# Hope for the Best, Test for the Worst

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# Agenda

What we know

Test Lifecyle

Obstacles

Removing the obstacles

# Systems, applications, and data are your business.

Testing is the process of evaluating and verifying that those systems and services will do what they are supposed to do when you need them to.

Hardware eventually fails.

Software eventually works.

Defects found and fixed anywhere other than production are cheaper to fix and hurt less.

"Defects" aren't the only thing that can cause outages and potentially cripple your business.

- ❑ Insufficient resources lead to degraded performance and ultimately outages.
- ❑ Unpredictable workload can create bottlenecks.
- ❑ Improper or outdated configuration results in inefficient processing and even outages.

# Testing is more important than ever in this highly demanding business environment.

## Agile Development and Continuous Delivery

Businesses are pressured to deliver new capabilities faster than ever before to remain competitive.

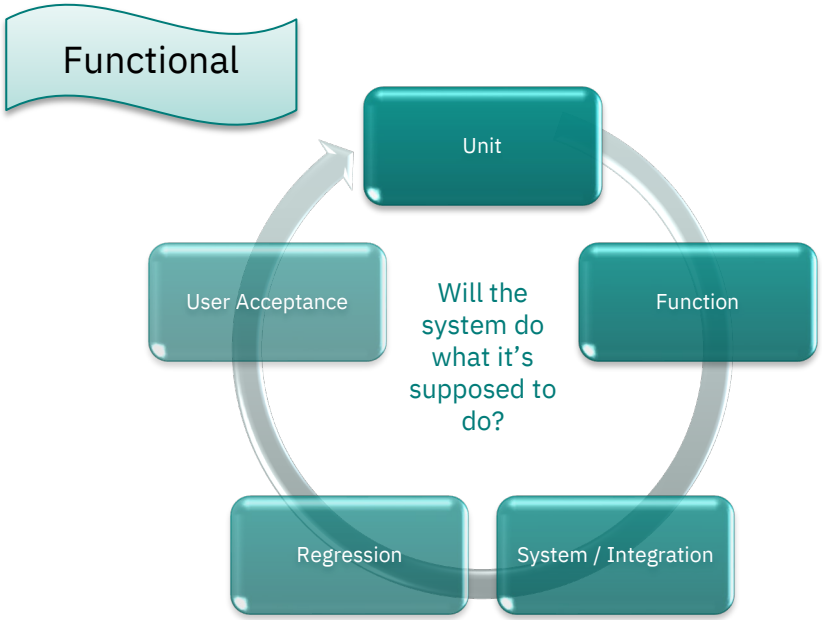
## Unpredictable and projected workload growth

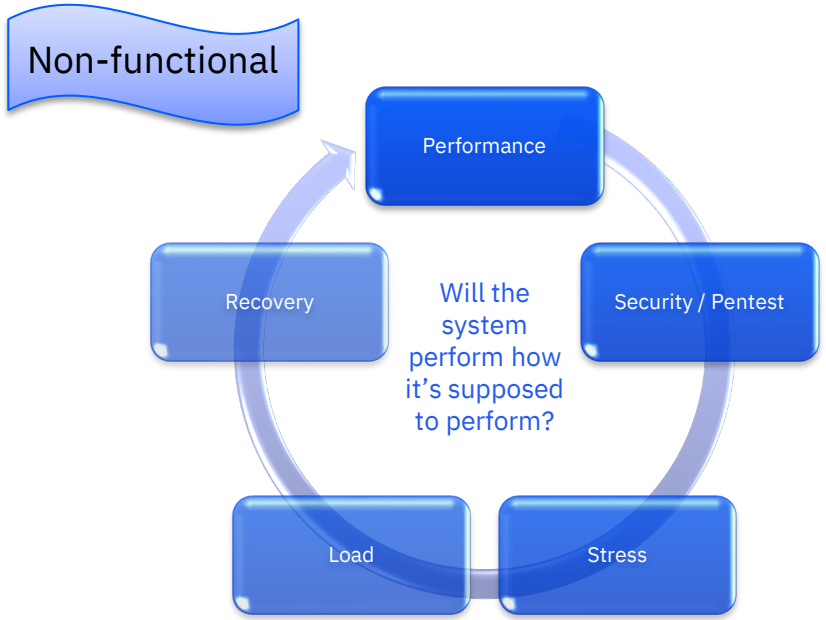
Spikes in workload cause performance issues and outages that are difficult to identify and address.

## Continuous Operations

Businesses expect zero downtime and cannot tolerate any outages.

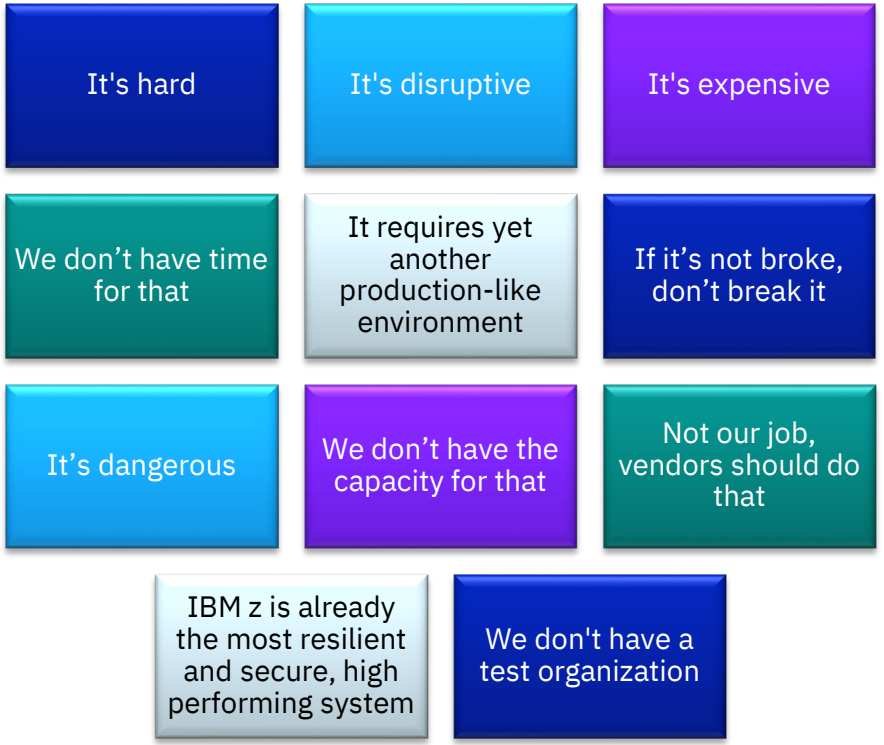
# Testing can be broken down into two equally important components.



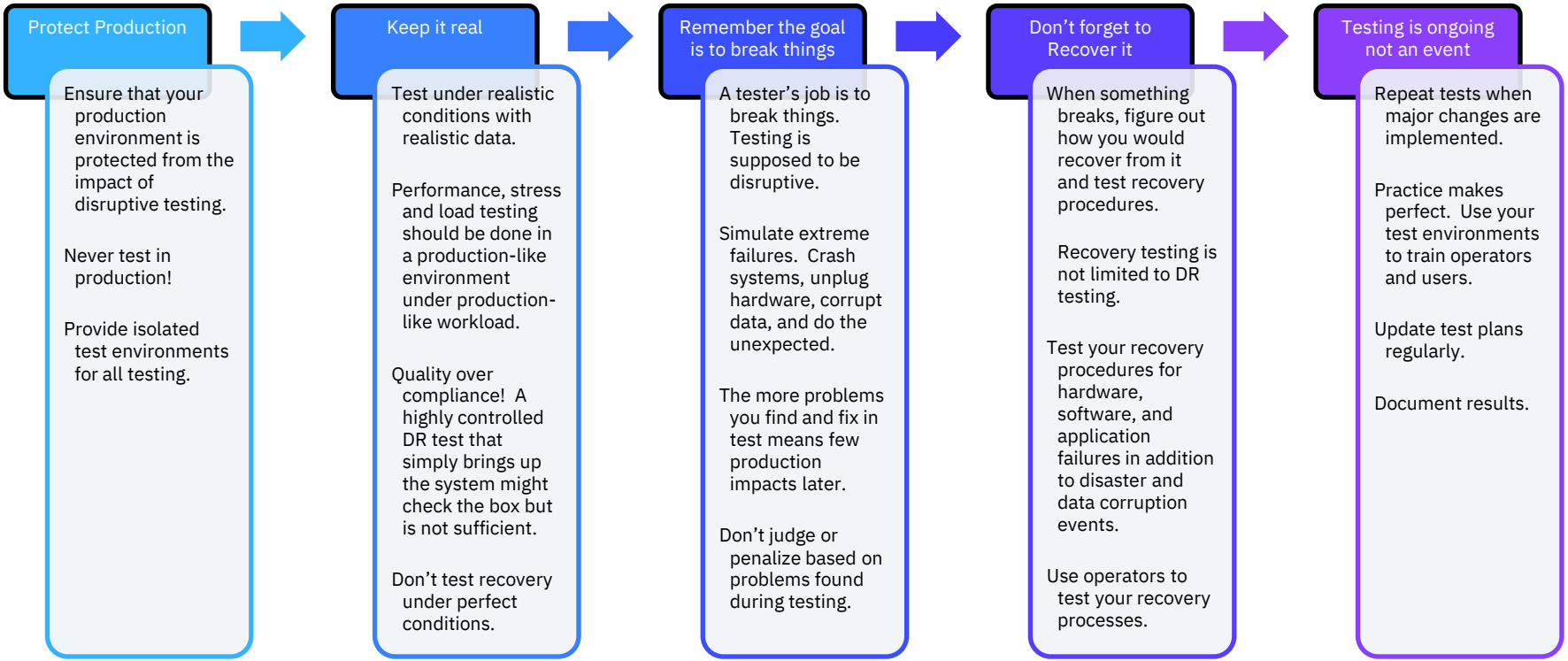



# Fact: Robust testing is the foundation that supports resilient systems.

So why doesn't it get the attention and investment it deserves?



# Get the most out of your testing by following these best practices.



# The effort, impact, and cost influence test strategy and investment but there is help.


*Application Development and Test Solution* provides up to three times the capacity with no increased Monthly License Charges.

*Wazi as a Service* provides z/OS development and testing in IBM Cloud for cloud native app development and modernization in a flexible consumption model.

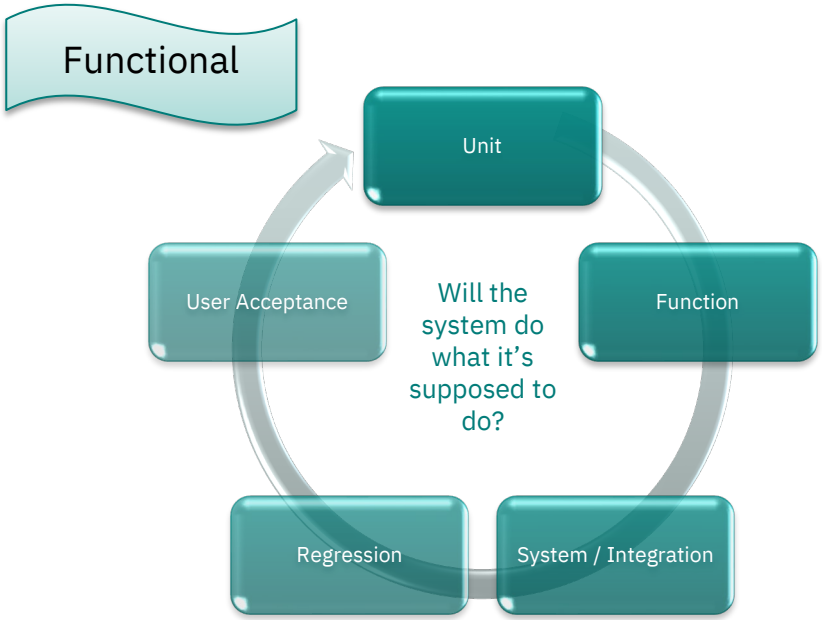
*IBM Z Business Resilience Stress Test (zBuRST)* enables load and stress testing at scale with discounted capacity using non-production resources.

*Flexible Capacity for Cyber Resiliency* or *Capacity BackUp* provide temporary capacity for recovery testing.

# IBM Z solutions remove test obstacles and support robust testing and continuous operations.

| Test Type | DevTest | Wazi aaS | zBuRST | Flex Capacity |
|---|---|---|---|---|
| Unit | ✓ | ✓ | | |
| Function | ✓ | ✓ | | |
| Integration | ✓ | ✓ | | |
| Regression | ✓ | ✓ | | |
| UAT | ✓ | | | |
| Performance | ✓ | | ✓ | |
| Security | ✓ | | ✓ | |
| Stress | | | ✓ | |
| Load | | | ✓ | |
| Recovery | | | ✓ | ✓ |

# It is an accepted part of software development.



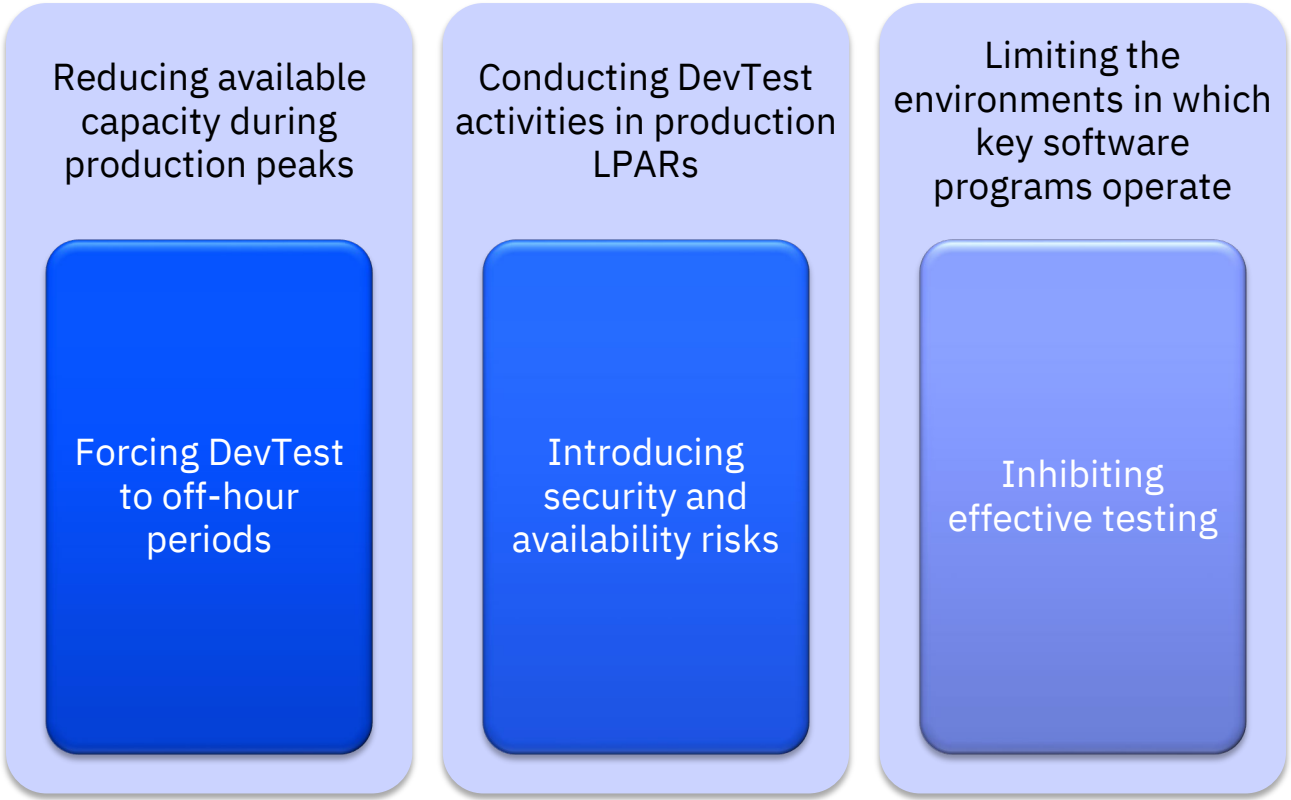

- ✓ Can be tied directly to revenue and customer satisfaction.
- ✓ Understood from the board room down to the application programmers.
- ✓ Tends to be the responsibility of the application development community.
- ✓ Test plans and exit criteria are based on known business requirements.

# Functional testing focuses on “Fit for Purpose” and is more application centric.


| | |
|---|---|
| Unit | Validating that each software unit performs as expected. A unit is the smallest testable component of an application. |
| Function | Checking functions by emulating business scenarios, based on functional requirements. Black-box testing is a common way to verify functions. |
| System / Integration | Ensuring that software components or functions operate together. |
| Regression | Checking whether new features break or degrade functionality. |
| User Acceptance | Verifying that the whole system works as intended. |

Everyone does at least some of this type of testing.

# Impacts of capping DevTest



# Application Development and Test Solution

**IBM Z DevTest solution** enables you to grow a healthy development and test environment that can keep up with all your application development and test projects.

By moving those projects over to DevTest containers, you have the freedom to *use up to three times (3x)* the base capacity while controlling software expenses.

"This new competitive pricing option was a game-changer for us and we are very happy with this cost-efficient offering."

Walter Svoboda,

CEO, Wüstenrot Datenservice GmbH

Tailored Fit Pricing for IBM provides more control over software expenses.

1. Greatly simplified software pricing for qualified solutions
2. Competitive economics that are relevant to the solution
3. Flexible deployment options that support the best technical fit

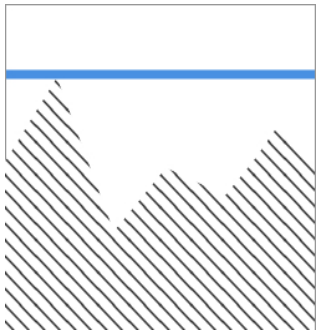
With a DevTest solution, you can build modern, healthy Development and Test environments.

- No artificially capped MLC costs
- No exponential hardware costs
- Security managed through isolated DevTest LPARs
- Ability to test at scale

# Tailor Fit Pricing and DevTest containers make testing more affordable.

## Traditional DEV/TEST

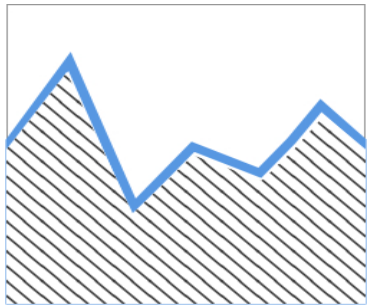
Sub-Capacity
(R4HA)



Limited in size

## New DEV/TEST Container

Tailored Fit Pricing



- Consumption pricing to allow realistic testing
- Removal of ‘peak-based’ pricing

# Wazi aaS

**IBM Cloud**

**IBM zSystems**

**Pre-Deployment (Build and Test)**

**Final Build and Test**

| | | | | |
|---|---|---|---|---|
| **Code** | • **Build**<br>• **Unit Test**<br>• **Early Integration**<br>• **Functional Test** | **Final build** | • **Stress testing**<br>• **Performance testing**<br>• **Full integration test** | **End user test** |

THE

## Mission

To provide a modern, cloud native developer experience for IBM z/OS that is consistent and familiar to all developers

### Speed to Market and Flexible Pricing

Accelerate development and testing with on-demand access to z/OS systems.

Pay for what you use on an hourly basis.

### Wazi Image Builder

Create custom images from your on-premises LPAR from a web UI with role-based access and REST APIs to streamline the creation process.

# Key Wazi aaS Use Cases

### *Early Development and Test*

- Leverage IBM Cloud with On-demand access to z/OS systems
- Deploy custom image created from your own LPAR
- Get started with development and testing in minutes without any dependency on operations

### Infrastructure Testing

- Overcome issues like broken processes and insufficient security preventing you from being able to test your software upgrades at speed
- Expedite testing with z/OS Virtual Server Instance provision and Wazi Image Builder

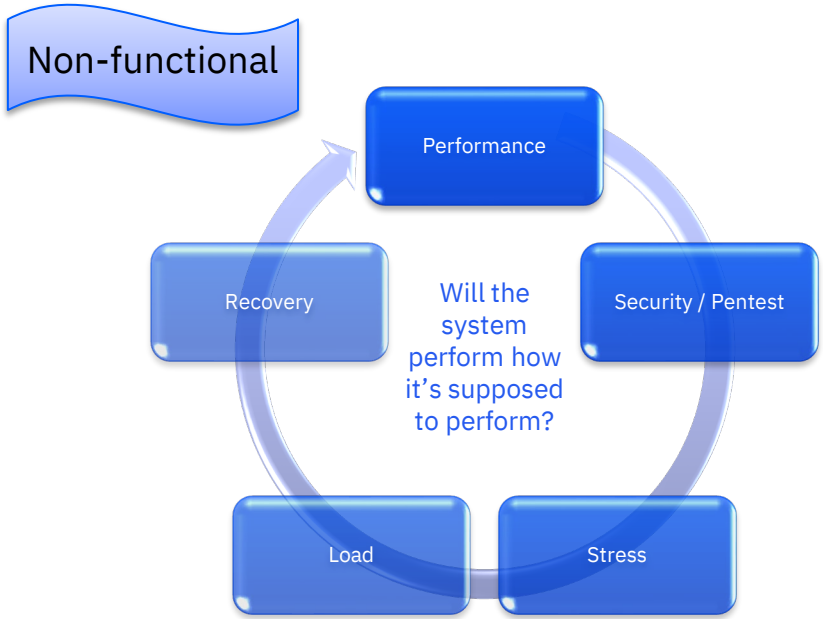
### Education

- Leverage IBM Cloud with On-demand access to z/OS systems
- Lower the barrier to entry for your z/OS programmers with easy access to z/OS system
- Attract and retain new talent

### Embrace enterprise-ready DevSecOps

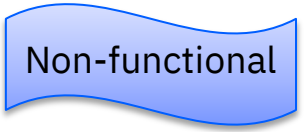
- Easily adopt DevSecOps practices z/OS Dev and test pipelines
- Ensure continuous compliance and auditability
- ‘Shift left’ and test as early as possible

# Non-functional testing does not get the attention it deserves.




- ✓ More difficult to tie to revenue and customer satisfaction.
- ✓ Expected, but not understood from the board room down to the application programmers.
- ✓ Tends to be aligned with infrastructure or systems support but ownership is vague.
- ✓ Test plans and exit criteria are based on poorly defined objectives and vague measurement.

# Non-functional testing focuses on “Fit for Use” and extends to infrastructure hardware and software.




| | |
|---|---|
| Performance | Validating that the solution performs and responds as expected. |
| Security / Pentest | Ensures the solution is free of potential vulnerabilities, weaknesses, risks, or threats. |
| Stress | Determining how much strain the system can take before it fails. |
| Load | Evaluating performance under normal and expected workload conditions. |
| Recovery | Practicing and validating recovery processes. |

Not everyone does this type of testing.

# These tests all have one thing in common.

Non-functional


***They all require a production-like environment.***

- ✓ Processing capacity must match or exceed production capacity.
- ✓ Processor and I/O performance must
- ✓ System and subsystem configuration must match production.
- ✓ Security configuration must match production.
- ✓ Requires a copy of production data.
- ✓ Must be able to drive production-like workload mix and volume.

# IBM Z Business Resilience Stress Test (zBuRST)

## Testing at production scale has been *cost prohibitive*....

Problems related to size and scale could only be discovered in production and consequently, impact the business

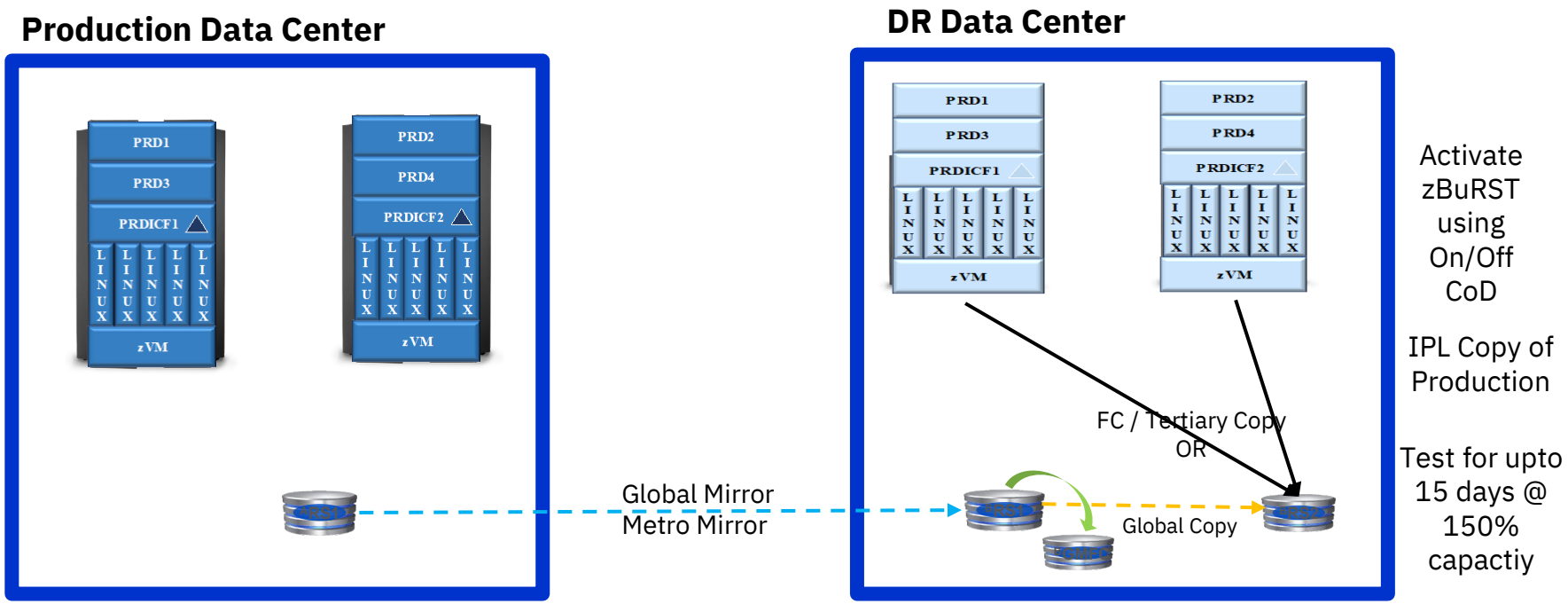
## Reduced cost for stress testing

- Scale test environments to 150% of production
- Up to 15 days of extreme load testing via pre-paid, deeply discounted zBuRST tokens
- Option to run stress test environments on dedicated disaster recovery (DR) machines
- Extension of the DevTest Container offering

## Improved Resiliency

- Reduce risk
- Simulate workload spikes
- Validate changes or new technologies at scale
- Gain insight into production efficiencies, scalability, and performance
- Increase workloads with confidence

# zBuRST allows you to leverage DR assets




GDPS can bring on / remove the zBuRST capacity via CAPACITY ACTIVATE / UNDO statement in a script / workflow; and the Test Copy Manager in GDPS 4-site can be used to create a consistent copy of data for stress testing

# IBM Z Flexible Capacity for Cyber Resiliency

## Greater Flexibility

Dynamically shift production capacity between z16 systems in different sites

Flexibility and elasticity for proactive outage avoidance, facility maintenance, compliance and disaster recovery – test and actual DR scenarios

Works in conjunction with other temporary record types

## Complete Client Control

Remotely transfer capacity – no on-site personnel (IBM or client) required after initial set up

Flexibility over duration of capacity transfer, up to 1 year

Fully automatable using solutions such as GDPS

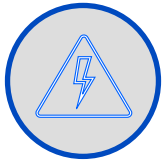
Integrates with System Recovery Boost for faster system and workload startup

## Improved Compliance for Disaster Recovery

Simplify compliance and improve confidence both for testing and real DR scenarios

Closer mapping between test and production scenarios

# IBM Z Flexible Capacity for Cyber Resiliency Use Cases



## Disaster Recovery & DR Testing

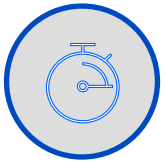
Transfer the capacity you need at your DR site to continue to run your business workloads. Automate and test recovery procedures for unplanned outages, including cyber attacks to provide near-continuous availability and disaster recovery.

## Frictionless Compliance

Meet the ever-evolving stringent requirements of global regulators, allowing a highly automated and fast process to demonstrate a production site swap.

## Facility Maintenance

Run your production workload from your alternate site while you perform maintenance at your primary site with the capacity you need.



## Pro-active Avoidance

Protect your critical business services from natural disasters. Avoid rolling power outages. Migrate your critical workloads to an alternate site before your business gets impacted and stay there for up to one year.

# An alternative to Flex Capacity is Disaster Recovery Testing with Capacity BackUp

| Description | Flexible Capacity | CBU |
|---|---|---|
| Customer controlled | Yes | Yes |
| GDPS Enabled | Yes | Yes |
| IBM intervention required (On-Site) | No | No |
| Activated by | One Flex Cap Record per serial# | 1 or more CBU Records / serial# |
| Replacement Capacity Limit | Up to owned capacity | No limit typically 1 on 1 |
| Activations/Deactivations per year | 12 | DR and DR Test only |
| Maximum Stay out period | 12 Months | 90 Days (DR) / 10 Days (Test) |
| Use cases | Real Disaster Recovery / DR Test<br>Facility Maintenance<br>Compliance Testing<br>Proactive DR avoidance | Disaster Recovery<br>DR Test |
| Technology requirement | IBM z16 + TFP SW | Systems Not Withdrawn from Marketing |
| Tiered pricing | Yes | No |
| Carry forward | Yes | No |

# Robust testing leads to quality and resiliency. IBM solutions can help.

*Testing = Quality = Resiliency*

Testing is the key to high quality solutions that deliver the functionality with the performance, scalability, security, and availability that the business demands.

Cost and complexity have limited investment in testing, leading to high impact outages.

*Application Development and Test Solution*, *Wazi as a Service*, *IBM Z Business Resilience Stress Test (zBuRST)* and *Flexible Capacity for Cyber Resiliency or Capacity BackUp* are available to help you enhance your test environments at a fraction of the cost.

# Additional Information

DevTest Containers
- Tailored Fit Pricing for IBM Z
- Tailored Fit Pricing for IBM SW
- IBM Z DevTest Solution – Getting Started

Wazi aaS
- Wazi aaS Solution Page
- Documentation
- Quick Technical Demo
- Blogs
- Join the IBM Cloud Native Developer Community
- Explore the IBM Z and Cloud Modernization Center

zBuRST
- IBM Z Business Resiliency Stress Test
- z/OS Academy Presentation

Flex Capacity
- IBM Z Flexible Capacity for Cyber Resiliency
- Introducing IBM Z Flexible Capacity for Cyber Resiliency Redpaper
- IBM Z 16