Optimizing DevOps in FOPM: Characteristics & Benefits of a Regression & Performance Testing Framework

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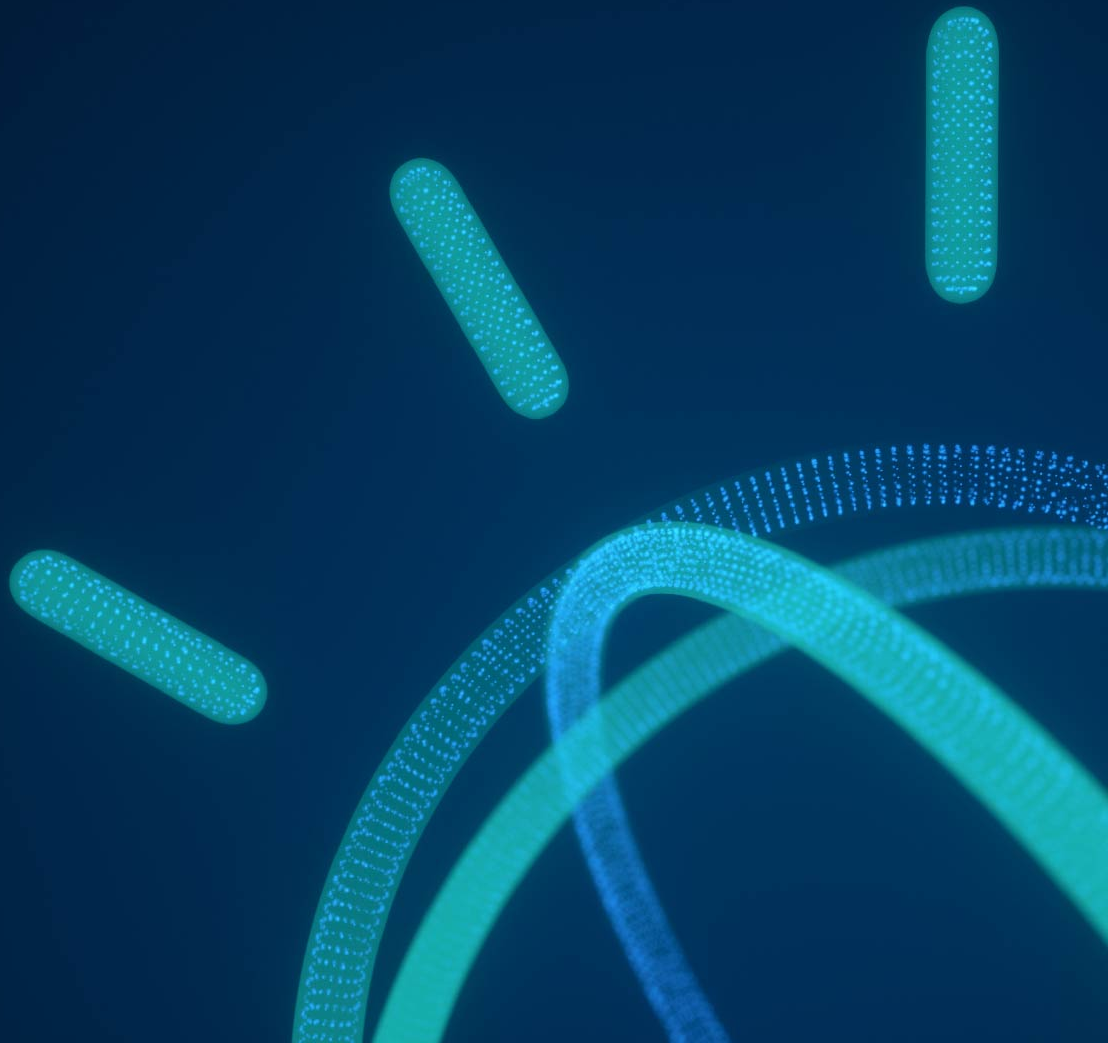


Why Performance Testing?

‘Trust, but Verify’

A proper regression & performance testing framework
gives us **peace-of-mind***
about the capability of a software system
to **continuously**** **perform as required***.

*peace-of-mind:
- thorough, i.e. needs to touch upon all major functionalities & aspects of the system
- benchmark-oriented (targets to measure against & boundaries to be established)
- detail-oriented (to know where to look for answers to address issues)

**continuously:
- integral part of a deployment plan and every development cycle
- from the beginning until the end of the system’s life-span

***perform as required:
- Functionality, Reliability and (then) Speed (FRS)

Getting peace-of-mind:

Which questions does Regression & Performance Testing need to answer?

Validate Functionality:

- Does the system function as required / per spec?

Validate Reliability/Scalability:

- what are the maximum stress levels that the system can handle?
- what are the maximum stress levels that the system should handle?
- what is the expected stress level at average expected load?

Validate Speed:

- what are the response time at maximum load?
- what are the response times at maximum expected load?
- what are the response times at average expected load?

Expose, Isolate & Assist (EIA) in alleviating contention issues:

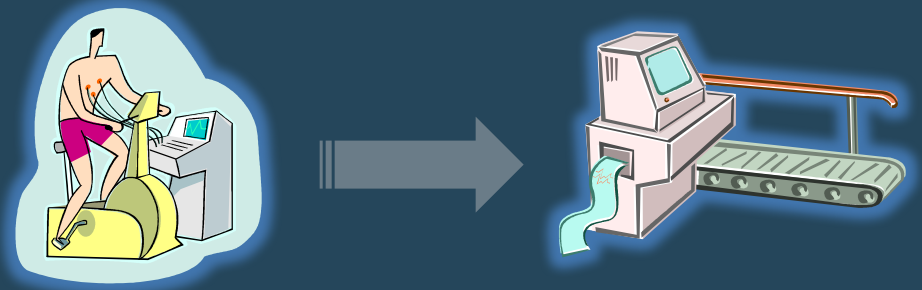
- where do we get contention?
- is this expected and acceptable (i.e. OK) or do we need to do something about it?
- what is the context of the contention and what causes it?
- how to we address it?

Performance-related **regression testing**:

- Will a new functionality affect performance (FRS)?
- If yes, how so? (which areas are affected?)

How do we approach this?

- We do not just want to have Testing give us an overall ‘blessing’.
- Rather, the ‘blessing’ needs to be measurable and qualified, i.e. supported by data.
- A performance that did not meet our expectations (it did not ‘grant a blessing’) is not a failure, but a qualified opportunity to improve:
  - Any test outcome (because it is qualified) gives us invaluable information,
  - be it on what is working well or on what needs to be fixed or improved.



OK, but what do we need to build it & bring it to life?

1. **Strategy:** A strategy and outline of how regression & performance testing is integrated into the deployment plan & SDLC cycle

2. **Methodology:** A systematical approach to structuring, assembling and configuring the tests.

3. **Testing Tool:** A Software Tool that can fully support the testing methodology and execute tests in perfect alignment with the methodology.

Performance Testing **Strategy**

- How do we look at regression & performance testing and how to we want to approach it, i.e. why and what for?
- How do we integrate testing into the SDLC cycles to allow it to fulfill its role?
- looking at it from a project perspective, not from a technical/licensing perspective: Who will be the owner of the testing framework?
- How do we structure the framework such that can become an integral part of the SDLC?

Performance Testing **Methodology**

2.1 User Profiles or Application Categories

- What are the User-Profiles (identify)? OR:
- What are the Application Categories/Types/Use Cases (identify)?

=> then, use the Profiles or Application Categories to define Usage Scenarios:

2.2 Usage-Scenarios

- Based on one or more user-profiles / Applications, what are the usage-scenarios (define)?
- How do we group those scenarios (characterize & classify)?
- How can we describe them (describe = script)?

⇒ **then, use the Usage Scenarios to assemble Workload profiles:**

2.3 Workload Profiles

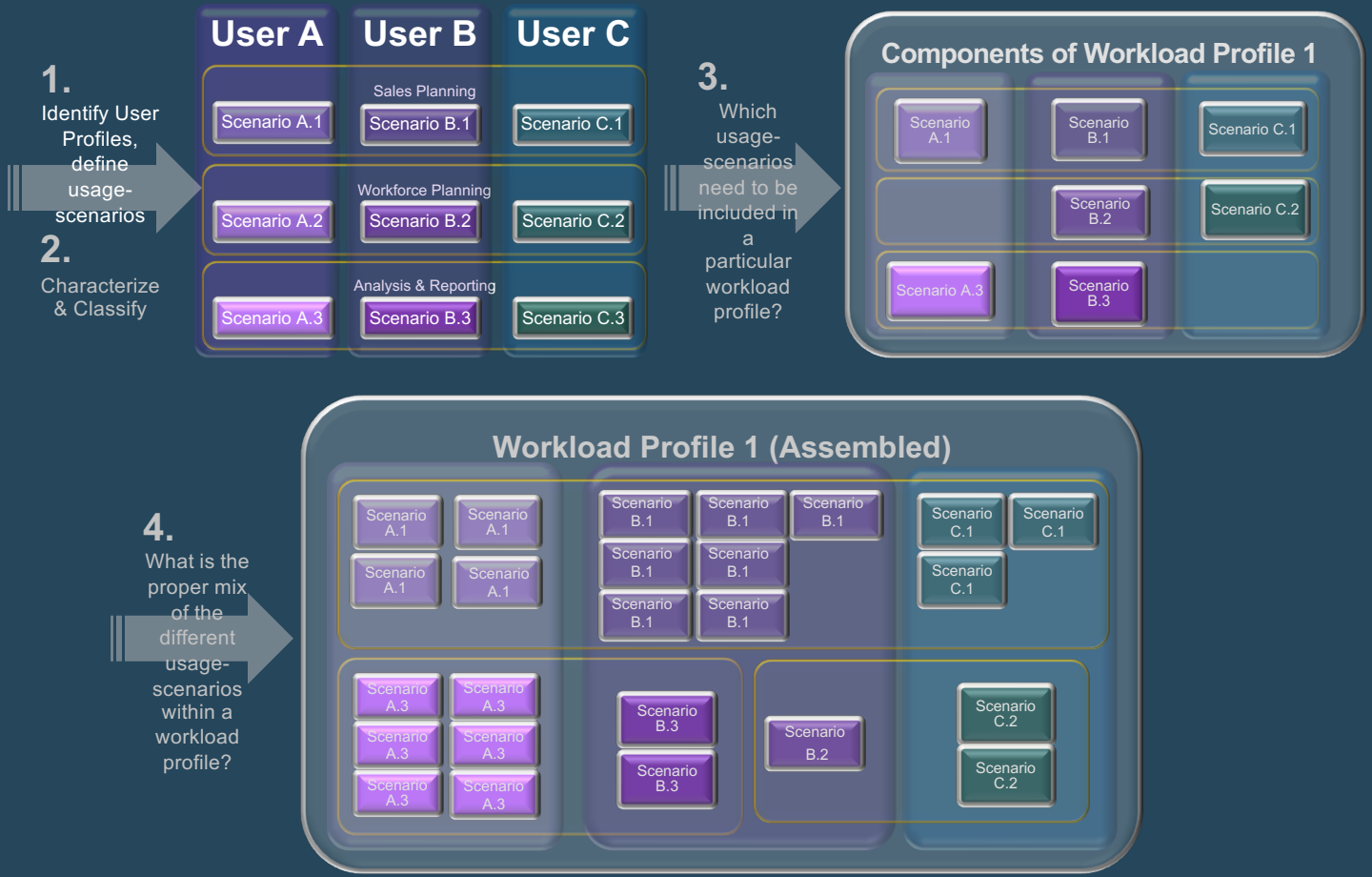
- Which Workload-Profiles do we want to cover (define & describe)?
- How do we characterize the workload-profiles (characterize & classify)?
- Which usage-scenarios need to be included in a particular workload-profile?
- How does a particular workload profile need to be assembled using its usage-scenario components?

Performance Testing **Methodology**

Creating Usage Scenarios,

Defining & Assembling Workload Profiles

Creation of **Usage Scenarios** based on **User Profiles**



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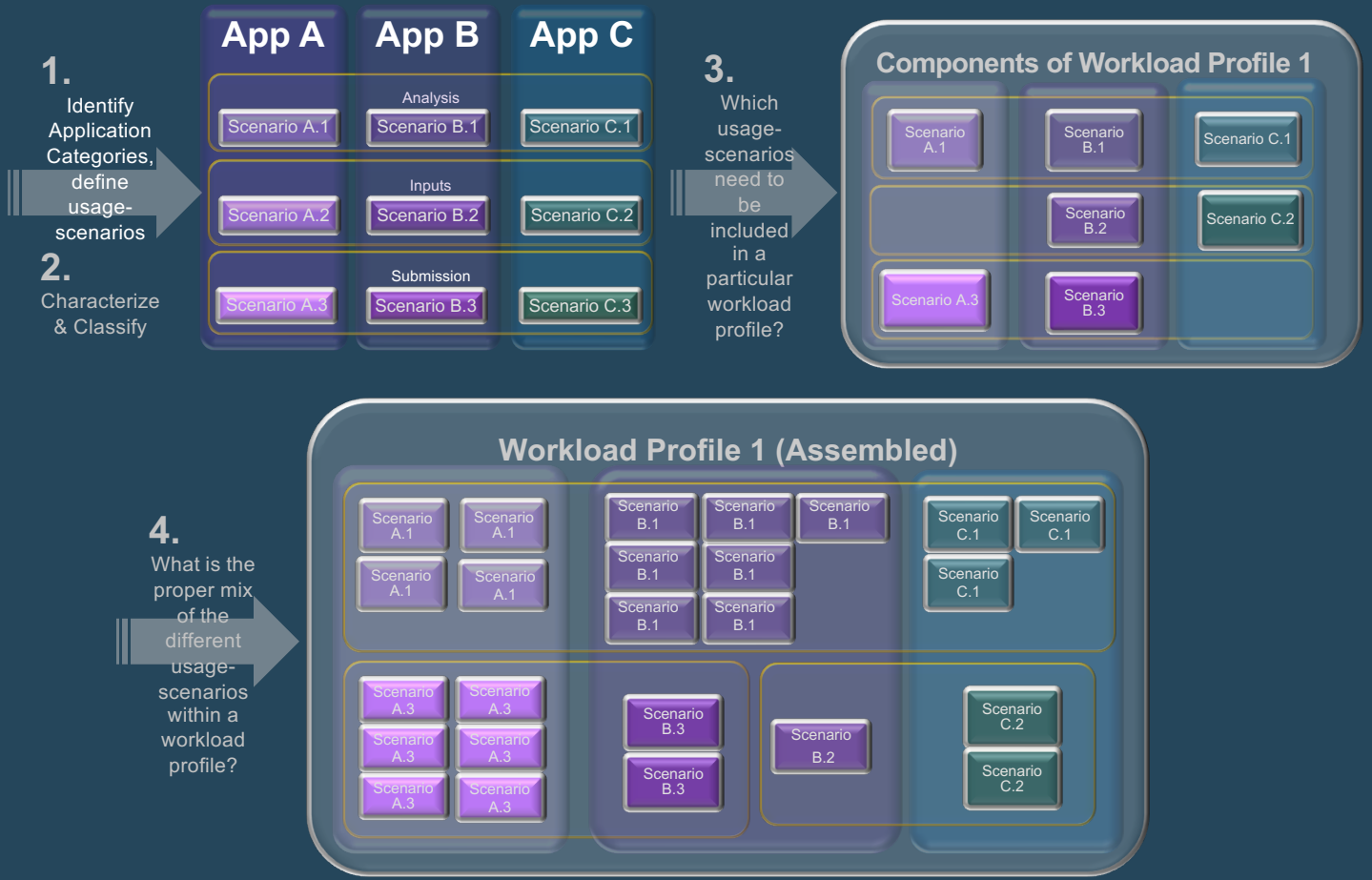


Performance Testing **Methodology**

Guidance on Development of User-profiles / Application Use Scenarios

The Application Use Scenarios can be assigned to the following transaction types that are representative of the application/system one wants to test:

- Business Critical (BC),
- High Resource consumption (HR),
- Most Commonly used (MC), and
- High Frequency (HF).

Think of five typical role classes for the User Profiles / Application Use Scenarios:

1. Analysts,
2. Contributors/Planners,
3. Contribution Managers/Approvers,
4. Report Consumers,
5. Application/System Administrators.

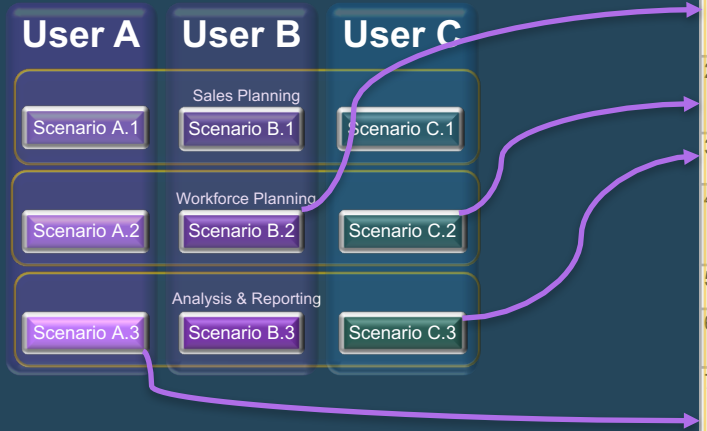
Performance Testing **Methodology**

Example Workload Profile (assembled of User-profiles / Application Use Scenarios)

Number	Scenario Title	BC	HR	MC	HF	Role Class	Workload Profile 1 typical forecast cycle – high-intensity input, high concurrency) Capacity Test	Workload Profile 2 Overnight processing – low concurrency Capacity Test	Workload Profile 3 Mixes aspects of profiles (1) & (2) during times of medium concurrency Capacity Test	Workload Profile 4…N
1.	US Workforce Planning Contributor	X		X	X	Contributor	%?	%?	%?	
2.	US Workforce Planning Manager	X		X	X	Contribution Manager	%?	%?	%?	
3.	US SG&A Analysis	X		X		Consumer	%?	%?	%?	
4.	…	X		X	X	Contributor	%?	%?	%?	
5.	…	X		X		Consumer	%?	%?	%?	
6.	User Attribute Maintenance	X	X	X		Maintenance / Administration	%?	%?	%?	
7.	Model Control 1: Actuals processing	X	X	X		Maintenance / Administration	%?	%?	%?	
8.	Model Control 2: Data Validation & Reconciliation	X	X	X		Maintenance / Administration	%?	%?	%?	
9.	…									

Performance Testing **Methodology**

Creation of **Usage Scenarios** based on **User Profiles**



Naming & Describing		Usage Scenarios Classification					Defining & Assembling **Workload Profiles**			
ID	Usage Scenario Title	BC	HR	MC	HF	Role Class	Workload Profile 1 typical forecast cycle – high-intensity input, high concurrency) Capacity Test	Workload Profile 2 Overnight processing – low concurrency Capacity Test	Workload Profile 3 Mixes aspects of profiles (1) & (2) during times of medium concurrency Capacity Test	Workload Profile 4…N
1.	US Workforce Planning Contributor	X		X	X	Contributor	%?	%?	%?	
2.	US Workforce Planning Manager	X		X	X	Contribution Manager	%?	%?	%?	
3.	US SG&A Analysis	X		X		Consumer	%?	%?	%?	
4.	…	X		X	X	Contributor	%?			
5.	…	X		X		Consumer	%?		%?	
6.	User Attribute Maintenance	X	X	X		Maintenance / Administration		%?	%?	
7.	Model Control 1: Actuals processing	X	X	X		Maintenance / Administration	%?	%?	%?	
8.	Model Control 2: Data Validation & Reconciliation	X	X	X		Maintenance / Administration	%?	%?	Scenario B.3 Scenario B.3	Scenario B.2
9.	…						Scenario A.3			

Performance Testing **Tool(s):** Use & Execution

3.1 Record scenario scripts

3.2 Adapt/Configure use-scenario recordings to allow for parameterization as well as the use for runtime parameters

3.3 Create a ramp-up plan for each workload profile

3.4 Run Tests

3.4 Archive test-results along with used scripts/workload profiles

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