IBM Integrated Solutions Test

Enterprise Test Series: Ideal Stack Testing Concepts and Process

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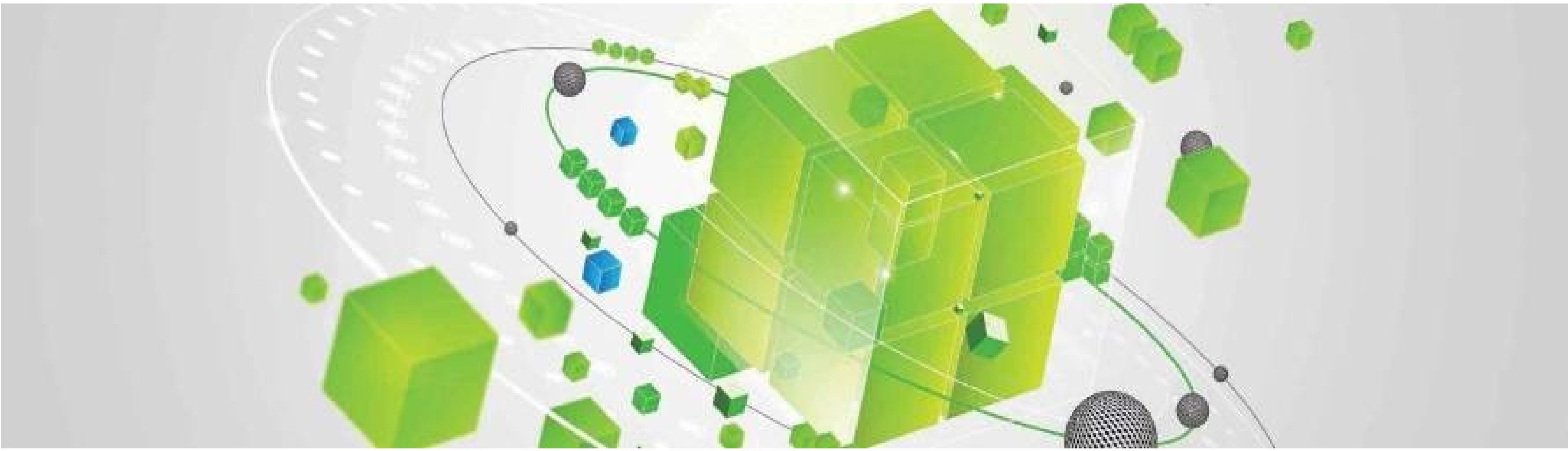


Outline

Objectives

Introduce the “stack concept” in an IT infrastructure

Explain the problem that a product stack solves in a production environment

Explain what a stack test is, where and why it is done

Introduce some advanced concepts used in stack testing

Propose an “ideal” process to expose stack defects

Stack Concept Introduction

Level Set

Enterprise production server infrastructure

High Availability , Disaster Recovery, Continuous Availability assumed

Worldwide environment (e.g. Banking Institution, Online Brokerage, Retailer, consumer products etc)

Picture a never ending stream of customer/transactions flowing into a compute infrastructure where if the infrastructure is down there is a stream of revenue lost.

As a result of the previous 24x7 operation is assumed and downtime for migration/maintenance is measured in minutes with advanced methods to migrate being required.

Stack Concept Introduction

Hardware / Software Components

Network/Network switch, Storage network/ switch

Computer Server and consoles, virtualization software, Operating System

Storage, Tape and consoles

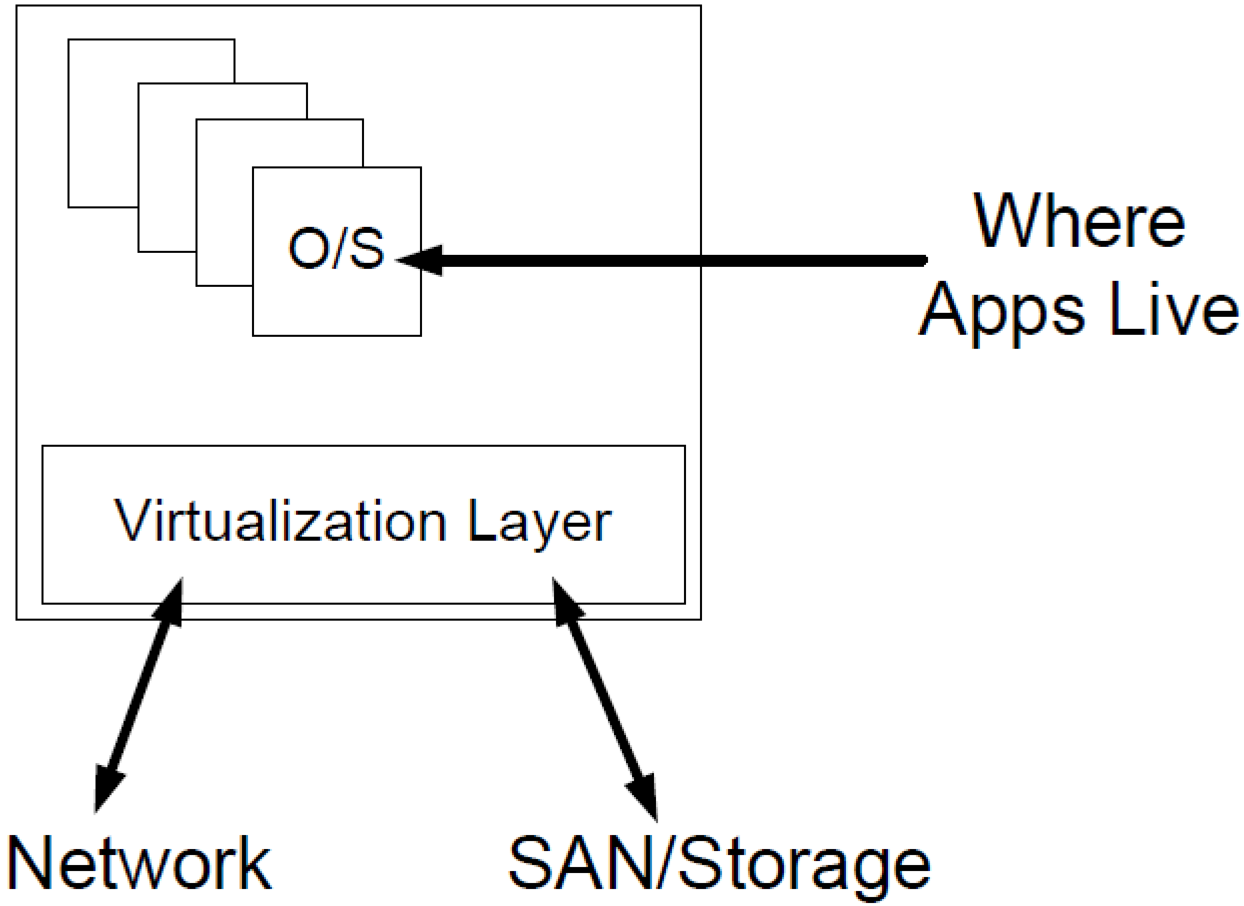
Middleware (Database, Messaging, Web)
Customer Applications on top op the middleware

High Availability and clustering software

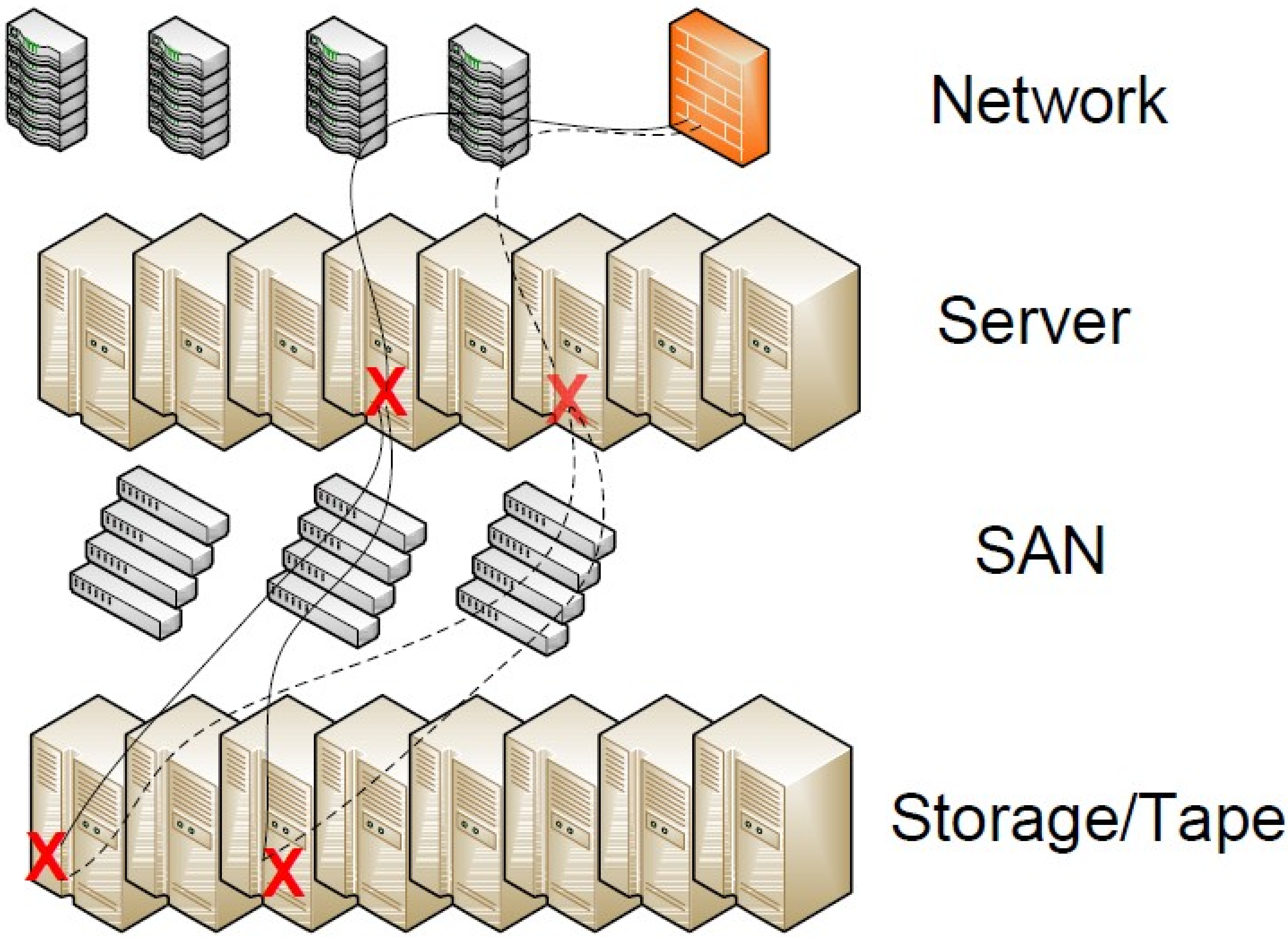
Provisioning and Monitoring Software

Backup Software

Stack Concept Introduction - Infrastructure



Stack Concept Introduction - Infrastructure



Stack Concept Introduction – Infrastructure Components

Category	Stack Item	Version	GA Date	EOS
Network/SAN	Net FW SAN FW Mgmt SW	23.4.5 7.1.5 10.1.2		
Server	CEC FW Console code Adapters Mgmt SW	20398_8 6.5.2 various 2.2		
Storage	STG FW Mgmt SW	7432_2 1.65		
Op. System & Middleware	OS Level Database Messaging Web Server Plugins/agents	7.2 10.1 8.2 8.3 various		
Monitoring SW	Console SW	4.1		
Provision SW	Server SW	5.2		
Virtualization SW		2.1		
Backup / Restore	Server SW	6.4		

What problem a Stack Solves

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Permutations/combinations to be tested are the problem.
Considerations: (1) Interoperability and (2) Migration

Stacks solve the permutation problem.

- 15 item stack, 2 versions = 225 combinations for interoperability
- stack-to-stack combinations (if more than one stack or versions of a stack)
- Using Single Stack (for interop) gets your permutations to 2-4.

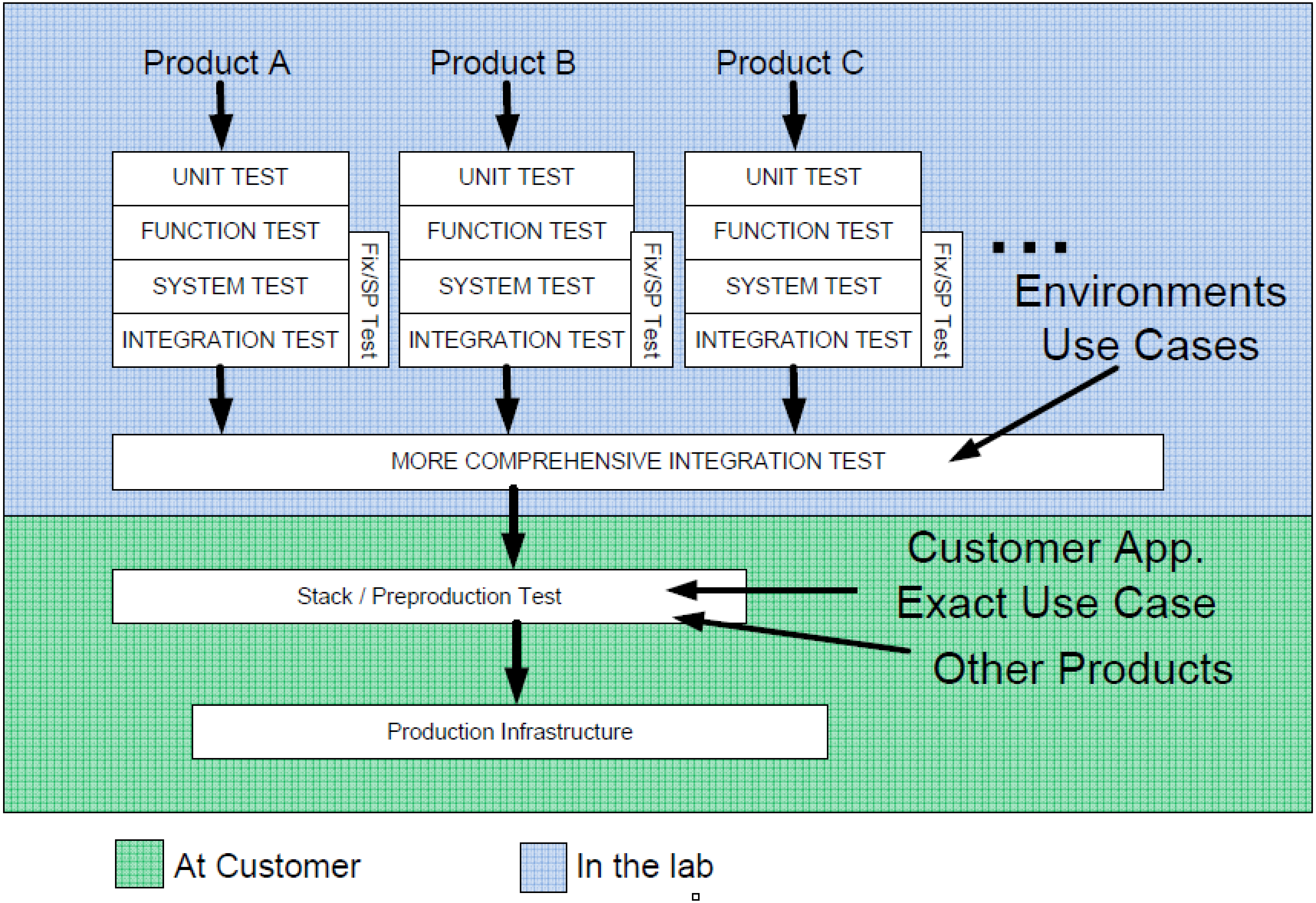
Migrating components in a stack is another permutation problem

- Interop permutations defines stack “states”, migration permutations defines “stack transitions” – these are additoinal tests/combinations.
- Using Single Stack minimizes the migration combinations as well. (<6 range depending on procedure)

Note that various organizations handle stack-to-stack migrations differently

- Most production environments are measured on “uptime”, so downtime is minimized
- Some may do “a big bang” every year
- Others may do 2-4 per year, or even ones a month
- Process is key

Stack Test – what is it, where is it done



Stack Test - review

A Stack Test is an integration test

A Stack Test is definitely done in a customer preproduction test.

A Stack test is done in the Integration Test Lab

- is it the right one for your particular implementation?
- A product provider typically provides integration test, it may not work horizontally or vertically (the way you use it)
- Note that if varied single-customer products are integrated in the customer preproduction the preproduction test becomes the integration test as well!

Stack Testing Challenges

Realistic application/load nearly identical and as diverse to what is experienced in the production environment.

- test plan is operational in nature

Robustness Tests

- how are long running defects exposed.

Scale or Volume Stress Testing

- Is it tested until it breaks or procedurally understood.
- Batch processing example
- Where are the inflection points

Investment in test infrastructure / personnel can be quite large

Stack Testing Advanced Concepts / Methods

Application / Infrastructure Profiling.

- Robust infrastucture replication initially. Selected data sampled from test and production environments. Compare, tweak test workload. Compare again. Iterate.

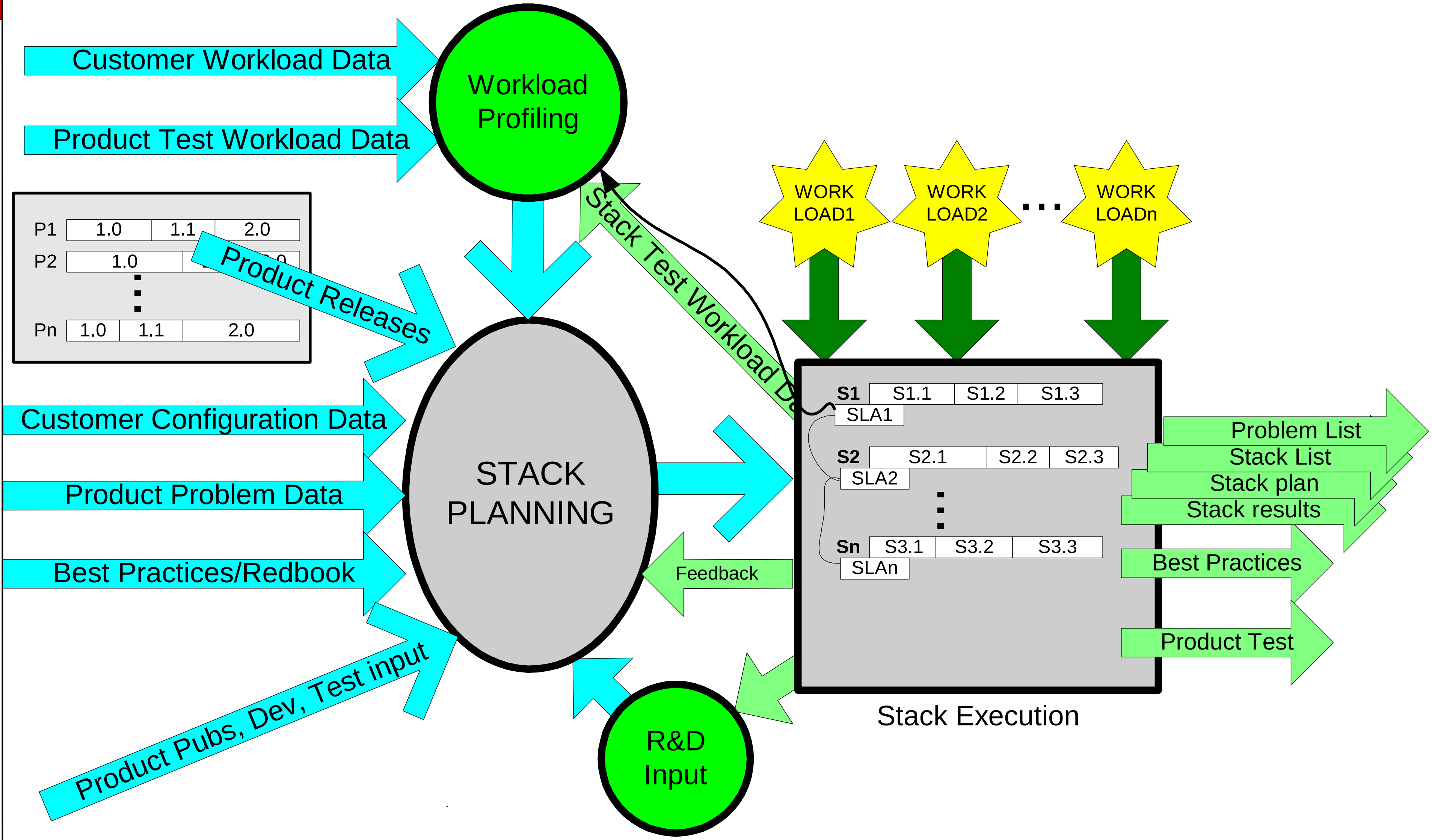
Operational Time Compression

- Done via rapid repetition. Daily functions done repetitively to expose problems that might take months in production to be exposed.

Robustness Testing

- Try to break the infrastructure while it is running, usually centered around redundancy / high availability components, with error injection
- Sick but not Dead scenarios

Ideal Stack Testing Process (from the paper)



Ideal Stack Testing Process - Goals

Increase production defects found in Integration and Product Test Labs

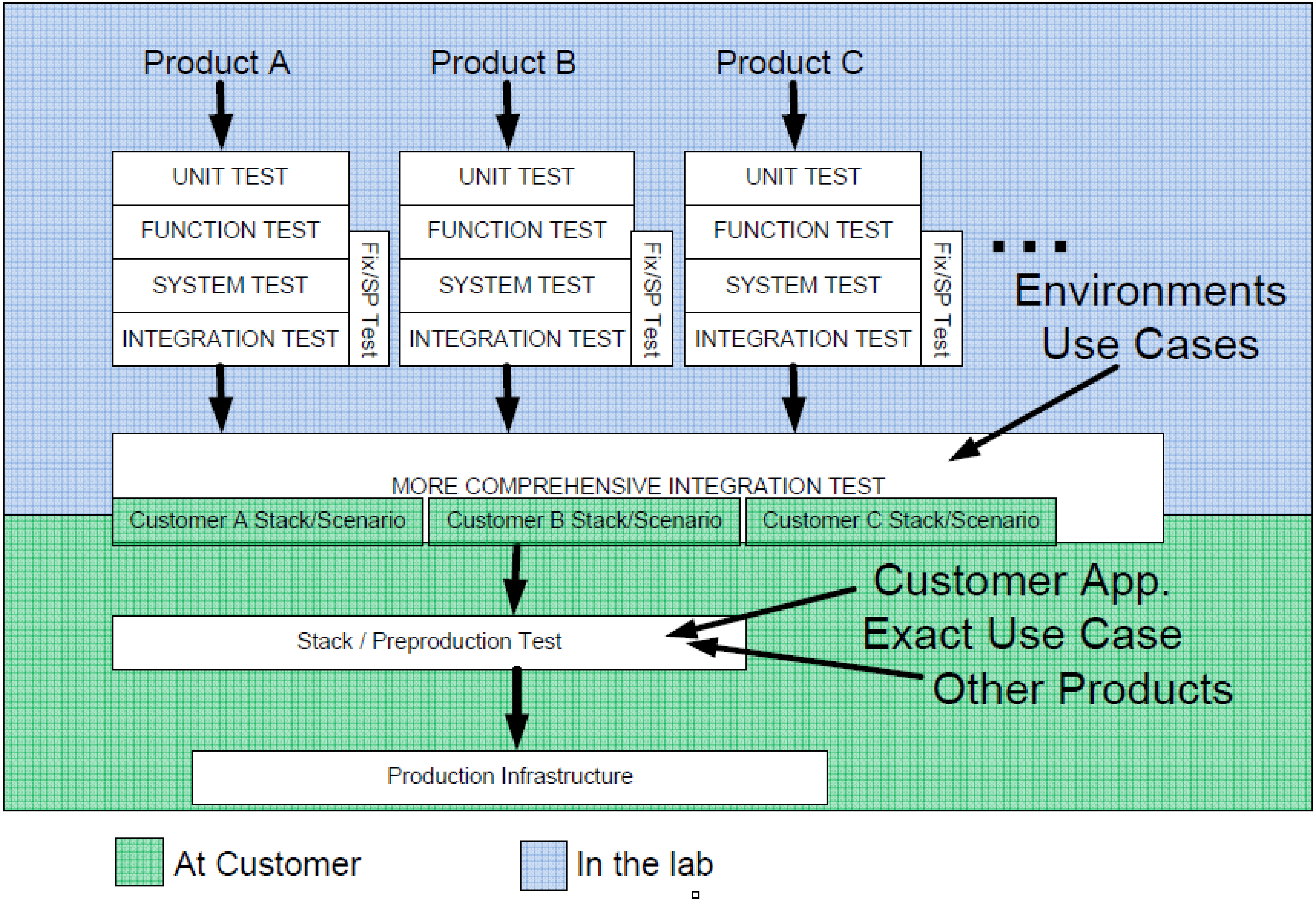
- By using customer stack tests and scenarios
- Utilizing advanced methods to close gaps
- Adapt a more operational approach to the integraton testing process
- Partnering with customers as possible to facilitate the previous

Stack Documentation for wider consumption

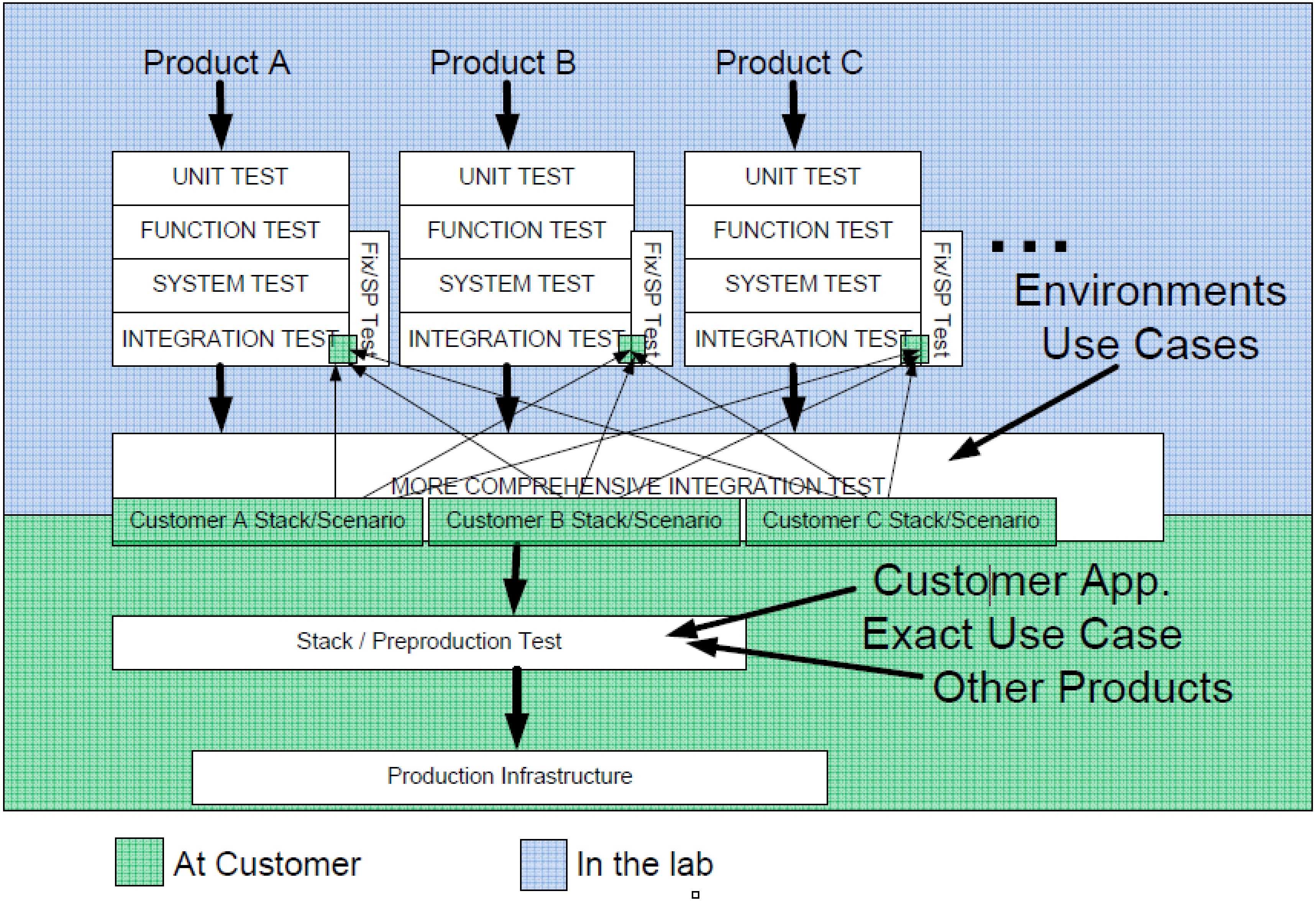
Other Feedback into necessary documentation

- Redbooks, Redpapers
- Product pubs

Ideal Stack Test – Step A



Ideal Stack Test – Step A+B



Your questions?

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Comments / collaboration always appreciated.

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Stack Currency

Currency Issue