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Test Environment Management

Full Lifecycle Delivery and Support

The Test Environment Management (TEM) service enables organizations to speed up their software release schedules by up to 25%, cut infrastructure costs by 5-10% and increase team productivity by up to 30%.

The business demand for faster time to market, lower cost of ownership and higher levels of quality within organizations' IT landscapes has not changed since the dawn of the information age.

As companies continue to search for better ways to achieve these fundamental aims – whilst also keeping pace with modern trends such as big data, social media and multi-channel solutions – their goals are becoming much harder to realize. The increased integration and complexity of requirements placed on solution delivery lifecycles can see release schedules slip or lengthen organically over time.

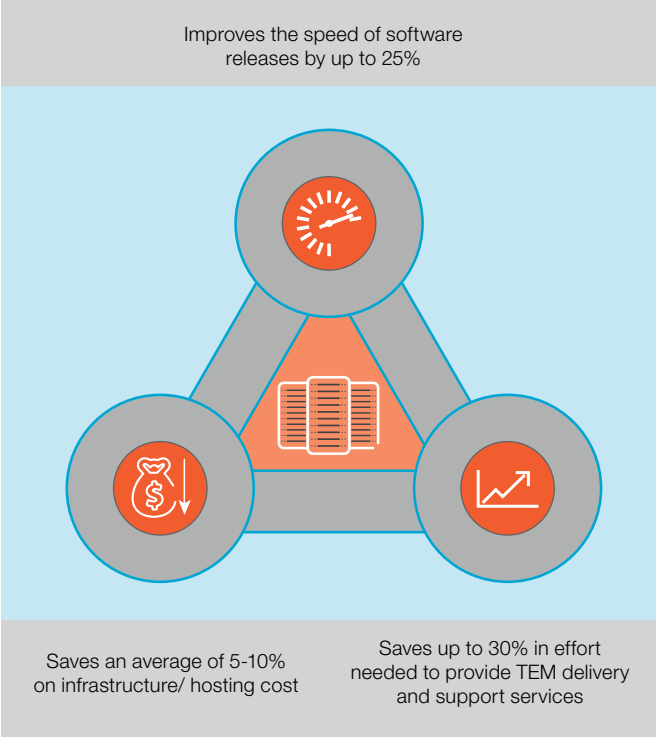
To successfully test business applications end-to-end, across multiple user channels and through the distributed systems landscape and proliferation of system interfaces, the organization must have the right environment, controlled change, and tailored support practices.

The **Test Environment Management** service from Capgemini Group and Sogeti fulfills all these demands.

Business benefits

The Test Environment Management (TEM) service enables organizations to speed up their software release schedules by up to 25%, cut infrastructure costs by 5-10% and increase

Figure 1: Benefits of TEM service



team productivity by up to 30%. It does this by addressing the critical testing challenge:

How to improve product quality and time to market whilst minimizing cost

The emergence of more sophisticated application solutions, combined with cheaper storage and alternative infrastructure models such as virtualization and cloud technologies, have led to businesses' IT landscapes becoming increasingly integrated and complex. More than ever, managers are under pressure to maintain control of these application ecosystems whilst maximizing the availability and utilization of these investments, in order to speed up their overall product time-to-market.

Take payment systems, for example. Most are now settled in real-time, rather than at pre-defined time periods (overnight batch) as they were previously. And as IT architectural trends evolve (payments hubs), the demands on distributed systems integration and testing across shared services environments have escalated rapidly, while organizations continue in their drive to reduce overall development and testing investment. This has significantly added to the complexity of managing competing projects, releases, change schedules and business priorities.

Organizations typically need a number of test environments for every production application – they may require anywhere between one to 250 different environments for a single business application. With the growth in 'agile' development environments, the need for frequent software releases has also increased, sometimes to the level of hourly or on-demand.

Many approaches are available today to help companies solve their demand for rapid code and the associated environment provisioning requirements. These include automated build technologies, cloning technologies and strategic service virtualization technologies.

But these practices bring their own problems. How do you ensure the test environment is broad and representative enough to test all possible scenarios? How do you safely integrate those test environments into the pre-existing landscape? How do you effectively co-ordinate release priorities and control change in a shared services environment? How do you ensure you can re-use the same environments time after time?

Simply put, companies struggle to deliver test environments fast enough for their ever-growing development schedule. Many clients have summed up this challenge: *"We know about our core systems. We know about the business processes, configuration and data in our systems. But we don't know how to deliver and manage the test environments well enough to meet our time and cost expectations."*

The solution

The Capgemini and Sogeti Test Environment Management service tackles organizations' key testing challenges:

- It minimizes the cost of testing – by utilizing smaller asset footprints to support test projects.
- It shortens the time to release – by simplifying and automating the environment delivery and support services, across development and testing.
- It ensures the quality of testing – the environments are representative of the 'live' production situation, making the test fully valid.
- It improves test coverage – environments are integrated, incorporating all relevant risks and requirements.

How does Test Environment Management deliver?

Test Environment Management is a professional services-led approach that:

- Analyzes an organization's current software testing and test environment management.
- Proposes what actions (policies, standards, processes, guidelines) and toolsets are needed to improve testing within the organization.
- Helps customers choose the right tools.
- Offers a pilot or proof of concept to show the selected tools can deliver the test environment required within the client organization, and that the proposed process can deliver the expected benefits.
- Provides a full TEM rollout.
- Supports and trains customers all the way through the process and even after the rollout.

The TEM approach enables clients to begin testing earlier, at a higher quality and at a lower cost to the organization.

The more applications a company has, the harder it is to create good end-to-end environments. The configuration and systems integration settings must be correct for an end-to-end scenario, otherwise testing suffers because the business can only test part of its system.

Using TEM, Capgemini and Sogeti can help customers improve their testing by understanding their complete systems landscape, including the number of environments, configuration and integration points. By understanding the dependencies and controlling the impact of change on this landscape as it relates back to the project pipeline (environment traceability), utilization and test productivity are maximized.

TEM also leverages Capgemini and Sogeti's Test Data Management (TDM) service, which identifies the complete data landscape across all the client's applications and, by so doing, can introduce and mask data across all systems. By ensuring data integrity is maintained across the end-to-end application landscape, the TDM service ensures all data is aligned across all systems, if that is needed to achieve the goals of the test strategy.

TEM works by implementing environment delivery techniques which are fit-for-purpose or relevant to the phase and scope of testing. For example, in the System Testing (ST) test phase, TEM ensures that an appropriate environment, configuration and landscape integration are available or delivered, in order to allow the testing to be completed successfully.

TEM's techniques

Three techniques are used to deliver accurate test environments:

1. Constructing a new test environment – the most labor-intensive and time-consuming of the three approaches.
2. Copying an existing test environment – less labor-intensive, due to the use of cloning tool suites and potentially less configuration, integration and test data provisioning activity.
3. Re-using an existing test environment – the least labor-intensive option as it uses existing baselines of application code, configuration, integration and test data.

Re-using the existing environment is the optimal technique as it is the lowest cost-and-effort solution. This highlights the importance of getting projects to share test environments successfully, as it results in the most cost-effective TEM landscape possible for the client organization.

The delivery activities and effort involved in the TEM service environment can vary depending on the technique chosen and may involve:

- Environment cloning (copying).
- Infrastructure and platform (operating system) provisioning.
- Application provisioning (code compilation and installation).
- Workplace technology provisioning (lab environment).
- End-user provisioning (mobile device environment).
- Configuration (system, module, sub-module).
- Integration (endpoints).
- Service virtualization.
- Test data provisioning (traceability, privatization, segregation, ETL – extract, transform, load).
- Shake-down testing (automation).
- Monitoring (automation).

Capgemini and Sogeti continually examine how the client's test environment investment can be optimized through the introduction of new or more cost-effective infrastructure, storage and tool solutions.

Why is TEM from Capgemini and Sogeti different?

- **Better service.** TEM not only helps to deliver test environments, it improves the test process. Capgemini and Sogeti can create the best set-up for the client: for example, they can plan and co-ordinate the sharing of environments, select tools, and educate and coach employees.

  The set-up of TEM is a one-time activity, but the service supports ongoing delivery. This not only allows the client to create their test process, but offers them the opportunity to improve it. This combination makes the TEM approach unique.

- **Full service.** TEM uses the leading TMAP® and TPI® test methodologies originally developed by Sogeti to manage the entire test environment – whether that's the infrastructure, data or just ensuring the live production systems are replicated as closely as possible.

Capgemini Group is the only testing service provider that covers the full testing lifecycle. Other suppliers may offer implementation services for tooling or build automation; and there are tool vendors and specialists in build automation. But no single toolset can handle the whole task; and build management is only a small part of the overall solution.

Capgemini and Sogeti take responsibility for the full service delivery, incorporating testing tools, the management of test environments and data, and understanding the issues. They do this by partnering with major tool vendors and helping to integrate the customer's testing process.

"We know testing. So we know test environment management."

Benefits of Test Environment Management

- Lower test environment set-up and support costs.
- Flexible and faster test environment provisioning and support services delivery.
- End-to-end environment management.
- Greater co-ordination and control of change.
- Defined and measureable outcomes.

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Challenges in Test Environment Management

- Speed and agility in test environment support services.
- Lengthy test environment delivery timeframes.
- Size and complexity of end-to-end test environments.
- Developing the business case.

Test Environment Management's end-to-end service

Capgemini and Sogeti deliver TEM using a four-stage approach:

- Initiation.
- Set-up.
- Rollout.
- Operations.

Each stage includes a number of integrated, yet also separately available services:

Stage 1: Initiation.

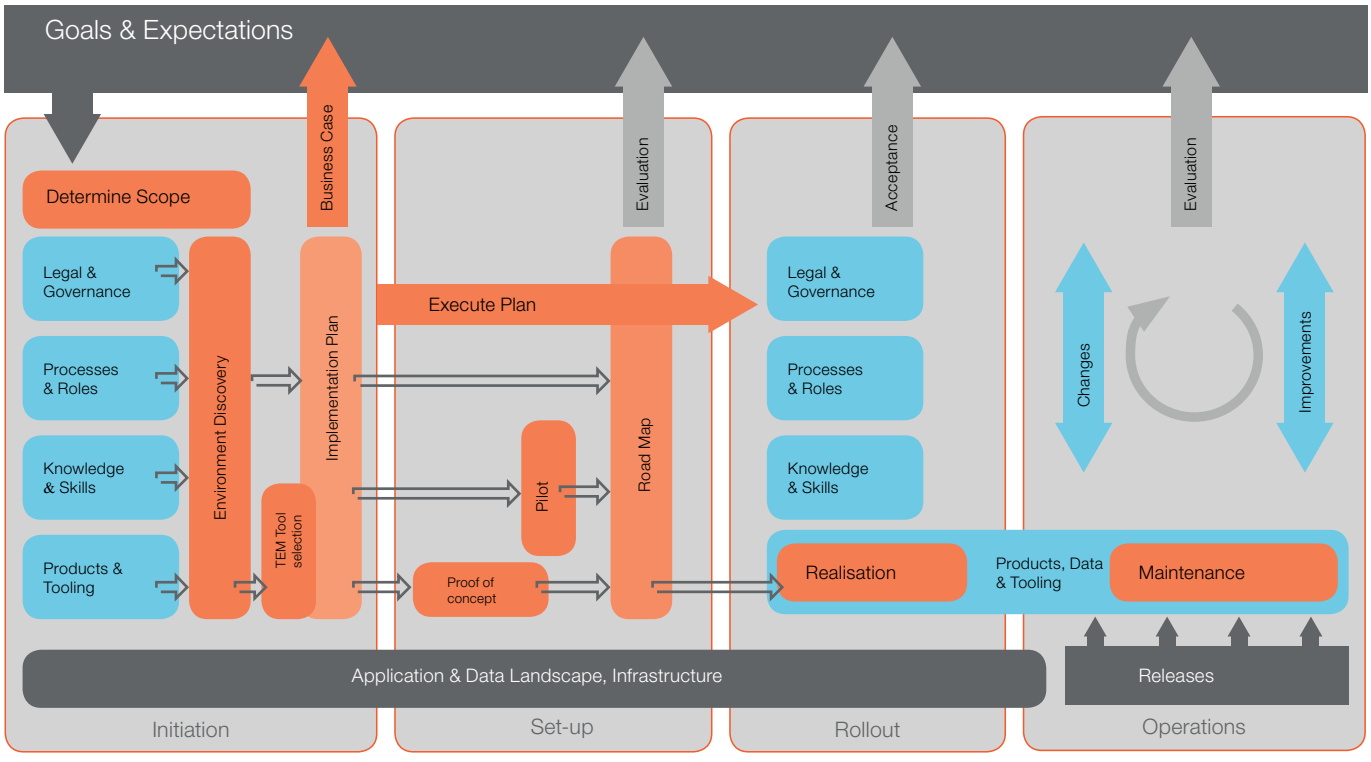
The goal of this phase is to identify the opportunities to improve the customer's test environment management operations and to speed up the process. Based on this, Capgemini and Sogeti identify tactical and strategic objectives and formulate plans for the future. They also formulate conditions for a business case and set up an approach for selecting the most relevant tools.

One key service during this stage is the **Quality Blueprint (QBP)**, an IT service management capability assessment that allows the customer insight into what problems need to be addressed, and the steps which need to be taken to solve them.

Based on tried-and-tested ITIL (Information Technology Infrastructure Library) software development standards, QBP:

- Analyzes the client's current test environment management situation, including:
  - The existing applications/data landscape, environments and infrastructure.
  - Which processes and roles are in place.
  - How often environments are shared/re-used.
  - The requirements of the test team.
  - The requirements of the project teams.
- Proposes what actions are needed to embed TEM into the organization and what TEM tools are needed to achieve this.
- Identifies the benefits, if any, of introducing the TEM process and using the TEM tools – including describing the current problems, proposed improvements and expected results; and highlighting the expected business benefits, from small, tactical solutions up to total implementation of TEM.

Figure 2: Test Environment Management end-to-end service



Another key service in the Initiation stage is the **Implementation Plan**, where Capgemini and Sogeti draw up a strategy for the TEM implementation or improvement process, including:

- Project set-up.
- Detailed business case for the improvement/introduction of the TEM process and corresponding TEM tooling.
- Tools selection process.
- Proof of concept.
- Pilot.
- Rollout/implementing the TEM process.
- Operational after-care.

Stage 2: Set-up.

Sometimes clients want a demonstration that the proposed TEM process is workable and can deliver the expected benefits. Capgemini and Sogeti offer the required **TEM Pilot,** which involves:

- Defining the TEM Pilot – determining its goals, tool environment, scope, coverage and control measures used.
- Preparing the TEM Pilot – installing and configuring the tooling, defining the TEM process outlines for the pilot organization, creating the TEM workspace on the client's infrastructure, and determining and analyzing the general test data requirements.
- Performing the TEM Pilot – executing all stages of the TEM model within a pilot environment, including performing the most high–risk activities in all stages of the model.

Stage 3: Rollout.

During this phase, Capgemini and Sogeti introduce the selected toolset, and the TEM service acts as an instrument for test environments. Services provided include **Tools Implementation** and full **TEM Rollout.**

Through the TEM Rollout service, Capgemini Group introduces the full TEM cycle into the customer organization.

Business case

Presenting a business case for TEM is characteristically difficult. The burden of setting up a test environment lies mainly within the testing department, but responsibility for the cost of test environments is often located in different parts of the organization. As the investment and payback are therefore felt on different sides of the organization, the benefits and costs are difficult to combine.

Capgemini and Sogeti can help clear up this confusion and present decision makers with a clear business case for the costs and benefits of using TEM in their organization.

Once the TEM process has been set up, it can be applied to new software development projects, or to maintaining existing applications. Capgemini sets up the environments for an application/new release via a five-step process:

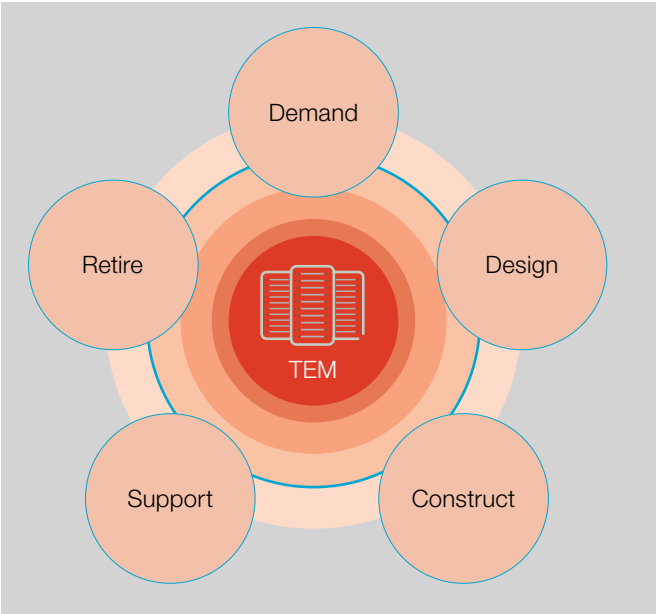
1. Demand. Capgemini or Sogeti gains an understanding of the demand for test environments in the particular client situation, then determines and details the test-specific requirements – the number of test environments, scope of the data sets, configuration, integration, etc.

2. Design. To turn demand into a design of the test environment, Capgemini/Sogeti determines the solutions for provisioning test environments based on what is in scope. This may include building new environments, either from the ground up or from templates, and/or sharing existing environments within the client landscape. This phase consists of determining tool requirements and set-up, to manage artifacts (code, packages, configuration) for re-use, compliance and audit purposes.

3. Construct. After the TEM tooling has been set up and tested, application environments are configured and integrated into the right environment at the right time. Other services available through the Capgemini Group and Sogeti during this stage include:

- Managing the provision of test data within the application environments.
- Keeping test environment codebases up-to-date (aligned).

Figure 3: TEM's five stage approach



- Reseeding test environments with data from the central test data repository.
- Rolling back the environment to pre-determined baselines.

4. Support. After the environments have been provisioned, the test teams will require support on many levels from the environment team, including:

- Incident prioritization.
- Change delivery (configuration, builds, firewall rules).
- Job execution (batch, file transfers).

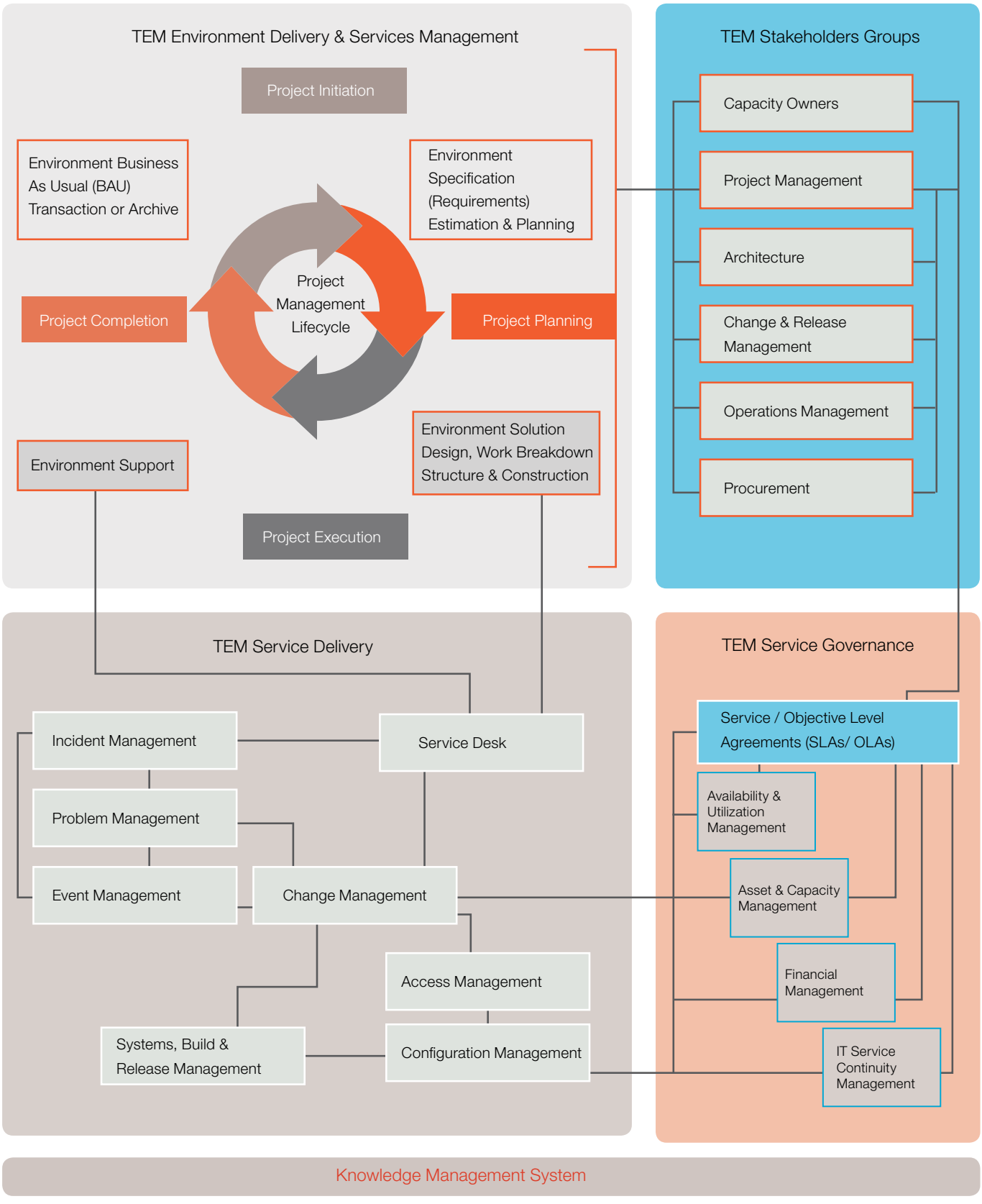
5. Retire. After the project requirements for the test environment have been fulfilled, the test environment assets are retired. This may include:

- Handover to the next project/release team for continued product delivery and integration.
- Handover to business-as-usual (BAU) support teams for on-going product and solution maintenance.
- Archiving for use at a later date to be determined.
- Decommissioning as future demand does not warrant continued investment.

Stage 4: Operations.

Capgemini/Sogeti defines the required changes to keep alignment with live production environment baselines and continues to improve the test environment delivery and support process. Services offered include maintenance of set-up, 'feeding and watering' of environments, as well as training and support.

Figure 4: Test Environment Management Operations



Benefits of Test Environment Management

The two case studies below prove the benefits of TEM:

Client 1: Large international bank with 1,000-plus application environments

Challenges

- Support in-flight pipeline of work comprising up to 100 concurrent projects.
- Reduce build failures by an average of 75%.
- Reduce release timelines by an average of 5%.
- Increase service delivery efficiency by 25%.
- Reduce infrastructure footprint by 2%.

Project characteristics

200 applications within over 1,000 environments, with platform upgrades, updates and migrations occurring continually. Platforms range from mainframe to web applications, mobile solutions, cloud and lab technologies.

TEM approach

Identified business risks

- Knowledge management practices.
- Silo-based operating model.
- Key resource points of failure.

Goals

- Set up services-based operating model (best practice).
- Set up centralized knowledge repository including integrated project, release, service and configuration management.
- Reduce effort associated with support of environments once delivered by simplifying processes and introducing service/objective level agreements (SLAs/OLAs).
- Reduce the need for so many test environments through better requirements capture, analysis and change control.

Results and benefits

- As a service operating model, delivery (including service breakdown) became aligned to industry best practice.
- Integration with Capgemini/Sogeti standards, processes, guidelines.
- Introduction of OLAs for environment delivery and support teams, including measurement and reporting automation.
- Build failure reduced by 50% (ongoing initiative).
- Release timeframes reduced by an average of 6%.
- Service delivery productivity improved by 25%.
- 4.5% reduction in development and test environment infrastructure.

Client 2: Insurance institution

Challenge

- Continual delay in pipeline project delivery due to environment delivery delays and change implementation failure.

Project characteristics

50 integrated applications including a shared, client-facing front-end and a core systems back-end.

TEM approach

Identified business risks

- Shared systems management processes ill-defined and managed.
- Poor requirements capture and utilization traceability.
- Weak shared-systems change control processes.
- Weak dependencies and impact assessment practices.

Goals

- Streamline shared services management processes.
- Establish dependent team's service/objective level agreements (SLAs/OLAs).
- Reduce change failure rate by 15%.
- Improve environment provisioning lead-time by 25%.

Results and benefits

- Centralized engagement, requirements capture and estimation, including traceability.
- Centralized shared service change advisory board (CAB) formalization, including change ownership, dependencies and impact assessments coupled with formalized approval processes.
- Change failure rate reduced by 17%.
- Environment provisioning lead-time reduced by 25% through OLA introduction and simplified request, measurement and control process, including tool integration.

To successfully test, the organization must have a test environment which is fit for purpose. This is the key challenge addressed by Capgemini group's test environment management (TEM) service.

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About Capgemini and Sogeti

With more than 125,000 people in 44 countries, Capgemini is one of the world's foremost providers of consulting, technology and outsourcing services. The Group reported 2012 global revenues of EUR 10.3 billion. Together with its clients, Capgemini creates and delivers business and technology solutions that fit needs and drive the results they want. A deeply multicultural organization, Capgemini has developed its own way of working, the Collaborative Business Experience™, and draws on Rightshore®, its worldwide delivery model.

Sogeti is a wholly-owned subsidiary of Cap Gemini S.A., providing local professional services, specializing in Application Management, Infrastructure Management and High-Tech Engineering. Sogeti offers cutting-edge solutions around Testing, Business Intelligence, Mobility, Cloud and Security. Sogeti brings together more than 20,000 professionals in 15 countries and is present in over 100 locations.

The Capgemini Group has created one of the largest dedicated testing practices in the world, with over 11,000 test professionals and a further 14,500 application specialists, notably through a common center of excellence with testing specialists developed in India.

Together Capgemini and Sogeti have developed innovative, business-driven quality assurance (QA) and Testing services, combining best-in-breed testing methodologies (TMap® and TPI®) to help organizations achieve their testing and QA goals.

Learn more about us at

www.capgemini.com/testing

www.sogeti.com/testing

Contact

For more information about how Capgemini and Sogeti's Testing Services can help organizations achieve their testing and QA goals, please contact your local Capgemini or Sogeti account manager or our Global Testing Services Team:

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