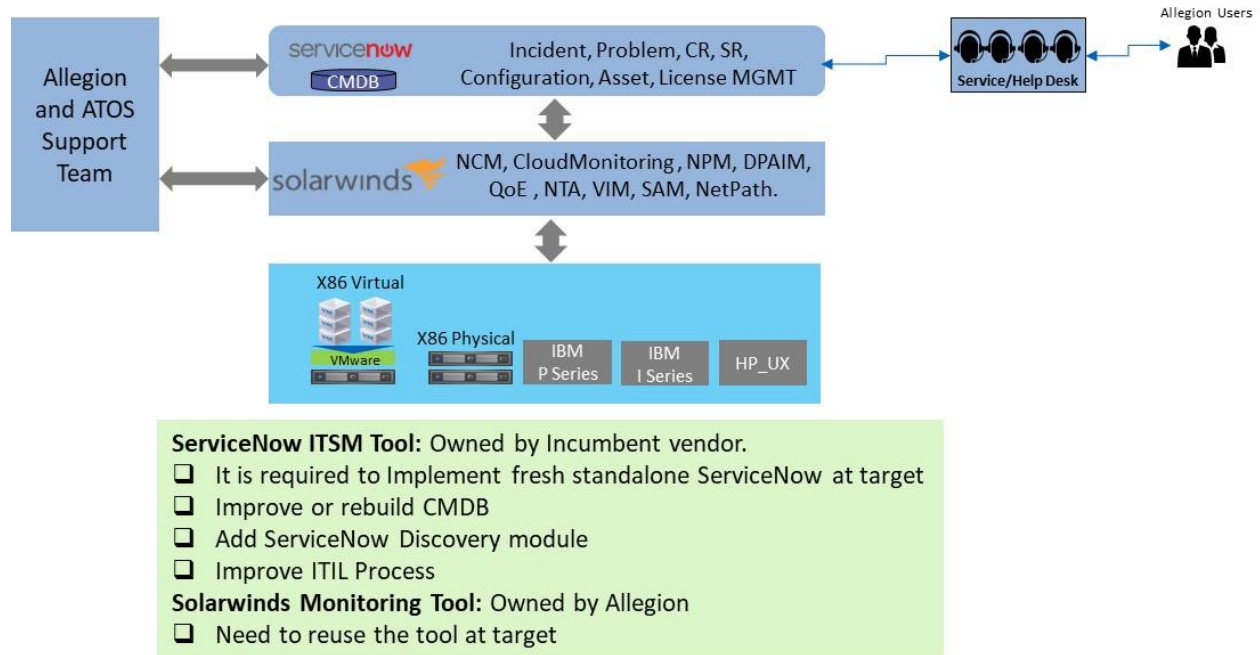
- ✓ Perform workload assessment, analysis and migration planning.
- ✓ Migrate (using V2V migration method) the Cloud workloads (Windows and Linux VMware Virtual machines) along with associated cloud storage to TCS Cloud or TCS DC.
- ✓ Migrate (Using P2P or P2V migration method or Physical lift and shift migration method) the Windows and Linux Physical servers along with associated SAN storage to TCS Cloud/DC.
- ✓ Migrate (Using physically lift and shift migration method) the IBM Power Systems with AS 400 LPARs, IBM Midrange servers with AIX instances/LPAR and HP_UX servers to TCS DC Colocation.
- ✓ Post the migration, perform the Infrastructure Operations services.

3.3.2 AS IS Tools Solution

Schlage made significant investment in Solarwinds monitoring tool which is having modules like NCM, CloudMonitoring , NPM, DPAIM, QoE , NTA, VIM, SAM, NetPath.

Currently Incumbent vendor is owning the ServiceNow ITSM tool. Current setup does not have the IT discovery module and CMDB is not up to date.

The indicative AS-IS existing tool solution is shown below.



3.3.3 In Scope and Out of Scope Services

TCS is responsible to provide below in-scope services to Schlage

- a) Assessment, Analysis and Planning
- b) Migration services
- c) Service transition
- d) Infrastructure Operations services
 - ✓ 24x7 monitoring & Reporting
 - ✓ Datacenter Management
 - ✓ Servers Management (Windows, Linux, HP_UX, AS 400, AIX)
 - ✓ DC Network Management
 - ✓ Storage Management
 - ✓ Backup & Restore Management
 - ✓ Disaster Recovery
 - ✓ Vendor Coordination

Below listed services are out of scope for TCS.

- Application- Database management
- Database Management
- Middleware Management
- Application Management
- Security Operations Center (SOC)

3.4 TCS Proposed Technical Solution:

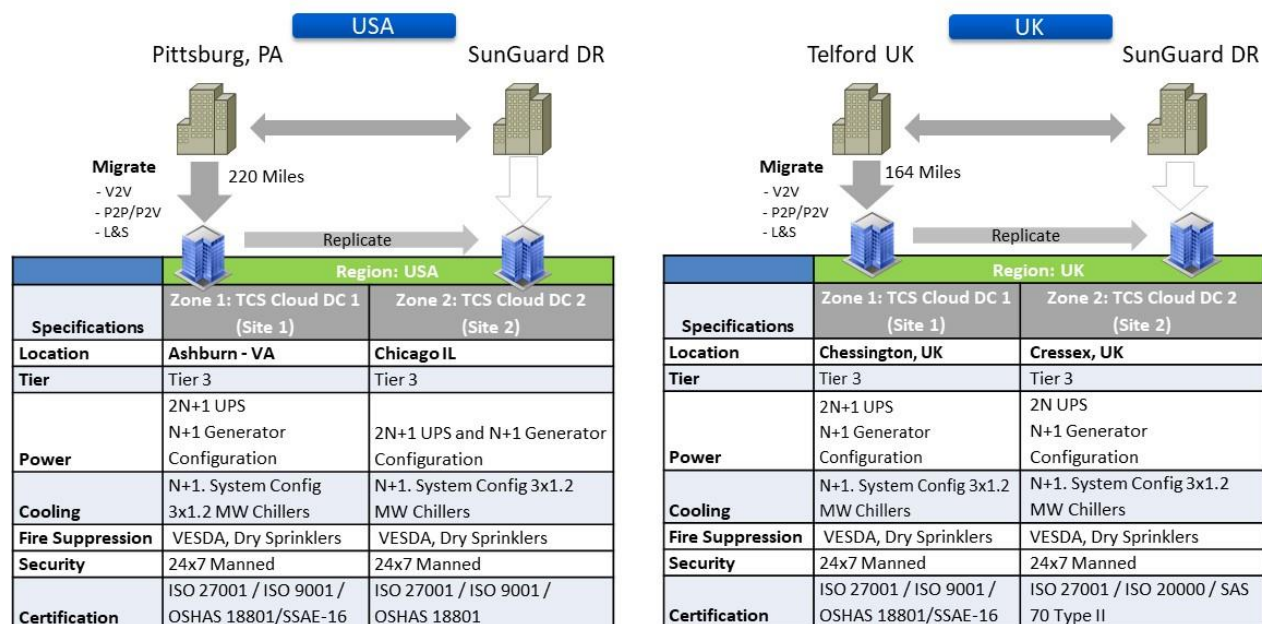
TCS has proposed the technical solution for Schlage target Cloud environment and non-cloud environment based on the assessment and analysis done on Schlage provided RFP document, Infrastructure inventory, and query response. TCS has taken certain considerations while building the solution to fulfill the requirements and to fill the unknown gaps. These considerations are listed at the end and will be used during next stage to refine the technical solution and commercial.

3.4.1 TCS Proposed Data Center Hosting Facility Solution

TCS has considered TCS Cloud DC at Ashburn, VA USA as primary data center to migrate the workloads at Schlage's primary data center in Pittsburg, PA USA. Distance between these two data centers is ~ 220 Miles which will reduce the time required to lift and shift the non-cloud systems. TCS has considered TC Cloud DC at Chicago, IL USA as secondary data center to migrate the workloads at Schlage's Secondary DC.

TCS has considered TCS Cloud DC at Chessington, UK as primary data center to migrate the workloads at Schlage's primary data center in Telford, UK. Distance between these two data centers is ~ 164 Miles which will reduce the time required to lift and shift the non-cloud systems. TCS has considered TC Cloud DC at Cressex, UK as secondary data center to migrate the workloads at Schlage's Secondary DC.

Figure below shows the TCS proposed data center hosting facility solution.



Features of TCS Enterprise Cloud Zones are shown in section **3.2.2 TCS Enterprise Cloud Capability**.

3.4.2 TCS Proposed Private Cloud and Colocation Services Solution

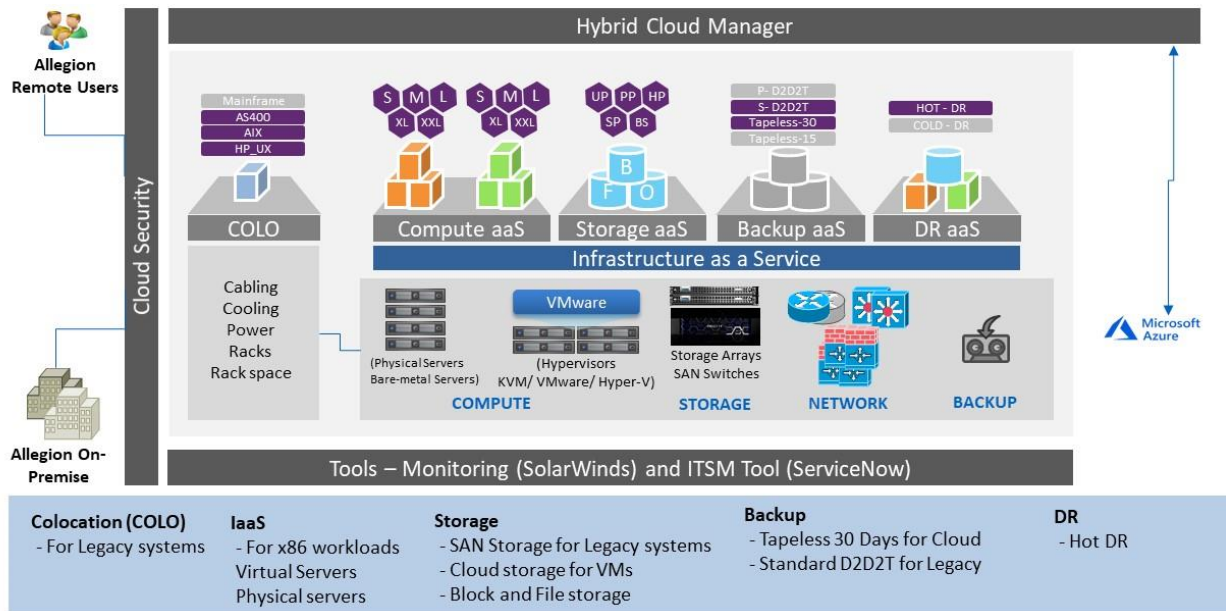
Target solution for Schlage Cloud environment is supported by TCS Enterprise Private cloud “Infrastructure as a services (IaaS)”. IaaS will provide compute, storage and backup requirements categories which will match with Schlage requirements.

- a) Compute for Cloud instances (Small, Medium, Large, Extra Large, Extra Extra Large) for Windows and Linux Operating systems with antivirus.
- b) Cloud storage [Premium Performance (T1), High Performance (T2) and Standard Performance (DR)] for cloud instances.
- c) Backup solution (Standard D2D2T) to backup cloud storage and replicate the backup data to DR site.
- d) DR Solution (Hot DR) for critical cloud instances provided by Schlage in infrastructure inventory

Target solution for Schlage Non-Cloud environment is supported by TCS colocation services. This will provide

- a) Schlage matching categories of SAN storage [Premium Performance (T0), High Performance (T1) and Standard Performance (T2 & DR)] for non-cloud instances.
- b) Rack space, Racks, Power, cooling and cabling for non-cloud instances – HP_UX servers, IBM Power systems, IBM midrange servers, Windows physical servers and Linux physical servers.
- c) Backup solution (Standard D2D2T) to backup SAN storage and replicate the backup data to DR site.
- d) DR Solution (Hot DR) for critical non-cloud instances provided by Schlage in infrastructure inventory

Figure below shows the TCS proposed Private Cloud and Colocation solution for Schlage.



TCS Proposed Private Cloud:

The ECP (Enterprise Cloud Platform) Alpha Architecture is designed based on Software Defined Datacenter (SDDC) standards, automating the various components of computing, storage and network at all levels. The architecture is constructed based on OpenStack with the industry leading OEM (Original equipment manufacturer) hardware vendors who have the good market presence and innovation roadmaps. The ECP network architecture encompasses Software Defined Network (SDN) tightly integrated with OpenStack thereby giving us multiple choices (No vendor lock-in) across compute, storage network and service layer components.

TCS ECP Private Cloud Alpha Architecture is divided into 3 major parts as per functionality as below.

- Underlined Enterprise Level Infrastructure
- SUSE OpenStack Cloud Services and API
- Network Connectivity and Integration points

Enterprise Level Infrastructure:

TCS Alpha Architecture's underlined Server, Storage, Network and Backup infrastructure is based on Enterprise level industry leading OEM (Original equipment manufacturer) hardware vendors (HP, Dell/EMC, Hitachi, Cisco) who have the good market presence and innovation roadmaps. It offers best in class infrastructure with Fault tolerant, scalability, security, performance, availability and reliability. The Space, Racking, power and cooling provided for legacy system colocation will have redundancy at rack power and cooling with Tier 3 DC features.

The technology stack is maintained at N or N-1 level as per customer requirement. All the necessary critical updates will be deployed in the controller change process.

- **SUSE OpenStack Cloud Services and API**

SUSE Open Stack Cloud Services and APIs are set of DevOps tool that helps us to manage the underlined infrastructure as software and enable us to define, automatically manage and provision infrastructure through source code. It includes all the cloud services required for automation of compute, storage, network, image, identity, metering and an orchestrator to coordinate with these services to provide the programmable infrastructure. Programmable infrastructure will extract the underlined compute, storage and network and provide the software defined compute, storage and network to offer Infrastructure as a Services as shown.

TCS private cloud support multiple hypervisors (VMware, KVM, Citrix, Hyper-v) in virtualizing the compute. It provides multiple storage (Block, File and Object) to fulfill customer requirements.

- **Network Connectivity and Integration Points:**

Inter DC Connectivity between the primary and Disaster Recovery (DR) sites facilitates replication, cross-site backup and failover as needed. MPLS (Multi-Protocol Label Switching) connectivity can also be provided to the corporate customer network, including the extension of Active Directory services to the private cloud.

Cloud Services will be delivered through a segmented Network architecture with multi-tenant capability. It will also have connectivity to customer's MPLS at WAN (Wide Area Network) and Internet with the global carriers. It provides the logical separation between various customer environments with the tight security on management stack.

TCS Enterprise Cloud architecture's Open and portable feature will support, to get integrate with multiple public cloud providers to form a hybrid cloud environment. TCS Enterprise cloud will support integration with Public Cloud Providers such as MS-Azure, AWS, GCP.

TCS Enterprise Cloud accelerates cloud journey for clients and lays the foundation for software-defined IaaS (Infrastructure as a Services) & next-gen apps via a strong PaaS (Platform as a Service) backbone.

Target TCS Private Cloud for Schlage:

TCS has analyzed the Schlage requirements of Cloud instances, Cloud storage and backup and mapped to TCS Enterprise Private Cloud's standard catalog. As per requirement. Table below shows the Schlage requirement mapping with TCS Standard catalog.

Cloud Capacity	TCS Catalog	Total Count	USA Count	UK Count
Windows Small VM (1 VCPU + 2 GB Mem.)	SMALL - 1 vcpu , 2 GB RAM, 20 GB	11	11	0
Windows Medium VM (2 VCPU + 4 GB Mem.)	MEDIUM - 2 vcpu , 4 GB RAM, 40 GB	113	95	18
Windows Large VM (4 VCPU + 16 GB Mem.)	LARGE - 4 vcpu , 8 GB RAM, 80 GB *	99	73	26
Windows Extra Large VM (8 VCPU + 32 GB Mem.)	EXTRA LARGE - 8 vcpu , 16 GB RAM, 160 GB *	41	34	7
Linux Small VM (2 VCPU + 4 GB Mem.)	MEDIUM - 2 vcpu , 4 GB RAM, 40 GB	29	27	2
Linux Medium VM (4 VCPU + 8 GB Mem.)	LARGE - 4 vcpu , 8 GB RAM, 80 GB	13	10	3
Linux Large VM (8 VCPU + 24 GB Mem.)	EXTRA LARGE - 8 vcpu , 16 GB RAM, 160 GB *	1	1	0
Linux Extra Large VM (8 VCPU + 64 GB Mem.)	EXTRA LARGE - 8 vcpu , 16 GB RAM, 160 GB *	0	0	0
Windows Small VM (1 VCPU + 2GB Mem) - DR	SMALL - 1 vcpu , 2 GB RAM, 20 GB	5	5	0
Windows Medium VM (2 VCPU + 4GB Mem) - DR	MEDIUM - 2 vcpu , 4 GB RAM, 40 GB	47	42	5
Windows Large VM (4 VCPU + 16GB Mem) - DR	LARGE - 4 vcpu , 8 GB RAM, 80 GB *	32	24	8
Windows Extra Large VM (8 VCPU + 32GB Mem) - DR	EXTRA LARGE - 8 vcpu , 16 GB RAM, 160 GB *	22	15	7
Linux Small VM (2 VCPU + 4 GB Mem.) - DR	MEDIUM - 2 vcpu , 4 GB RAM, 40 GB	0	0	0
Linux Medium VM (4 VCPU + 8GB Mem) - DR	LARGE - 4 vcpu , 8 GB RAM, 80 GB	7	7	0
Linux Large VM (8 VCPU + 24 GB Mem) - DR	EXTRA LARGE - 8 vcpu , 16 GB RAM, 160 GB *	0	0	0
Linux Extra Large VM (8 VCPU + 64 GB Mem) - DR	EXTRA LARGE - 8 vcpu , 16 GB RAM, 160 GB *	0	0	0
		420	344	76
Tier 0 Storage (FLASH) – TB	Premium Performance – 1000 IOPs/TB		0	0
Tier 1 Storage – TB	High Performance – 500 IOPs/TB		2.15	0
Tier 2 storage – TB	Standard Performance – 200 IOPs/TB		91.928	20.692
DR Storage - TB	Standard Performance – 200 IOPs/TB		27.036	6.025

- ❖ Mapped Allegion's requirement to TCS Catalog
- ❖ Have not considered Storage utilization factor. It is assumed that storage is 80% utilized.
- ❖ Sized Cloud instance for existing requirement. Have not considered Y-o-Y growth. As and when need, Allegion can subscribe required additional cloud instance and storage.

* TCS has considered extra RAM

Based on the Inventory sheet analysis, TCS has distributed the Cloud instances, Cloud storage and Backup volume across USA, UK and AUS region. Sum of these instances and storage are matching with Schlage provided volumes in pricing sheet.

TCS Proposed Colocation Services:

TCS has analyzed the Schlage requirements of Non-Cloud instances and SAN storage.

○ Colocation for X86 Physical Server:

There are two options for X86 physical servers (Windows and Linux).

- ✓ Option 1. Colocation services which provide the rack, rack space, power, cooling and cabling.
- ✓ Option 2. Private Cloud services (Physical server re-host solution) which provide the physical and/or virtual servers at TCS DC and help migrate data (P2P or P2V) from existing data center to TCS DC.

As part of the submission TCS has provided technical solution for both the options however, TCS has included the pricing for option 1. During the next stage, TCS will have detail discussion with Schlage on re-hosting the physical servers and migrating to TCS DC using physical-to-physical and/or physical-to-virtual.

○ Colocation for Non-x86 servers':

TCS will provide the colocation services for non-x86 servers (IBM Power systems, IBM Midrange systems, HP_UX Servers). It includes rack, rack space, power, cooling and cabling for non-x86 servers. TCS will provide the related SAN storage (T0, T1, T1) for non-x86 servers.

After analyzing the Inventory sheet using DR=YES attribute, TCS has identified T0, T1 and T2 storage along with DR storage is getting replicated to DR site. Table below shows the target solution for non-cloud environment and related SAN storage.

	USA			UK			Total		
Allegion Requirements	DC	DR	USA Total	DC	DR	UK Total	Total DC	Total DR	TCS Cloud Catalog
Windows									
40 Cores/ 128 GB RAM	1	1	2	0	0	0	1	1	Lift and Shift
64 Cores / 256 GB RAM	5	3	8	0	0	0	5	3	Lift and Shift
	6	4	10	0	0	0	6	4	
LINUX									
8 Cores/32GB RAM	1	0	1	0	0	0	1	0	Lift and Shift
16 Cores/ 36GB RAM	1	1	2	0	0	0	1	1	Lift and Shift
20 Cores/ 32GB RAM	0	0	0	0	0	0	0	0	Lift and Shift
32 Cores/ 64 GB RAM	1	1	2	0	0	0	1	1	Lift and Shift
	3	2	5	0	0	0	3	2	
Legacy Systems									
HP_UX Servers	5	4	9	1	0	1	6	4	Lift and Shift
IBM Server for AS400	2	1	3	0	0	0	2	1	Lift and Shift
IBM Servers for AIX	5	3	8	1	0	1	6	3	Lift and Shift
	12	8	20	2	0	2	14	8	
SAN Storage									
Tier 0 (GB)	13811		13811	0	0	0	13811		Premium Performance – 1000 IOPs/TB
Tier 1 (GB)	51794		51794	0	0	0	51794		High Performance – 500 IOPs/TB
Tier 2 (GB)	82302		82302	0	0	0	82302		Standard Performance – 200 IOPs/TB
DR Server Storage (GB)		63228	63228	0	0	0		63228	Standard Performance – 200 IOPs/TB
	147907	63228	211135	0	0	0	147907	63228	

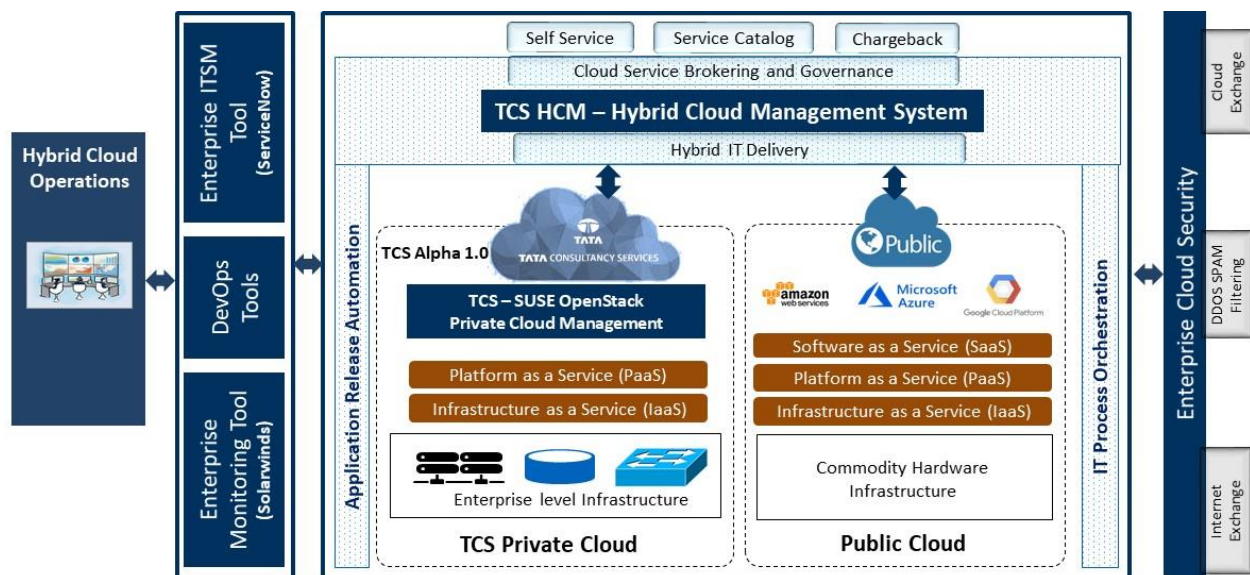
- ❖ Mapped Allegion's requirement to TCS Catalog
- ❖ Have not considered Storage utilization factor. It is assumed that storage is 80% utilized.
- ❖ Sized Cloud instance for existing requirement. Have not considered Y-o-Y growth. As and when need, Allegion can subscribe required additional cloud instance and storage.

TCS gone through the Schlage provided physical servers inventory (IBM and non-IBM) to arrive at target rack count based on available hardware make and model. Given count are tentative and it is required to complete the detail due-diligence to get exact rack size and power requirement. Table below shows the indicative non-x86 servers rack unit, rack count and power requirement (collected from Schlage physical server inventory) for Schlage USA and UK region.

USA DC/DR				DC				DR			
Region	Server Name	Make - Model	OS	RU count	kWh	Server Count	Racks	RU count	kWh	Server Count	Racks
USA	DAL-USRH045	PROLIANT DL740 G1 SERVER 1.5GHZ 4P	Linux	2	0.35	1	1	2	0.35	1	1
USA	IGRDBSND011	POWEREDGE R910 SERVER - SQL Cluster node 1	Windows	4	0.5	1		4	0.5	1	
USA	IGRDBSND012	POWEREDGE R910 SERVER - SQL Cluster node 2	Windows	4	0.5	1		4	0.5	1	
USA	IGRLNXNDC054	POWEREDGE R720 SERVER	Linux	2	0.35	1		2	0.35	1	
USA	IGRLNXNDC055	POWEREDGE R720 SERVER	Linux	2	0.35	1					
USA	IGRDBSND033	POWEREDGE R820 SERVER - SQL DB node 1	Windows	2	0.44	1					
USA	IGRDBSND034	POWEREDGE R820 SERVER - SQL DB node 2	Windows	2	0.44	1					
USA	PITWALGPSQLP01	POWEREDGE R820 SERVER - SQL DB node 1	Windows	2	0.44	1		2	0.44	1	
USA	PITWALGPSQLP02	POWEREDGE R820 SERVER - SQL DB node 2	Windows	2	0.44	1		2	0.44	1	
USA	ILSHPF01	HP 3000 N4000, 550MHz, 3GB, MPE	HP_UX	10	0.75	1		10	0.75	1	
USA	ILSHPF05	HP 9000 MODEL L3000 SERVER	HP_UX	10	1.064	1	1	10	1.064	1	1
USA	ILSHPF09	HP 9000 MODEL L3000 SERVER	HP_UX	10	1.064	1		10	1.064	1	
USA	ILSHPF11	HP 9000 MODEL RP7400 SERVER (550MHZ PA8600 1.5MB CACHE CPU FOR N/RP74)	HP_UX	10	0.75	1	1				1
USA	ILSHPF10	HP 9000 MODEL RP8400 SERVER	HP_UX	42	1.46	1	1	42	1.46	1	1
USA	ALG900E-SN7829510	IBM Power 9 I Series	AIX	42	1.8	1	1	42	1.8	1	1
USA	PITALGHMCP02	IBM x3500	AIX	10	0.415	1	1	10	0.415	1	1
USA	PITALGHMCP01	IBM x3550	AIX	10	0.415	1		10	0.415	1	
USA	TAP01	IBM x3750	AIX	10	0.415	1					
USA	DAL-UNIFER	IBM x3850 M2	AS400	6	0.65	1	1	6	0.65	1	1
USA	DAL-SS-UNIFIER2	IBM x3850 M2	AS400	6	0.65	1		6	0.65	1	
USA	INDY OPT01	NA	AS400	6	0.15	1					
USA	6855164	ULTRIUM LTO 3	Tape Drive for AS400	4	0.025	1		4	0.025	1	
USA	6880091	ULTRIUM LTO 3	Tape Drive for AS400	4	0.025	1		4	0.025	1	
USA	10P0642	7208	Tape Drive for AS400	4	0.025	1					
		TOTAL		206	12.593		7	170	10.198		7
UK				DC				DR			
Region	Server Name	Make - Model	OS	RU count	kWh	Server Count	Racks	RU count	kWh	Server Count	Racks
UK	XXX	IBM x3850 M2	AS400	6	0.65	1	1				
UK	XXX	ULTRIUM LTO 3	Tape Drive for AS400	4	0.025	1					
UK	XXX	IBM x3500	AIX	10	0.415	1					
UK	XXX	HP 3000 N4000, 550MHz, 3GB, MPE	HP_UX	10	0.75	1	1				
		TOTAL		30	1.84	4	2				

3.4.3 TCS Proposed Hybrid Cloud Solution

As per Schlage RFP objective, Hybrid cloud is one of the requirement. TCS has proposed TCS Enterprise Cloud's Hybrid Cloud Manager (HCM) to fulfill the requirement. Figure shown below is TCS HCM high level architecture.



TCS Hybrid Cloud Management (HCM), is a robust hybrid cloud management solution built on a modern platform providing enterprise-grade orchestration to deliver and manage hybrid IT infrastructure and services, automate application release, and broker public and private cloud services.

It aggregates public cloud services or VMware templates to use as service design building-block components. It design, complex service designs to run on any cloud with the drag and drop designer using components for containers, VMs, databases, networking, and middleware. It orchestrates any process or automation tool with the industries best orchestrator and content library. Design drag-and-drop or infrastructure as code orchestration flows to orchestrate automation tools, integrate with any vendor technology, or automate any task in the datacenter on applications and infrastructure.

Use the integrated CI/CD (Continuous Integration and Continues Delivery) Application Release Automation (ARA) pipeline to continuously deliver applications and infrastructure with customizable stage gate actions such as approvals, security scans, execution of scripts, or deployment of infrastructure. Publish any service design to the multi-tenant consumer market place portal or select them as deployment stage gate actions in the ARA pipeline.

TCS Hybrid Cloud Solution provides

Hybrid IT Delivery: DevOps-driven hybrid and multi-cloud provisioning & management which provision and manage IT services across any cloud, container or infrastructure with a unified hybrid and multi-cloud management platform.

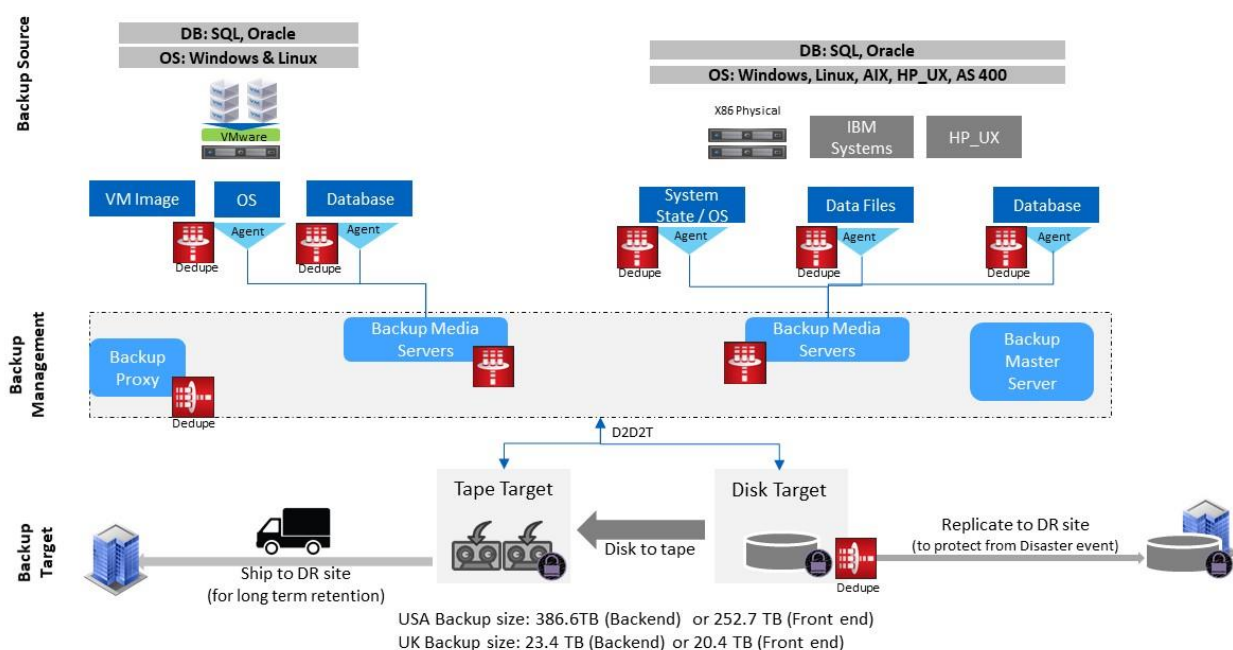
IT process orchestration: automate end to end IT process with a proven, enterprise-grade orchestration engine that provides extensive out-of-the-box content and open APIs to integrate across traditional and hybrid IT ecosystems, teams and tools.

Application release automation for any cloud in any environment with any technology. It automates infrastructure and application deployment through all application lifecycle stages with fully customizable stage gates and a complete CI/CD pipeline to support DevOps.

Cloud Service Brokering and Governance: Aggregate public cloud services and hybrid cloud service designs, publish offerings into catalogs, broker service offerings through a centralized self-service portal.

3.4.4 TCS Proposed Backup Solution

TCS ECP's application aware and enterprise level backup and restore solution is a one stop solution that address all the backup and restore request of Cloud environment and non-cloud environment of Schlage. TCS Alpha Architecture's underlined Backup and Restore infrastructure is based on Enterprise level industry leading OEM (Original equipment manufacturer) hardware vendors for backup target and software vendor for Backup application, who have the good market presence and innovation roadmaps. It offers best in class backup infrastructure with latest generation, Fault tolerant, scalability, security, performance, availability and reliability. An Indicative Backup and Restore solution for Schlage is shown below.



Dedicated backup network will be used to backup data, which will help to manage and maintain the production network performance. Disk device will act as backup target and will provide the benefits of deduplication, compression, remote replication and scalability. Backup system will support source based and target based inline deduplication. Backup system master server will manage the backup and restore requests and maintain the metadata that includes Client File Index (CFI) and Media Index (MI).

Application aware and database aware backup will be performed using Backup module for application and database. Combination of Agent based and VADP based backup methods will be used to protect the Web servers, application servers and file servers. Based on the Schlage requirement compatible Backup and recovery catalogue (Standard D2D2T) has been selected. This category will backup the data to disk and then stage to Tape for long term. At the same time the backup data on disk will get replicated to DR site using backup application aware feature.

TCS Backup solution is flexible to use the Enterprise level backup solution or native backup solution for the IBM AS 400 systems. As part of physical lift and shift, TCS will lift and shift the LTO 3 drives along with IBM systems to backup AS 400. Schlage has option to choose TCS Enterprise backup solution to backup IBM AS 400.

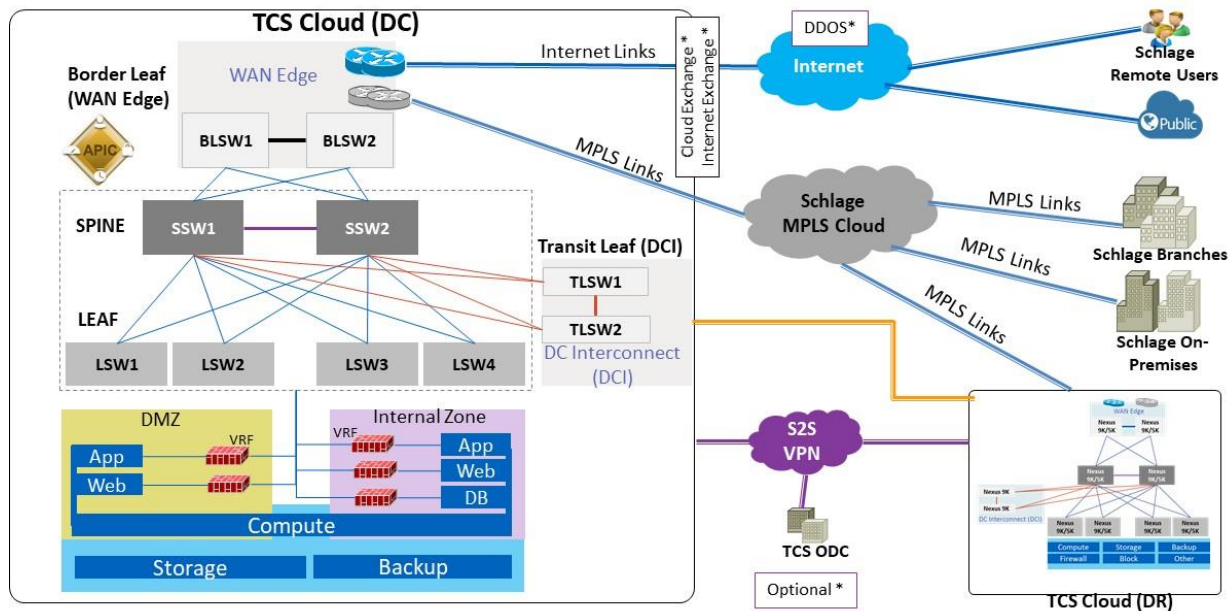
TCS is responsible to backup the Schlage systems post the migration and retain the data for short term and/or long term. TCS has not considered migration of existing backup data (disk and tape media) from Schlage DC/DR backup media to TCS DC/DR.

3.4.5 TCS Proposed DC Network Solution

TCS Enterprise Private Cloud will deploy a dedicated Network Fabric that is based on Cisco's Application Centric Infrastructure (ACI), SDN (Software Defined Networking) for DC Network Architecture.

The Architecture provides

- Simplification of the network architecture
- Increased redundancy, resiliency and high availability
- Separating the physical and logical design such that a single standard physical fabric to be deployed to support any logical network architecture to meet tenant needs
- Multi-tenancy at scale with full isolation between tenants
- Support for live migration within and between data center
- Network services to multiple hypervisor such as VMware ESXi and physical (bare metal) servers.
- Integration with Layer 4 to Layer 7 services such as Firewalls and Load Balancers (physical and virtual).
- Active / Active Dual Data center environment, with dark fiber or multiple 10G links between the Data centers.



The network fabric for TCS management is separated out from the Schlage production fabric to connect the compute to host the infrastructure management service, and its external communication to TCS offshore delivery Centers (ODC) through Site-Site VPN over Internet. The management connection from all the compute, network and storage devices (except the third party devices) are also connected to TCS Infra-Management switches.

TCS will manage the ACI Infrastructure through a Jump servers deployed in the management stack. TCS Offshore Delivery Centre (ODC) will access the DC Infra management network through a pair of dedicated firewall deployed in TCS Infra - Management fabric. The network fabric also facilitates the DR connectivity and Inter-Cloud fabric to access and host the services from public cloud.

Network Time Protocol: One of the core network fabric component will configured as the NTP server in each DC and its clock source will be from internet. All internal network devices hypervisors (VMs get time sync with hypervisor), servers and other appliance will be configured to sync with NTP server over management network.

Stratum 1 appliance will be deployed only if Nano second time precision requirement is identified. In that case, the Stratum appliances synchronize time with stratum 0 servers over satellite connection.

IP Addressing: The Tenant Schlage provided IP address schema of the existing systems will be used in the TCS cloud while migrating servers from the incumbent DCs to TCS Cloud DC into the respective zones. The VLANs will be stretched across DC to host the services actively across the DCs and also to configure DR in the next phase of Transformation.

WAN Connectivity: Schlage's existing MPLS dual redundant link will be extended to TCS Cloud DC until to our PoP, from there we will do a cross-connection and will be connected to our edge router or directly to Border Leafs. The production services hosted in the DMZ zones are connected through the Tenant internet to the external world.

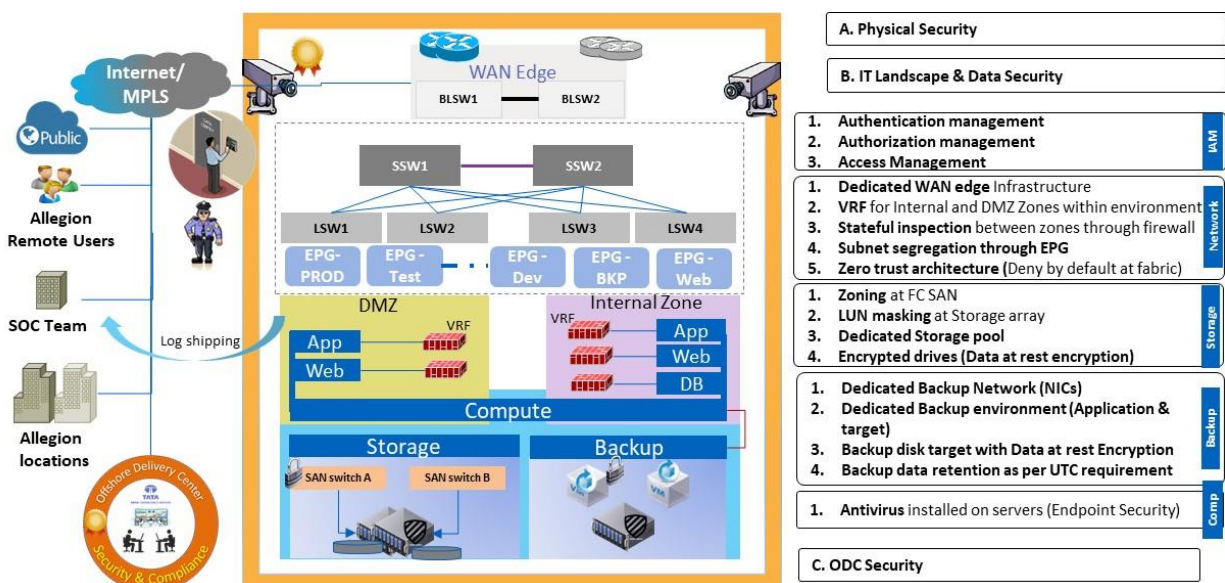
Inter DC Connectivity: DCs within a region (US/UK) are interconnected through a higher throughput lower latency links (i.e., DWDM/dark fibers).

Geo Connectivity: TCS will continue to leverage existing Schlage MPLS cloud for Geo connectivity

3.4.6 TCS Proposed DC Security Solution

TCS Enterprise Cloud architecture is based on the zero trust architecture with micro segmentation and policy based access. Best in class segmentation techniques will be deployed in TCS Enterprise Cloud to ensure customer's data is isolated and protected from other tenants. In TCS Enterprise Cloud, each environment is bounded by VXLAN across the DCs (availability zones). The security zones are defined by VRF within the environment (for example, for production, internal and DMZ). State full Inspection between the Zones is done through Firewall.

Figure below shows overall TCS Enterprise Private Cloud Security architecture.



3.4.7 TCS Proposed Disaster Recovery Solution

Schlage's business is depending on IT infrastructure availability particularly data or information for business. It is highly important to protect the data and availability of data to avoid business impact. Business impact will get measure based on the amount of data that lost i.e Recovery point object (RPO) and time required to rebuild the data i.e Recovery Time Object (RTO).

DR Deployment Selection:

Based on the information available, TCS has considered to deploy Hot DR site. This DR deployment includes, the compute and storage systems at DR and ready to take over the DC workload in the event of disaster. Time (RTO) required to make service available at DR includes application/database activation and testing time which is in hours. This is a reliable and consistent way of deploying DR.

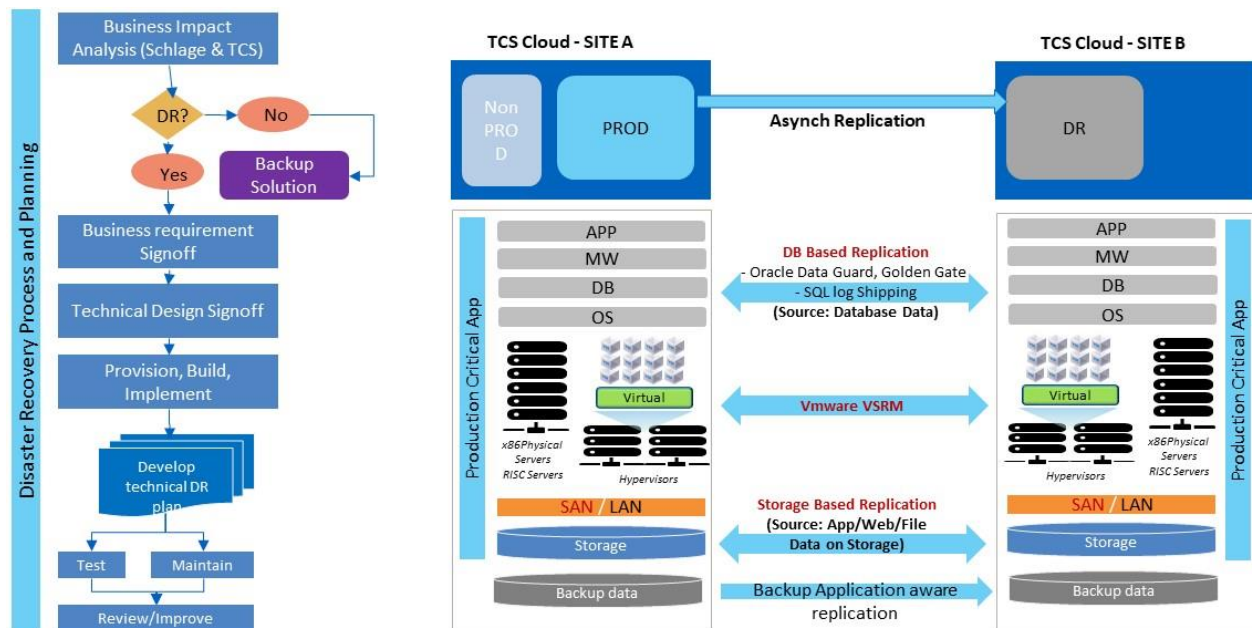
- ✓ DR server and Storage are active. Ready to take over in the event of site disaster.
- ✓ RTO in hours: Time required to bring up application/database and test.
- ✓ Business impact is very low

Data Replication Technology and Type:

TCS supports different replication technology to replicate the data between DC and DR synchronously and/or asynchronously to meet RPO requirements. The TCS Enterprise Cloud's dedicated inter-DC link will help to replicate the data between DC and DR. Replication bandwidth will be provided based on % of data that change daily and required to replicate to DR site. Currently TCS has considered the InterDC link bandwidth based on Schlage requirement sheet (600 Mbps between USA DC and USA DR sites). TCS Enterprise Cloud supports below listed replication technologies

- ✓ Database level replication technology: SQL log shipping, Oracle Data guard (License provided by Schlage)
- ✓ VMware (Hypervisor) level replication technology: vSRM – VMware Site Recovery Manager
- ✓ Storage level replication technology: EMC SRDF, EMC Recovery Point Appliance, Hitachi Universal replicator, HP 3PAR Replication.

TCS proposed DC and DR sites are more than 150 miles. So TCS has considered to propose "Asynchronous Replication" which provides RPO > 0.



DR Planning and DR Operations:

TCS Enterprise Cloud provide DR planning and DR operations support to Schlage to setup the DR solution and manage/operate DR environment.

TCS Business Continuity Practice team will make use of existing DR run book and support Schlage in DR planning by providing the DR strategy, RPO selection, Replication bandwidth sizing, DR declare points, Replication technology selection and DR deployment planning.

TCS DR operations team will provide DR management support to Schlage to manage and maintain the DR environment. Team will monitor and report the replication status, coordinate with technology team to fix issues with replication, manage and maintain DR run book, execute the MOCK and LIVE DR drills as per plan, Support application level DR drills, Site level DR drills and on-demand DR drill as per Schlage requests.

Before each DR drill, Operations team will make sure that DR environment is ready for DR drill which includes

- ✓ The confirmation on consistency in replicated data,
- ✓ DR compute instance is available to take the failover workload in terms of capacity and performance
- ✓ Backup the source system before failover. As per DR plan and Schedule, execute the DR drill.

During each DR drill, operations team will closely work with Infrastructure and Application team, to fix issues and update the DR run book accordingly and also track/record the RPO and RTO. After each MOCK/LIVE Drill, operations team will provide the DR drill updates to customer which includes the RPO, RTO, issues, resolution, recommendations and DR drill status

Note: TCS is completely agree with the “**section 1.3 Disaster Recovery**” points provided by Schlage’s “**06 Schlage V2 - Data Center**” document in providing the DR management.

3.4.8 TCS Proposed Tools Solution

<< CBO Team to Explain Overall Tools Solution >>>

3.4.9 TCS Technical Solution Considerations

TCS has arrived at below listed Technical Solution considerations after assessing and analysis of RFP requirements, query responses and inventory sheet. All these considerations will get reviewed during due diligence and final solution will get fine-tuned accordingly.

Data Center and IT landscape strategy considerations:

- TCS will provide dedicated IT landscape (Compute and Storage) for Schlage at USA TCS DC/DR.
- TCS will provide dedicated compute for Schlage at UK TCS DC/DR.

Compute/Server Solution considerations:

- TCS will provide the Private Cloud “Infrastructure as a Service” to Schlage Cloud environment requirements.
- Considered VM count and Storage size from Schlage provided Pricing sheet and distributed across USA and UK DC and DR sites.
- TCS proposed private cloud IaaS Cloud instances includes OS and Antivirus.
- Database, Middleware and Application license will be provided by Allegion
- TCS will provide the Colocation services for Linux physical servers, Windows Physical servers, HP_UX servers, IBM Power servers and IBM midrange Servers
- TCS has provided the technical solution for Linux and Windows physical server’s re-hosting (P2P, P2V) and have not considered the pricing for target physical and/or virtual servers. During next stage, TCS will discuss with Schlage and arrive at final solution for Linux and Windows physical server migration.
- Additional vCPU and RAM considered as per Pricing sheet

Storage and Backup Solution considerations:

- Considered SAN Storage (T0, T1, T2 and DR) and Cloud Storage (T1, T2 and DR) from Schlage provided Pricing sheet and distributed across USA and UK DC and DR sites.

- Mapped the Schlage storage requirements to TCS Enterprise Cloud Storage catalog – Premium Performance (T0), High Performance (T1) and Standard Performance (T2 and DR).
- Have not considered Year-on-Year growth. Schlage can subscribe for additional cloud instances and Storage capacity on-demand.
- It is assumed that Storage utilization is 70% to 80%. So have not considered the Storage utilization factor while sizing target storage.
- It is assumed that the Schlage provided storage capacity includes the storage required for Clone and Snapshots.
- Considered Standard D2D2T backup category to backup Cloud data and non-cloud data.
- Considered Backend backup capacity provided by Schlage. Converted this backend backup capacity to frontend capacity using Schlage provided conversion rate to price.
 - At USA: Backend backup capacity = 386.6 TB – Conversion factor = 1.53 and frond end capacity = 252.7TB
 - AT UK: Backend backup capacity = 23.4 TB – Conversion factor = 1.15 and frond end capacity = 20.4TB
- As per Schlage requirement, Data will get backup at DC and backup data will get replicated to DR.
- Considered using existing Oracle data guard, SQL Log shipping license for database level replication. Considered Storage level replication and VM level replication (vSRM) to replicate data from DC to DR.
- TCS has not considered migration of existing backup data (Disk and/or LTO3 tape media data) from Schlage DC/DR backup media to TCS DC/DR

Network and Security Solution Considerations:

- TCS will provide the Network Security solution which includes SDN, Firewall, Firewall level IPS/IDS, Load balancers, Network components, VLAN.
- TCS will setup Security event and log collector at TCS Cloud using Schlage's Radius licenses and push logs to Schlage's SOC team.
- WAN bandwidth and connectivity between TCS Cloud and Schlage locations will be provided by Schlage.
- WAN bandwidth and connectivity (Azure direct connect) between TCS Cloud and Azure will be provided by Schlage.
- TCS has considered the InterDC link to replicate data between DC and DR. (600 Mbps in USA and 500 Mbps in UK – as requested by Schlage)
- TCS has considered the Internet link at DC and DR (500 Mbps in USA and 150 Mbps in UK).
- As per TCS calculation, InterDC and Internet bandwidth required is more than the size provided by Schlage. During due-diligence, TCS and Schlage has to arrive at final requirement.

3.4.10 Financial Responsibility Matrices

Table below shows the high level financial responsibility matrices. Table shows the Cloud environment and non-cloud environment hardware, software and tools responsibility or ownership during migration and operations phase. This is an indicative matrices based on the RFP document and query response input.

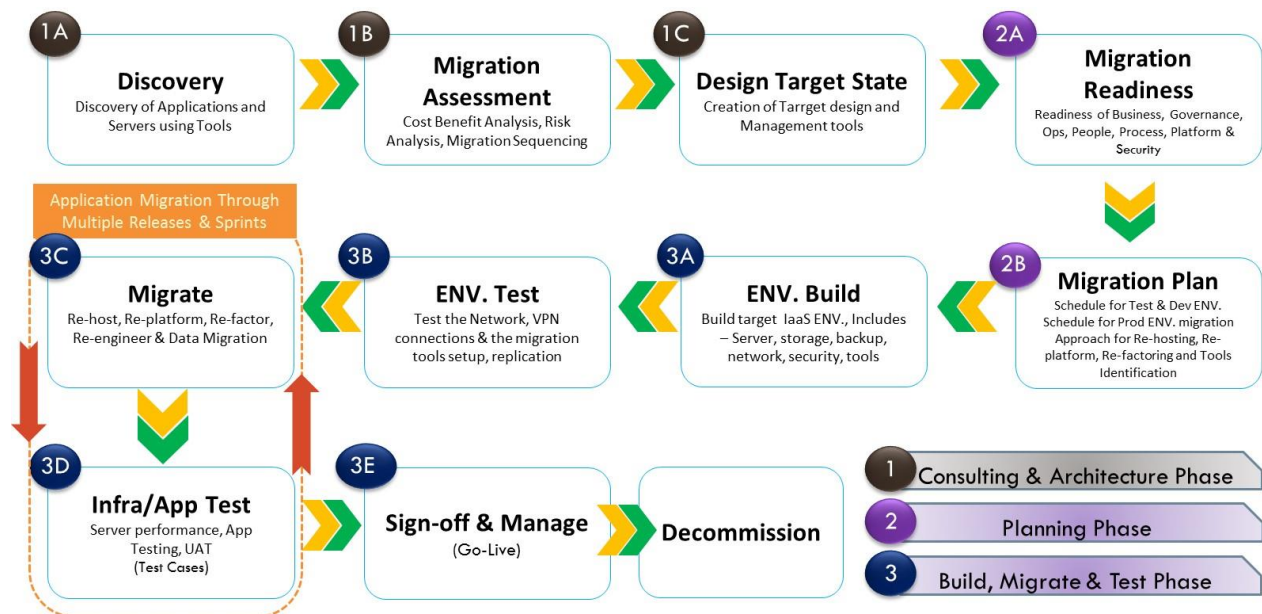
Scope Area	Description	Ownership		Comments
Managed Hosting (Colocation)	Space and DC facility for hosting, Tools, Passive Components		TCS	TCS Enterprise Cloud – Colocation includes Rack, Rack Spacing, Power, Cooling, Passive cabling
	Non-x86 Asset (H/w, OS, AMC)	Schlage		Allegion owns IBM Power systems, IBM Midrange servers and HP_UX servers and Windows/Linux Physical servers.
	Insurance (Break-Fix) during migration	Schlage		Insurance for Physical Lift and Shift assets
Cloud Environment	Space and DC facility		TCS	Cloud Hosting
	Asset (H/w)		TCS	Server, Storage, Network, Backup
	Asset (OS & Antivirus)		TCS	Cloud OS – Windows. Linux and Antivirus
	Inter-DC connectivity (MPLS)		TCS	TCS Cloud DC and DR connectivity
	Internet Connectivity		TCS	Internet connectivity at TCS Cloud DC and DR
	WAN Links / Migration Link	Schlage		Connection between Allegion Premises and TCS DCs
Infra Tools	Cloud Integration and orchestration		TCS	TCS Enterprise Cloud - HCM
	Service Management (ServiceNow)		TCS	TCS Enterprise Cloud - ServiceNow
	Infra, DB, Monitoring Tools (Solarwinds)	Schlage		Allegion Solarwinds Tool License
	Transition (Complete set of Migration tools)		TCS	Platespin, Cloud Counsel
	XenApp License	Schlage		Manage Cirtix Application virtualization

3.5 TCS Proposed Migration Solution:

TCS brings years of experience in Cloud consulting and migration services which will help Schlage in identifying the risks and related mitigations, migration plan and schedule, migration strategy and approach, migration tool and method, application move groups detail.

3.5.1 Migration strategy

TCS proposes an application led migration approach to Cloud which is time tested to ensure success in complex enterprise level Data Centre Migration. It follows process of D2D (Discovery to Decommission) Methodology which ensure process to be followed from Discovery, Dependency mapping, Data analysis, planning, build, migrate, testing and Decommission. This D2D Methodology depicted in the below figure and phases are detailed as below.



TCS – Migration strategy

○ Consulting and Architecture Phase:

TCS Enterprise architects, Infrastructure architects and Application architects will perform the Schlage's IT landscape discovery, assessment and analysis using proven "Cloud assessment tool" to identify and get the reports on AS-IS Schlage Infrastructure architecture, Application architecture, Application to Infrastructure mappings, Application dependency mapping and architectural gaps.

Based on the assessment and analysis reports and in discussion with Schlage IT/business team, TCS Enterprise Cloud architects will prepare the Application move

groups and map the Infrastructure & application to each move group. Business process, security and compliance assessment and analysis will be part of this phase, which will help Schlage to decide the target environment.

- **Planning Phase:**

TCS Migration architects, Enterprise architects, Application & Infrastructure architects and cloud architects will bring in years of experience in architecting the migration solution with right approach, strategy, schedule and plan. Migration strategy is based on application dependency, workload criticality, planned down time, IT components availability. Team will also draft possible risks and mitigation plan to address residual risks. Team will prepare design documents, resource planning and test and acceptance plan.

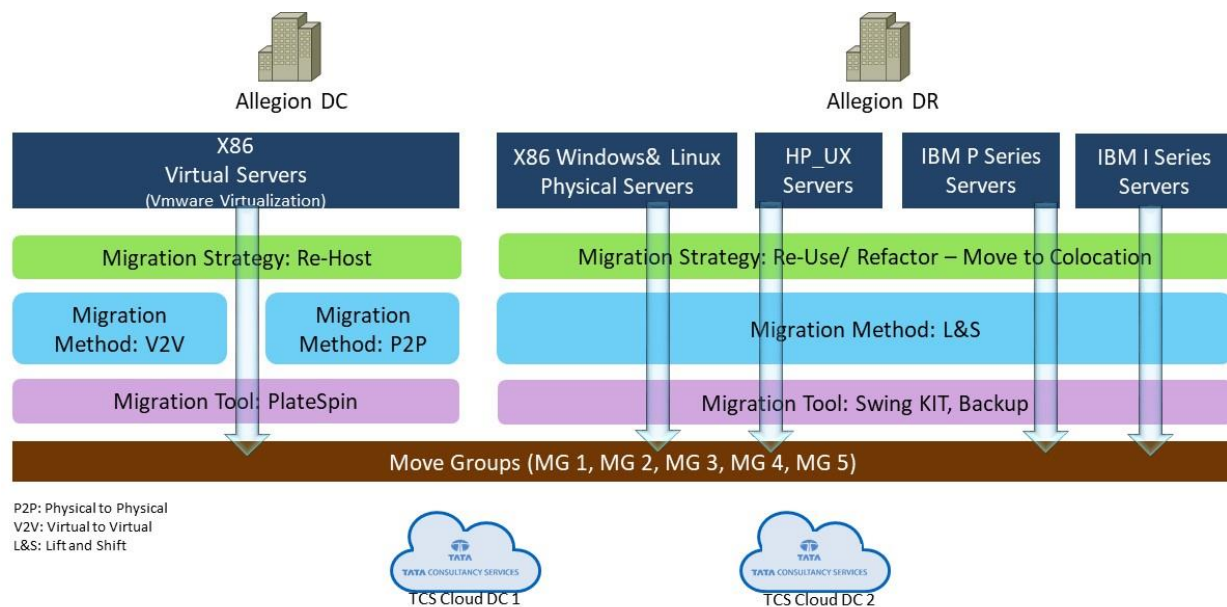
- **Build, Migrate and test Phase**

TCS migration experts with Infrastructure experts, Application experts and domain experts will perform the workload and/or application migrations using proven migration tools, proven migration methodology, best practice using finalized migration plan, strategy and schedule.

3.5.2 Migration Approach

Schlage's Cloud environment (Linux and Windows instances) and non-cloud environment (x86 physical servers, IBM servers and HP_UX servers) will get migrated from existing DC/DR to TCS DC/DR location. TCS provided migration approach is an indicative solution and it is required to conduct detail due-diligence to understand the application architecture, application to infrastructure mapping, Application profile & Target Roadmap to arrive at final migration approach. (Example: Analyzing the capability of converting Physical Windows and Linux servers to virtual during migration)

Based on the available detail, TCS has considered below approach in migrating the Schlage Cloud and non-cloud workloads to TCS DC locations.

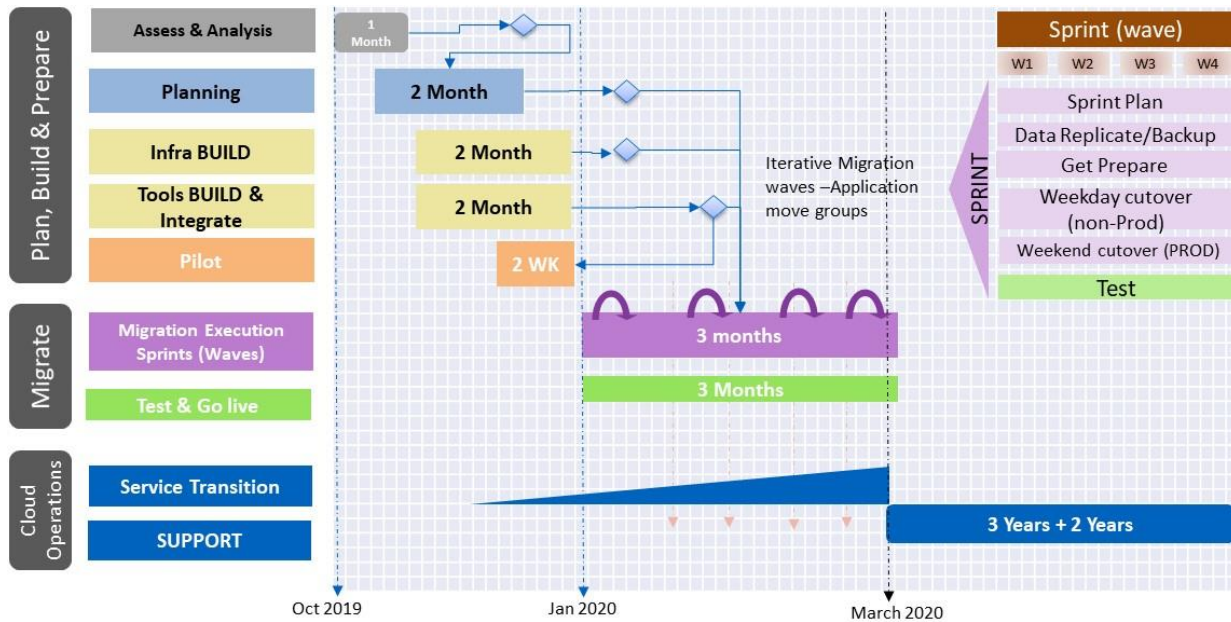


TCS has considered re-hosting the cloud instances and related cloud storage at TCS Enterprise private cloud and migrate the Schlage's AS-IS Cloud instances along with data to TCS Cloud using Platespin tool.

TCS has considered re-using/re-factoring the existing Windows physical servers, Linux physical servers, IBM Power servers, HP_UX servers and IBM midrange servers and use physical lift and shift method to migrate to TCS DC colocation.

3.5.3 Migration timeline (Plan and Schedule)

TCS has created indicative migration plan and schedule based on the detail received from Schlage (Query response, RFP document and inventory list). This will get refined based on further discussion with Schlage during due-diligence. Figure below shows the indicative migration time line.



TCS has considered first 3 months, starting from Oct 2019 for migration planning which includes – due diligence (assessment and analysis), migration planning, target environment readiness (Infra build and Tools build) and pilot program.

During the first week of January, TCS will configure the Cloud environment data replication using Platespin tool and schedule backup of non-cloud environment data. Based on the Schlage scheduled down time, TCS will perform the cut-over and/or lift and shift workload from existing DC to TCS DC based on migration method.

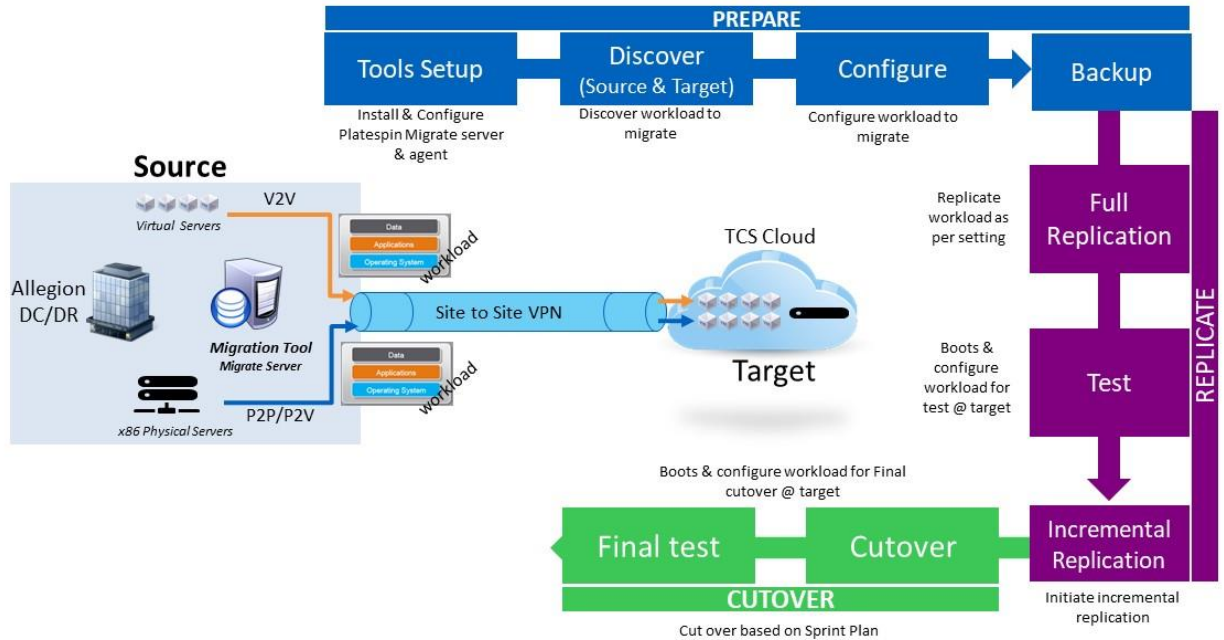
TCS migration team will work with different level of Schlage stakeholders who will get impacted and benefited by migration and arrive at plan after play back with, reviewed by and approved by Schlage.

3.5.4 Migration Methods

TCS migration specialists will migrate the Schlage's cloud environment and non-cloud environment to TCS DC/DR using proven method, procedures, tools and best practice.

○ Schlage Cloud environment migration method

For Windows and Linux virtual machines under Schlage Cloud environment TCS has considered using Platespin migration tool to migrate the workloads to TCS Private Cloud. As per migration strategy, TCS will use V2V (Virtual to Virtual) migration method for Cloud instance migration as shown below.



Cloud instances (Linux and windows workloads) will get migrated to TCS Cloud in 3 steps.

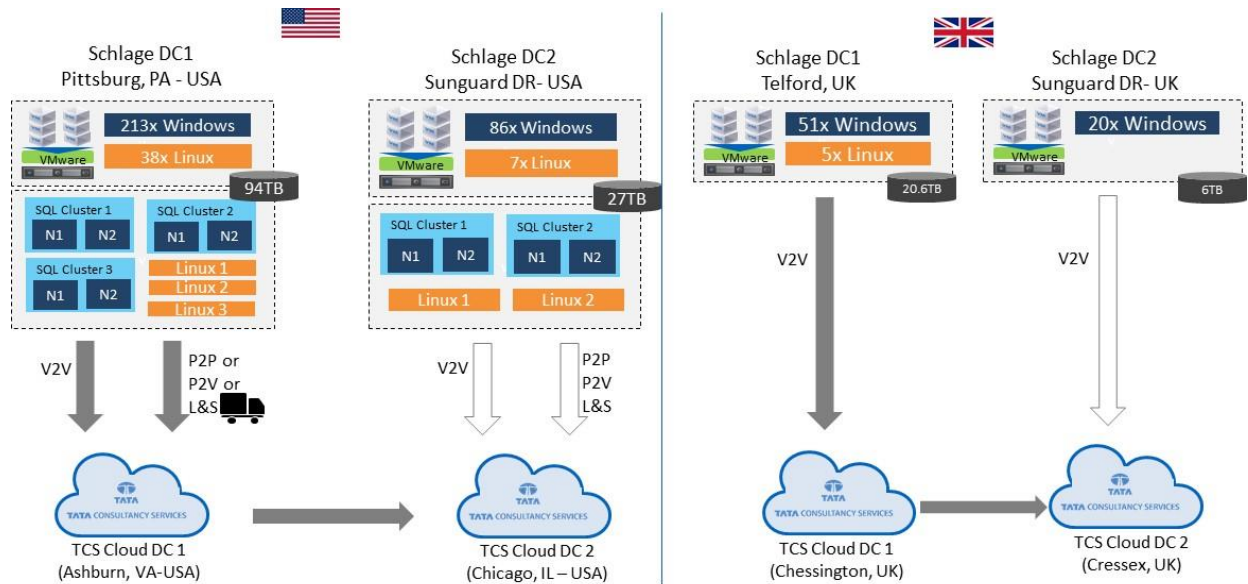
Step 1: Prepare - Team will setup migration tool and discover the source and target instances that participate in migration. Post the discovery, team will configure the discovered assets for migration as per migration strategy. Before and after the replication, the backup will be taken for each workload using Schlage's existing backup tool.

Step 2: Replicate – Using Migration tool's inbuilt replication technology, data will get replicated to target using block or file level. Post the first full replication, migrated workload will be tested in isolation to make sure data consistency and functionality. Post the test, incremental data replication will be initiated till cutover.

Step 3: Cutover – As per migration plan and schedule, the workload's replication will be verified and once again backup will be taken. Post the data safety verification, the cutover will be declared and executed. Final workload operations and functionality will be tested at target site.

Same migration tool will be used to migrate the existing Windows and Linux physical servers' migration using physical to physical (P2P) and/or physical to virtual (P2V) method.

Figure below shows the Schlage USA and UK Cloud environment migration overview.



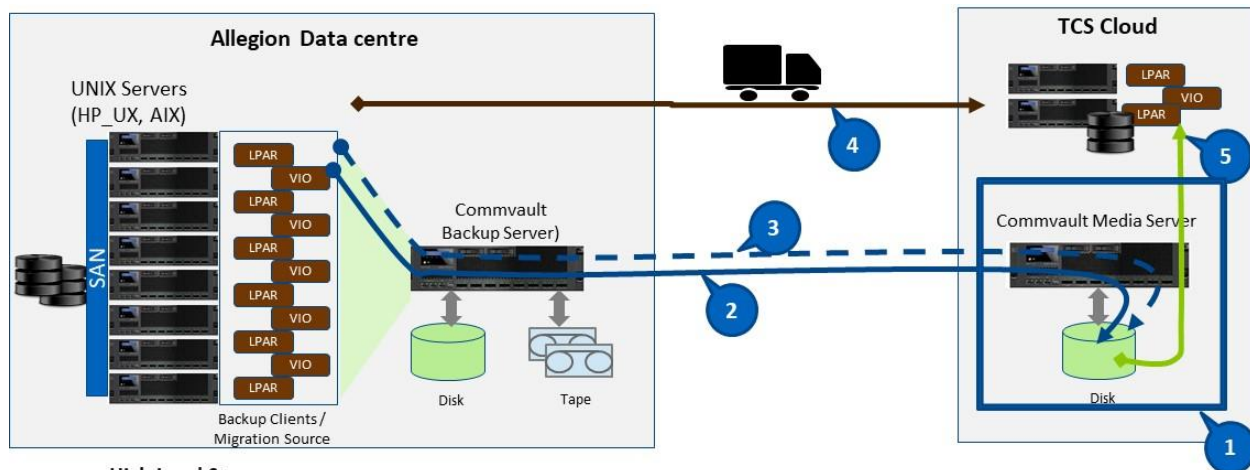
○ Schlage’s non-cloud environment migration

- HP_UX and IBM Midrange (AIX) servers’ migration

TCS has considered to physically lift and shift the UNIX (HP_UX and AIX) platform servers to TCS Enterprise Cloud’s colocation. Physical lift and shift migration method is based on the preparedness of source and target DC before lift and shift. TCS has considered using below two methods for UNIX servers’ migration.

Option1 – Using backup and recovery method

In this option, TCS will configure, existing UNIX servers as backup client of TCS Backup system and perform initial full backup and periodic incremental backup till the physical lift and shift. Figure below shows high level steps involved in this method.



High Level Steps

1. Prepare for migration (L&S)
2. Perform Full Backup of Source data to TCS Cloud disk target using Media server at TCS Cloud colocation
3. Perform Incremental Backup of Source data to TCS Cloud disk target using Media server at TCS Cloud colocation
4. Lift & Shift RISC Source servers to TCS Cloud as per Migration Plan
5. Restore data from TCS Cloud disk target to migrated servers using TCS Cloud media servers (if any data consistency issue).

Step 1: Prepare for migration

- Implement the Commvault Media server at TCS Cloud on x86 server.

Step 2: Perform Full backup of UNIX Source systems

- Reconfigure the Source Backup client (AIX or HP_UX servers) to point Backup media server hosted at TCS Cloud DC.
- Perform online full backup of “Root VG” and “File and Database file systems” of configured source systems using TCS cloud backup media server, two days prior to Cutover
- Post the full backup of source systems, roll back the client to the backup server at Source Data Centres for regular backup.

Step 3: Perform Incremental backup of Source systems

- During Cutover, stop application and database at source systems and reconfigure the client for Media server at TCS Cloud
- Perform online incremental backup of “Root VG” and “File and Database file systems” of configured source systems using TCS cloud media host. (This will take less time compare to full backup)

Step 4: Physically Lift and Shift UNIX systems to TCS Cloud and test.

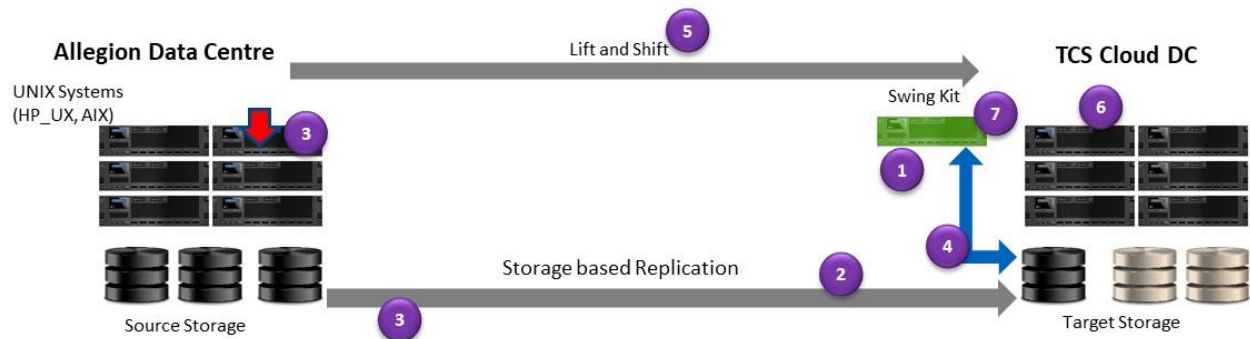
- Shutdown the UNIX systems and perform the lift and Shift to target Location.
- Verify the data consistency.
- Perform the functional testing at Infrastructure level
- Handover system to application team for testing and support application team during testing.

Step 5: Perform restore of migrated servers if need

- Power up and perform the data restore from the backup media server at TCS cloud and perform the functionality test.

Option2 – Using UNIX Swing kit

In this option, Schlage will provide UNIX swing kit to TCS. TCS install and configure the Swing kit at TCS Cloud colocation and initiate the data replication from existing DC to TCS DC. It is recommended to have compatible storage at Schlage DC for storage level replication or TCS can use the host based or database level replication to replicate the data to TCS DC. Post the data replication completes and data consistency checked at TCS DC using swing kit, UNIX systems at Schlage DC will get lift and shifted to TCS DC. Figure below shows high level steps involved in this method.



Step 1: Prepare the Swing Kit at TCS Cloud colocation and present SAN Storage to Swing kit.

Step 2: Perform initial replication of Source (HP_UX, AIX) systems data to TCS Cloud target using storage based / Host based replication method. Make sure replicated data is consistent before lift and shift.

Step 3: Stop the Application or Database on the Source Server (need to lift and shift) and complete final replication (100% sync) from source to target.

Step 4: Start the application and database on the Swing equipment at TCS Target DC using data replicated from source to target. Make sure data is consistent and users are able to access the data till source UNIX system is lift and shifted to target.

Step 5: Physical Lift and shift the Server from source to Target Data Centre

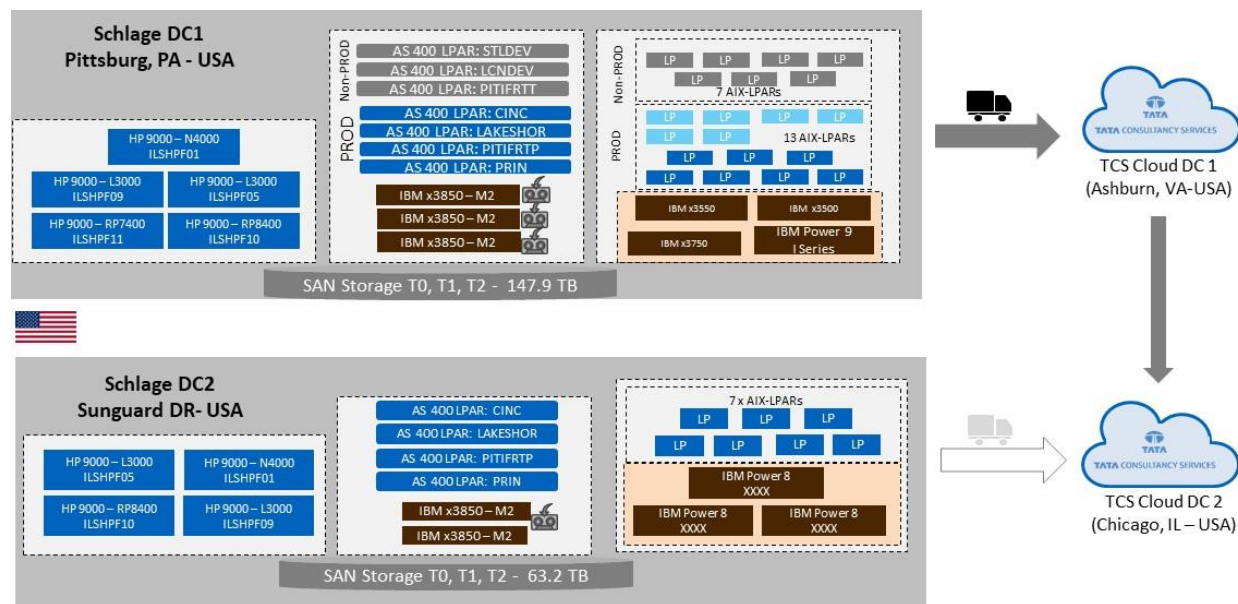
Step 6: At target data center, setup the lift and shifted HP_UX, AIX and other RISC system and perform functional testing. (Make sure swing kit is down)

Step 7: Release the Swing Server for next Unix Server Lift and Shift

- IBM Power system (AS 400) migration

<< Response from CBO Team >>

Figure below shows the Schlage USA and UK non-Cloud environment migration overview.



3.5.5 Migration Solution considerations

TCS has arrived at below listed migration Solution considerations after assessing and analysis of RFP requirements, query responses and inventory sheet. All these considerations will get reviewed during due diligence and final solution will get fine-tuned accordingly.

- Provided Migration plan and move group planning is tentative. It is required to complete detail due-diligence before actual migration plan.
- Schlage will provide the Migration links/Bandwidth required to migrate data.
- Schlage will provide the required infrastructure at existing DC to setup migration tool.
- TCS will perform Assessment, build the migration plan, risk & mitigation plan and play back with Schlage for approval.
- As per QA response, Migration starts from November 2019 and end by Q1 2020.
- TCS has considered to use PlateSpin tool to migrate Schlage Cloud environment's Windows and Linux virtual servers to TCS Cloud using V2V migration method
- Migration execution will not happen during December 2019, first two weeks of January 2020, month ends and closing days. However, TCS will make use of these period for Assessment, planning and readiness.
- TCS will execute the migration process or cut-over from 3rd week of January 2020 to end of March 2020.
- Any delay in source system readiness will impact the migration plan and schedule. During this event, Schlage and TCS will reschedule the migration process.

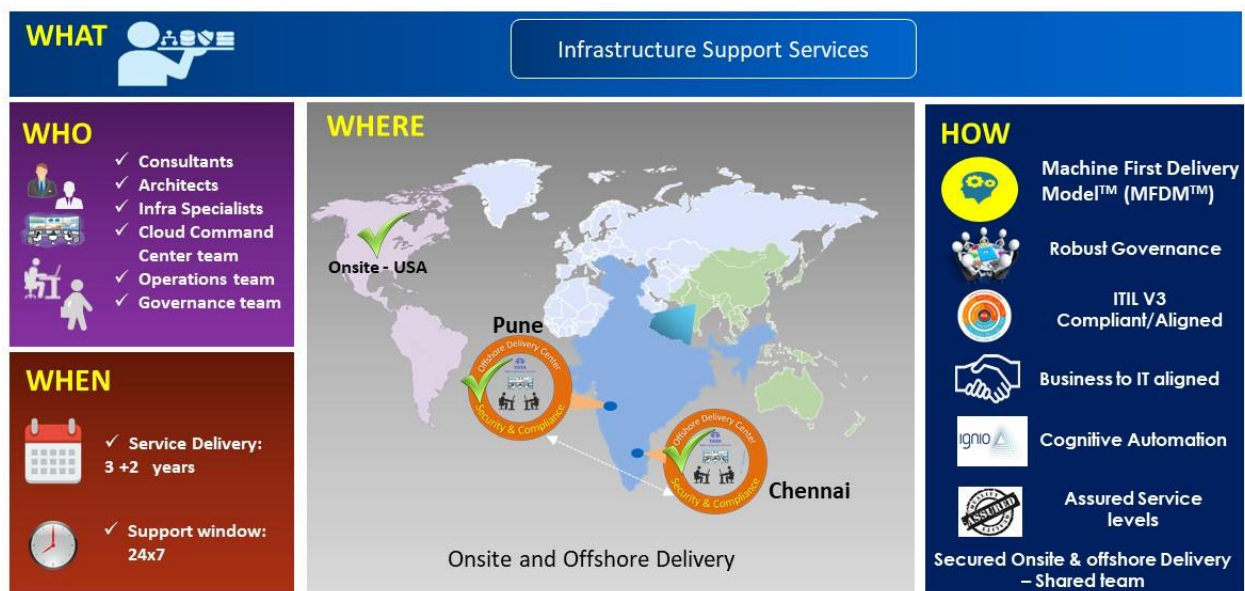
- TCS follows toll-gated migration process. Schlage has to nominate migration manage and participate in each migration process and review the migration tasks.
- If need (if mandated by IBM) Schlage will procure the IBM Professional services to lift and shift the IBM power i series servers.
- Schlage will procure the Insurance required for the assets which will get physically lift and shift to TCS Cloud.
- Schlage will provide the UNIX systems swing kit required for UNIX (HP_UX and AIX) server migration.
- Schlage will arrange extended planned downtime to physically lift and shift the non-cloud systems to TCS DC and/or DR.
- Post the migration and testing, migration team will hand over the documentation and transfer knowledge to TCS operations team.

3.6 TCS Proposed Operations Solution

TCS has successfully delivered and is delivering Fully Managed Infrastructure Services to several global customers through its Service Integration Framework in multi-vendor scenarios. TCS service delivery is based on W4H delivery framework and TCS's agile & flexible Machine First Delivery Model TM (MFDTM). Details of these framework and models are given here.

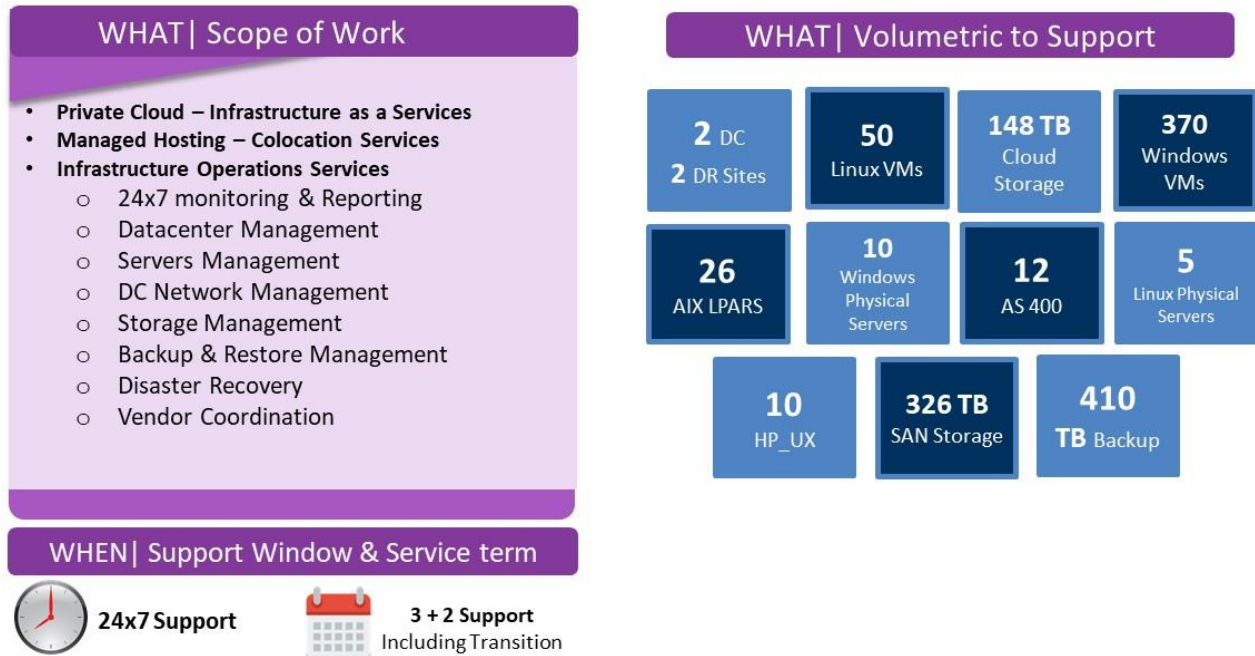
3.6.1 W4H Delivery Framework

W4H delivery framework provide details of What, Where, Who, When and How part of service deliver, which is depicted below.



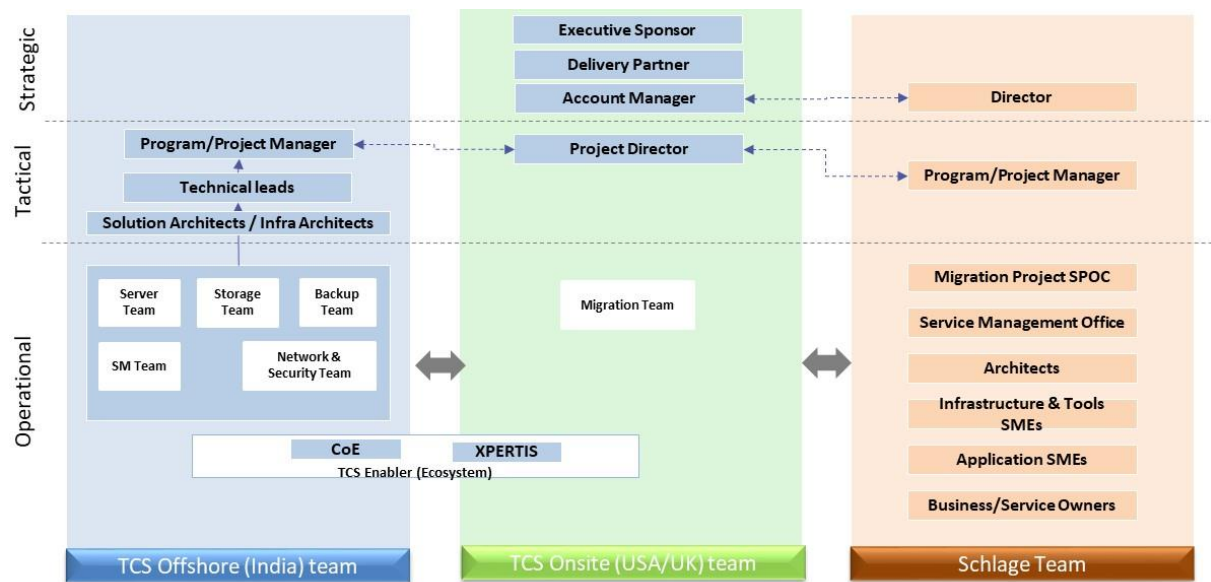
W4H | WHAT and WHEN to Deliver

WHAT part of the W4H covers, what is the volumetric supported by TCS and what is in Scope of services that provided by TCS to Schlage and WHEN part of the W4H covers the service window and service contract period as shown here.



W4H | WHO and WHERE to Deliver

WHO part of W4H provides who is responsible to deliver the service and agreed SLA. WHERE part of the W4H provides the detail of locations from where TCS will deliver the services. Following figure shows the proposed Infrastructure Support Services team structure.



TCS onsite core management team will operate from Schlage's corporate office location. Technical offshore team will operate from TCS – ODC (Offshore Delivery Centre) Chennai (Primary location) and TCS – ODC Pune (Secondary location). TCS Pune ODC will act as BCP for primary site.

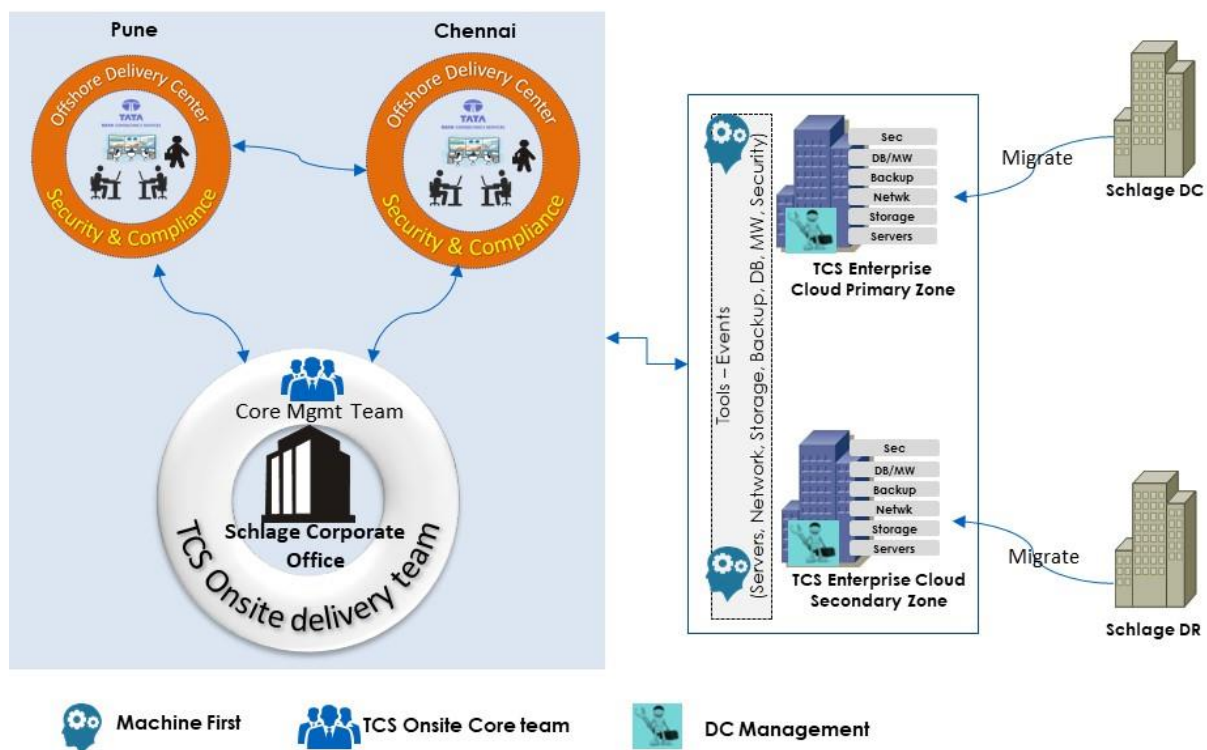
W4H | HOW to Deliver

Infrastructure Support Service will be delivered using Machine First Delivery Model™ (MFDM™). TCS proposed Service delivery model is Agile, Modular and Flexible, which is illustrated below



TCS offshore team will provide the Infrastructure support services which includes – 24x7 monitoring and reporting, manage, maintain and Operate TCS Enterprise Cloud's - Servers, OS, Storage, Backup and DC Network.

Alerts and events generated by Cloud and non-cloud IT landscape such as- Hypervisors, UNIX (HP_UX, AIX), AS400, VMs, Data Stores, Network, and Backup & Operating system will be captured by TCS proposed centralized monitoring tool Solarwind. The event co-relation engine of Solarwind will consolidate the events and reduce the noise. With the ability of auto ticketing functionality of Solarwind, tickets will get generated using the ServiceNow ticketing tool. 24x7 proactive monitoring team will fix the level 0 issues. If issue is not resolved, it will get escalated to level 1 and level 2.



With the help of proposed tools and existing Schlage tools, TCS Operations team at Onsite and Offshore will deliver the Infrastructure management, monitor, operate and maintenance services.

3.6.2 Service Level Agreement (SLA) and Known Performance Indicators (KPI)

TCS's Machine First Delivery Model (MFDM™), Agile methodology, Rigor in operations, robust governance, years of experience, skilled resources and Enterprise cloud are the TCS's strong levers to support in achieving the below listed SLA and KPI.

Operations and Infrastructure SLA and KPI:

SLA		Source	Target Level	Measure period	TCS Commitment
Service Fulfil	Service Request Fulfillment	Service Requests Resolution time	99%	Every 2 Months	Agree
Availability	Data Center Availability	DC downtime	99.99%		Agree
	Business Critical Systems Availability	Individual server uptime	99.50%	Monthly	Agree
		All servers in business critical availability pool uptime	99.96%	Monthly	99.90%
	Server Availability				99.90% Requirement: (Active-Active subscription is mandatory) Service Coverage – 24x7
		Platinum Servers uptime	99.96%	Monthly	
					99.80% Requirement: Active-Passive subscription is mandatory) Service Coverage – 24x7
		Gold Servers uptime	99.93%	Monthly	
					99.60% Requirement: Passive subscription is mandatory) Service Coverage – 16x7
		Silver Servers uptime	99.90%	Monthly	
					99.50% Service Coverage – 8x5
		Bronze Servers uptime	99.80%	Monthly	
	Optimized Storage Availability	Optimized Storage	99.999%	Monthly	99.50%
Problem Management	Root Cause Analysis Delivery	RCA	75%	Monthly	Agree
Backup	Backups	Backup success rate of all succeeded backup clients	98.80%	Monthly	Agree
Incident Management	Response and Resolution time	P1 Incidents	15 Min / 4 Hrs	Monthly	Agree
		P2 Incidents	1 Hr / 1 BD	Monthly	Agree
		P3 Incidents	1 BD / 3 BD	Monthly	Agree
		P4 Incidents	2 BD / 5 BD	Monthly	Agree
DR Management	DR Management	RPO - Replicated Data / Backup Data	4 Hr / 24 Hr		Agree
		RTO - Replicated Data / Backup Data	24 Hr / 72 Hr		Agree
KPI		Source	Target Level	Measure period	TCS Commitment
x86 Servers	x86 VM build / Provision	Time to provision Windows VM	95% delivered within 3 days		Agree
		Time to provision Linux VM	95% delivered within 5 days		Agree
	UNIX VM provision (LPAR)	Time to provision UNIX VMs	95% delivered within 5 days		Agree
	Physical Server Installation and Setup	Time to provision Windows servers	95% delivered within 5 days		Agree (post procurement)

		Time to provision Hypervisor	95% delivered within 5 days		Agree (post procurement)
		Time to provision Linux server	95% delivered within 10 days		Agree (post procurement)
		Time to provision Unix server	65% delivered within 10 days		Agree (post procurement)
Storage	Storage provision	Time to provision Storage post server ready	95% delivered within 3 days		Agree
Internet	Internet Access Availability	Internet egress access	99.97%		Agree
Quote	Hardware or Maintenance Quote	Time to return a quote request for Hardware or Maintenance items needed	80 % delivered within 10 business days		Agree

Delivery Commitments:

<u>Service</u>	<u>Committed Delivery Duration</u>	<u>Exceptions / Exclusions</u>
Wintel Virtual Instance	4 Hrs	
Linux Virtual Instance	4 Hrs	
Unix virtual Instance	TBD	
Physical Servers of any kind	5 Days	Post the Procurement
Storage additions	TBD	
VPN Tunnel Creation	TBD	
Firewall change requests	TBD	
Load Balancing change requests	TBD	

3.7 TCS Enterprise Cloud Case Studies

Currently TCS has on-boarded 35+ enterprise customers to TCS Enterprise Cloud. Customers have selected Hybrid Cloud and/or Private cloud solution and Colocation Services from TCS. TCS has supported customers to migrate their workload to TCS Cloud and also TCS is providing the Cloud infrastructure management services to on-boarded customers. Lister below are few TCS Enterprise customers whose workload and data foot print matches with Schlage.

Reference #1	
Company Name:	Global Logistics Company
Company Address:	Spanga, Sweden
Contact Name:	Ravinder Mann
Contact Phone Number:	416-529-6626
Contact Email Address:	Ravinder.mann@tcs.com
Date Work Undertaken:	May 2016

Customer name	Global Logistics Company HQ: Sweden
Contact names and telephones (business and technical)	Please contact TCS Client Partner for Schlage to schedule Reference call.
Brief description of TCS scope of services	<p>TCS Scope of Services:</p> <ul style="list-style-type: none"> • Six months of Service transition and migration • Fully managed services to support 600+ servers, 55 IT cards (each card represent group of applications) and 500+ TB (storage), ACI based Network infrastructure, Hybrid cloud management portal <p>TCS Solution:</p> <ul style="list-style-type: none"> • Hybrid cloud build and manage • IaaS support services • Service management co-ordination <p>Results Delivered:</p> <ul style="list-style-type: none"> • Infrastructure Transformation • Simplification and Virtualization • 80% increase in stability for mission critical applications • Zero outages during peak periods and Christmas • Ensuring high availability via business-aware command Centre • Hybrid cloud management portal implemented • Ignio implemented on Critical System for Self healing
Location(s) where services are delivered	Onsite Delivery: Customer location, Spanga Sweden Offshore Delivery: TCS Enterprise Cloud ODC at Pune and Chennai
How long has customer been using TCS services	TCS Enterprise Cloud – fully managed services for past 2 years

Reference # 2	
Company Name:	Leading Global Printer Company
Company Address:	Lexington, KY, USA
Contact Name:	Ravinder Mann

Contact Phone Number:	416-529-6626
Contact Email Address:	Ravinder.mann@tcs.com
Date Work Undertaken:	June 2006

Customer name	Leading Global Printer Company HQ: Lexington, KY
Contact names and telephones (business and technical)	Please contact TCS Client Partner for Schlage to schedule Reference call.
Brief description of TCS scope of services	<p>TCS Scope of Services:</p> <ul style="list-style-type: none"> • Three months of Service transition • 12 months of workload migration • Fully managed services to support • 87 Physical servers (71 Windows and 12 Linux) • 677 Virtual servers (635 Windows and 42 Linux) • 23 Oracle Sparc with 31 LDOMs. • Managed hosting and support for SAP HANA, Teradata • 700TB + Storage (SAN and NAS) • TCS SUSE OpenStack Orchestration and self service portal <p>TCS Solution:</p> <ul style="list-style-type: none"> • Private cloud build and manage • IaaS support services • Service management co-ordination <p>Results Delivered:</p> <ul style="list-style-type: none"> • 40% Savings in TCO • Netapp to EMC –Unified Storage • Sun to Linux Migration – Elimination of legacy platforms • Portable Infrastructure - Long term strategy of Customer • Better Performance • Charge back mechanism to Business • Better Asset Management
Location(s) where services are delivered	Onsite Delivery: Customer location, Lexington, KY, USA Offshore Delivery: TCS Enterprise Cloud ODC at Pune and Chennai
How long has customer been using TCS services	TCS Enterprise Cloud – fully managed services for past 12 years

Reference #3	
Company Name:	North American Distillery Company
Company Address:	Chicago, IL, USA
Contact Name:	Ravinder Mann
Contact Phone Number:	416-529-6626
Contact Email Address:	Ravinder.mann@tcs.com
Date Work Undertaken:	October 2016

Customer name	North American Distillery Company HQ: Chicago, IL, USA
Contact names and telephones (business and technical)	Please contact TCS Client Partner for Schlage to schedule Reference call.
Brief description of TCS scope of services	<p>TCS Scope of Services:</p> <ul style="list-style-type: none"> • Three months of Service transition • 12 months of workload migration • Fully managed services to support • 84 Physical servers (Reduced from 820 to 84) • 1987 Virtual servers • 2400 Databases • 4PB Storage (SAN and NAS) • 500+ Applications • SAP HANA • TCS SUSE OpenStack Orchestration and self service portal <p>TCS Solution:</p> <ul style="list-style-type: none"> • Private cloud build and manage • IaaS support services • Service management co-ordination • Integration with Azure public cloud • Backup as a Service for remote sites using existing backup architecture and client license. • Agility to provide DevOps model for business expansion. <p>Results Delivered:</p> <ul style="list-style-type: none"> • Higher virtualization • Platform migration (HP_UX and AS400 to Linux)

	<ul style="list-style-type: none"> Platform migration (Exadata appliance with 6 nodes to x86 physical servers) Self-Service portal to create the request for new server provisioning, existing server upgrade, additional storage provisioning etc. Reduced TCO as TCS is maintaining from hardware to application Single reporting and governance mechanism for entire support stack – SLA performance, availability, CSI, RCA, security compliance, process improvement, trend analysis. Advanced hardware layout (design and clustering) for both operating system and application to minimize licensing cost and efficient capacity utilization
Location(s) where services are delivered	Onsite Delivery: Customer location, Chicago, IL, USA Offshore Delivery: TCS Enterprise Cloud ODC at Pune and Chennai
How long has customer been using TCS services	TCS Enterprise Cloud – fully managed services for past 2 years

Reference #4	
Company Name:	Premium Nordic Insurance Provider
Company Address:	
Contact Name:	Ravinder Mann
Contact Phone Number:	416-529-6626
Contact Email Address:	Ravinder.mann@tcs.com
Date Work Undertaken:	Feb 2015 onwards

Customer name	Premium Nordic Insurance Provider
Contact names and telephones (business and technical)	Please contact TCS Client Partner for Schlage to schedule Reference call.
Brief description of TCS scope of services	TCS Scope of Services: Service Desk Services <ul style="list-style-type: none"> 5200+ end users in 4 languages

	<ul style="list-style-type: none"> • Global Delivery Centres: Denmark, Sweden, Norway and Riga <p>End User Computing Services</p> <ul style="list-style-type: none"> • Total 41 sites across Europe (Denmark, Sweden, Norway) • Total 5500+ devices (desktops, laptops, thin clients & Mobile Devices) • 3400+ Virtual Desktops/Dynamic desktops deployed • Automation & Self-service as first level support. Leverage Self-help knowledge base, Self-heal through DaRT, AppStore leveraging Citrix XenDesktop 7/SCCM 2012 • TCS Partner services for onsite dedicated/on-call desk-side support • Desk side support through ATEA, white box supplier <p>Data centre Services</p> <ul style="list-style-type: none"> • 3 Data centres (Denmark, Sweden), Data room in 15 remote Customer office locations in Nordic • Landscape: 1200+ Servers, 3 Mainframe LPARs, 74 AIX LPARs, 1+ PB Storage, 1000+ TB Backup, 300+ NW devices, 500+ NW Wireless access points, 300+ Database instances, Exadata, Exalytics, Data Power, 15+ Middleware Technologies, New ITSM Tools and Process <p>Cross Functional Services</p> <ul style="list-style-type: none"> • Incident, Problem, Change Management • Release Management coupled with Configuration management process or CMDB • Knowledge and Event Management • Service integration & centralized service Management tool • Service catalogue with a common governance process <p>Managed Network services</p> <ul style="list-style-type: none"> • WAN links for Data / Voice and Video Traffic • Tunnel between DC and Sites for Site to Site VPN connectivity • Wireless deployment and use of portable devices within the network • Network LAN infrastructure <p>TCS Solution:</p> <ul style="list-style-type: none"> • Application-driven Data Center Migration and Services transition within 6 months • Better appreciation of Customer business and Application stack due to TCS' existing AD / AM engagement leading to customized and precise transition plan
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	<ul style="list-style-type: none"> • Setup of basic Infrastructure and security in target Data Center at start of Data Center Migration • Risk-mitigated and Seamless transition because of <ul style="list-style-type: none"> ➤ Analytics-driven TCS Solution Accelerators such as eTransform ➤ Scientific Transition Methodology focusing on Red Zones ➤ Proven experience in Data Center Migration and Transition for global customers ➤ Knowledge and Tools-driven transition rather than people-driven ➤ High degree of automation eliminating errors during Transition and Data Center Migration. ➤ Migration of services in AS-IS state to target Data Center during transition ➤ Lift and Shift of legacy applications / appliances • Leverage TCS Insurance domain and Application knowledge (leveraging TCS AD / AM team) to categorize, prioritize and plan for applications migration • Hosting of Mainframe services from KMD (our Data Center partner) • Tie-up with local Service Provider (Atea) with extensive presence and experience of services in Nordics region for managing Service Desk and End User Computing (EUC) • Well-established Transition governance and stakeholder management <p>TCS Transformation (0 – 6 months) before exit of incumbent</p> <ul style="list-style-type: none"> • Risk mitigated migration approach to 2 regional data centres • Application-Driven Infrastructure Transformation • Increased Virtualization from 30% to 95% leading to DC cost reduction • Phased approach to de-risk services transition • Collaborative organization change management • Innovative 3rd party vendor management • Application-Driven Infrastructure Transformation • Well defined server migration waves planning considering application dependencies and business requirement • Phased approach to de-risk services transition • Service Integration & Management - Complex transition with Service Desk, EUC towers, & ITSM tool going live simultaneously <p>Results Delivered:</p> <ul style="list-style-type: none"> • Reduction in overall Infrastructure Foot Print (90% Virtualization on Wintel and Linux)
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	<ul style="list-style-type: none"> • 30% reduction in number of Servers by identifying unused applications and server consolidation • Improved Disaster Recovery Capabilities by implementing Active-Active DC • Increased Redundancy, Standardization and Adaptability • Improved Monitoring and Security by defining appropriate KPI's and Security Metrics • End to End SLA Management by implementing Service Integration and Management • Incident count reduced by 60% (from ~2500 to ~1000)
Location(s) where services are delivered	Customer Locations - Denmark, Sweden, Norway TCS Delivery Center – Kolkata
How long has customer been using TCS services	Infrastructure Services – January 2014 onwards. Contract period of 5 years with an extension of another 2 years

Reference #5	
Company Name:	A Large UK Public Sector Workplace Pension Provider
Company Address:	
Contact Name:	Ravinder Mann
Contact Phone Number:	416-529-6626
Contact Email Address:	Ravinder.mann@tcs.com
Date Work Undertaken:	Feb 2015 onwards

Customer name	A Large UK Public Sector Workplace Pension Provider
Contact names and telephones (business and technical)	Please contact TCS Client Partner for Schlage to schedule Reference call.
Brief description of TCS scope of services	TCS Scope of Services: The scheme was set up in 2010 as a pension scheme provider that enables employers to automatically enrol eligible workers in line with their duties under the UK Workplace Pension Reforms which came into force from October 2012.

	<p>The scheme has a Public Service Obligation (PSO) with legal obligation to be open to any employer who chooses to use it as the scheme to fulfil their auto enrolment duties. The scheme is expected to enrol around 7.2+ million members by 2018 and grow into one of the largest workplace pension providers in the UK.</p> <p>Scope of services included Establish the core pension administration platform (TCS Bancs Insurance) for scheme administration Develop Digital capabilities with extensive focus on user experience Build and maintain the underlying infrastructure and applications</p> <p>TCS Solution:</p> <ul style="list-style-type: none"> • Data Center setup for core and surrounding applications • Continual improvement of the customer experience layer • B2B data transfer solutions • Introduction of an intermediary layer • Integration of IVR and CRM solutions • Introduction of a new accounting and cash management solution • Introduction of integrated Live Chat • Payroll Integration via Web Services API solution • Data Hub and Data Analytics for Customer Behavior and Capacity Planning • Security and Component Monitoring Solutions in the ongoing development of the IT Command Centre <p>Results Delivered: By virtue of the scheme design, its customer centric approach coupled with a multi-channel strategy for scheme interaction this scheme has been able to:</p> <ul style="list-style-type: none"> • Become the large contribution pension scheme covering 675,000+ employers and over 7+ million low–middle income employees. • ‘Digital by Default’ with 95 % processes delivered through digital channels. • Certain key functionalities implemented through IVR • Realize a lower than envisaged opt-out rate, averaging at well below 10 percent. A contributing factor has been the behavioral science based strategy adopted. It promotes participation by demonstrating the financial value delivered by remaining in the pension scheme, avoiding jargon heavy communication, simplifying enrolment, and enhancing user experience • Complete the processing of over 97 percent of opt-outs over digital channels, which would have been a burden on employers, if not for the availability of online, telephony and IVR channels
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	<ul style="list-style-type: none">• Deliver over eleven million member/employer communications over electronic channels
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4. Wide Area Network (WAN)