

---

# TESTADVANCE TEST-SYSTEM OPTIMISATION SERVICES (TSO)

Related Documents:

Testadvance Test-System Engineering

Testadvance Test-System Specification (TSS)

Testadvance Test-System Design (TSD)

Rev D.01 Last modified: 15/05/10 Author: Ralph Becker

## Assessment

### Analysis of Testing

- Further productivity, yield & throughput
- Reduce costs & improve utilisation
- Reduce test-times
- Reduce Work In Progress, re-work and NTF/'false-fails'
- Increase utilisation of implement continual test-reduction
- Improve control and feedback between test-engineering, product-development and manufacture

### Optimisation of Test-System/Test-Plan

- Accelerate ramp-up test-cycles
- Improve ROI/ROA

Testadvance Test-Optimisation services help engineers and managers further the performance of testing, sensibly, reliably and cost-efficient

# 1 Introduction

Testadvance Test-Engineering Services provide test-engineers and managers with specification, design and optimization of Functional Test. The services integrate with the client's 'Test Life-Cycle'.

- Test-Specification
  - Requirements Analysis, Functional Design, System Requirements Specification
- Test-Design
  - System-concept, Test-Architecture, System Instrumentation, Test-Plan
- **Test-System Optimisation**
  - **Scope, Analysis, Measures, Execution, Review**

Services	Product/Service	Test-Engineering work-elements and deliverables	Production/Operation
▲ <b>Test-System / Test-Plan Optimisation</b>	<b>Feedback</b>  <b>Test-data</b>	<b>Benchmark &amp; Review</b> <b>Plan and execute implementation</b> <b>Design optimisation</b> <b>Analyse Test-System/-Stage</b> <b>Scope Optimisation</b>	<b>Monitor, leverage</b> <b>Outcomes</b> <b>Measures</b> <b>Test-Plan, Test-Data</b> <b>Target, extent</b>
▲ <i>Test-System / Test-Plan Design</i>	<i>Product /Service Test-specification</i> <i>Test-Methods &amp; Procedures</i>	<i>Benchmark performance</i> <i>Develop Implementation briefs (opt)</i> <i>Compile Test-Plan</i> <i>Design Test-Sequences, -Routines, -Cases et al</i> <i>Test-Layout</i> <i>Compile Test-System Specification</i> <i>Design Test-Architecture</i> <i>Design System Infrastructure/Interfaces</i> <i>Design Non-Measurement Sub-Systems</i> <i>Design Measurement Interface(s)</i> <i>Design Measurement Sub-System</i>	<i>Metrics, requirements</i> <i>build, deploy, ramp-up</i> <i>Production/Operation Test-specification</i>  <i>Test-Process</i>
▲ <i>Test-System / Test-Plan Specification</i>	<i>Test-Set-ups &amp; prototype testing</i>  <i>Product Test-specification</i> <i>Measurements</i> <i>Design-verification</i>	<i>Design System Concept</i>  <i>Plan and budget (opt)</i>  <i>Compile System Requirement Specification</i>  <i>Design Functional Requirements</i>  <i>Analyse Requirements</i>	<i>Operations Test-specification</i>  <i>Sourcing</i>  <i>Operations Test-specification</i>  <i>Test-concept</i>  <i>Volume, yields, cycle infrastructure et al</i>

Table 1 Test-Engineering services in operations

Test-Optimization typically focuses on one area of instance of testing or test-system. The target system is addressed as a system comprising sub-systems and key elements such as core measurements and instruments. The services apply a structured approach that is efficient and effective.

<i>Test-Process</i>				
Functional Layer	<i>Test Stage 1</i>	<b>Test Stage x</b>	<i>Test Stage n</i>	
	<i>User/Owner/Designer Knowledge, Skills and Abilities</i>			
Physical Layer	<i>Test-Plan Test-List/Sequence Test-Routines, Test-Cases et al Test-System Instruments, devices, sub-systems et al</i>	<b>Test-Plan Test-Sequence Test-Routines, Test-Cases et al Test-System Instruments, devices, sub-systems et al</b>	<i>Test-Plan Test-List/Sequence Test-Routines, Test-Cases et al Test-System Instruments, devices, sub-systems et al</i>	<i>Test-Infrastructure</i>

Figure 1 Systems-Approach to Test-Optimisation

## 2 Deliverables

### System Optimisation Specification (SOS)

1. Framework Analysis
  - o Needs and outcomes
  - o Target system and operation/entity
2. Scope of Optimisation (SoO/SOW Section 2)
  - o Benchmark
  - o Requirements
  - o Cost-benefit
3. Test-Analyses
  - o Test-Data/Utilisation
4. Optimisation Design Specification (ODS)
  - o System-Architecture/Test-Plan
  - o Areas of Improvement/Opportunity
  - o Test-System/Test-Plan Measures
  - o Functional/Operational measures
  - o Cost/Benefit
5. Implementation
6. Benchmark and Performance Review

## 3 Test-System Optimization Process (TSOP)

Test-System Optimisation services address the third and fourth phases of the Test Life-Cycle.

	<b>Client Operations/Product Life-cycle(s)</b>			
<b>SLC</b>	<b>Client Test Life-Cycle</b>			
	Plan/Specify ►	Design ►	Build ►	► Implement / Deploy ► Operate / Maintain
	▲	▲		▲
Execution	Test-Specification Compile SRS	Test-Design <i>Test-Plan</i>		<b>Test-Optimisation Execution</b>
Design	Functional/Performance Requirements	<i>Instrumentation</i>		<b>Design</b>
Analysis	Requirements Analysis	<i>Architecture</i>		<b>Analysis</b>
Scope	Scope	<i>Scope/Concept</i>		<b>Scope</b>

Table 2 Test-System Optimization in the Test Life-Cycle

## Testadvance Test-System Optimisation Services (TSO)

A Scope of Engagement ensures proper alignment with the client's operations, timelines and desired outcomes. The Scope is provided prior to a financial commitment. Communication and change management are managed within the delivery process. Client staff/teams can be involved. Work is executed as concurrently as feasible.

- |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li><b>i. Assessment</b><ul style="list-style-type: none"><li>i. Specify target testing/system</li><li>ii. Benchmark/quantify needs</li><li>iii. Project outcomes and cost/benefit</li></ul></li><li><b>ii. Develop Optimization</b><ul style="list-style-type: none"><li>i. Analyse Structure of Test-Plan/-System</li><li>ii. Analyse Work-flow on Test-Plan/-System</li><li>iii. Analyse Test-Data/System-Data</li><li>iv. Analyse Automation/Coding</li><li>v. Compare Performance/Benchmark</li><li>vi. Define Areas of Improvement (AoI)</li><li>vii. Define Areas of Opportunity (AoO)</li><li>viii. Compile Scope of Optimisation</li></ul></li></ul> | <ul style="list-style-type: none"><li><b>iii. Design Optimisation Measures</b><ul style="list-style-type: none"><li>i. Test-System/Sub-Systems</li><li>ii. Test-Plan/Test-Routines</li><li>iii. System Integration &amp; Operation</li><li>iv. Platform &amp; Code/SW</li><li>v. Asses Cost/Benefit</li><li>vi. Compile Optimization Design</li></ul></li><li><b>iv. Implementation</b><ul style="list-style-type: none"><li>i. Immediate measures</li><li>ii. Test-definitions/coding</li><li>iii. Structural measures (HW/SW)</li><li>iv. Opportunistic measures</li><li>v. Benchmark Performance/Review</li></ul></li></ul> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Table 3. Test-System Optimisation Process (TSOP) Overview

The process commences with the Framework Analysis. We provide clients with a clear explanation of the optimisation process and discuss the needs, objectives and constraints. We review the operation, test-process and test-stage/-system. We incorporate existing information and integrate with the client's operations and teams. We discuss the projected improvements. The outcome is the Scope of Engagement. The SoE is provided prior to a financial commitment from the client. As early as in the development of the SoE, we take care to ensure we do not 'over-optimize' and equally identify areas that can provide unforeseen benefits.

### **3.1 Scope of Optimisation**

Here we investigate test-system and testing in more detail. We establish its structure and elements and key performance indicators. We define and execute a benchmark. The benchmark delivers detailed performance criteria and metrics, e.g. test-times, yields, etc. We assess the results and specify the detailed requirements and metrics for the optimization. In parallel we assess the appropriate areas of the testing. We weigh cost/benefit and define the targets, extent and depth of the ensuing analyses and optimisation.

### **3.2 Test-Analyses**

The process provides for the analysis of Test-Data, Test-Architecture, Test-Plan and Utilisation. The full execution of all four individual analyses represents the 'worst-case' scenario. The previous scope of optimisation defines their extent and weighting. In Test-Data analysis we look for patterns and anomalies. In analysing Test-Architecture and Test-Plan we look for a variety of characteristics that help identify root-causes and areas to address. We focus on areas that provide the best cost/benefit from optimisation. We analyse Utilisation to determine any unrealised or imbalance in capabilities and capacities. We consolidate the results and specify Areas of Improvement (AoI). An AoI is an area that needs to be improved. We further define Areas of Opportunity (AoO) where performance is within expectation, yet where improvements can be made. We consolidate the results in the Performance Report and discuss the outcome with the client.

### **3.3 Test-Optimisation: Design & Implementation, Benchmark & Review**

Here we design the measures for the optimisation, e.g. a revised Test-Sequence. We assess each proposed measure for cost-benefit and develop a detailed design and specification. We then implement the measures according to an agreed implementation plan. In the implementation we leverage services and work-elements from our Test-System Engineering. We review key stages of the implementation. Upon completion of the optimisation, we jointly execute a detailed performance review and benchmark.

#### 4 Appendix – TSOP Flowcharts



