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PROVING CHANGE IN BUSINESS CRITICAL ENVIRONMENTS

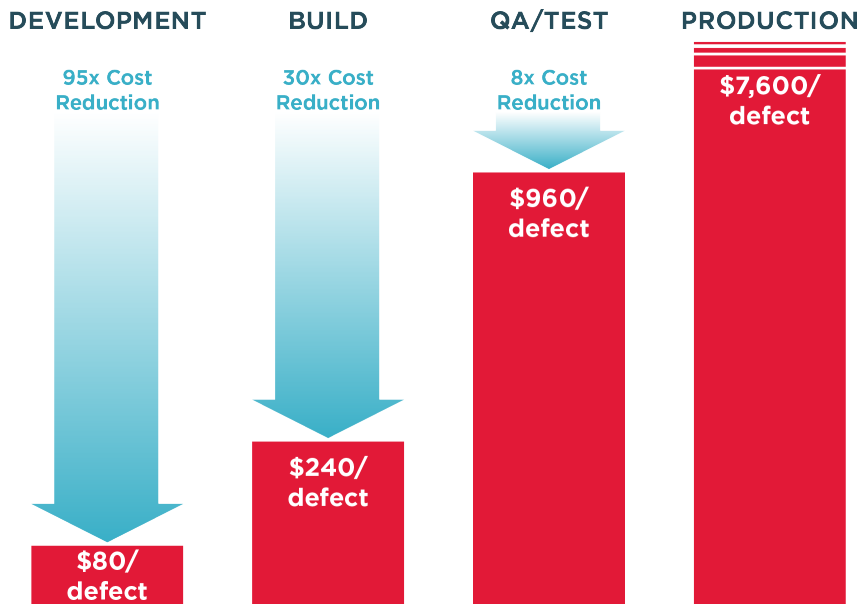## TESTING SOLUTIONS FOR PREDICTABILITY AND QUALITY

Mastering change is crucial to your success as a technology organization. It creates the most risk and opportunity in any environment. Change comes from new service implementation, new technology adoption, network expansion, software updates, or a thousand other ways. It is inherent to data center convergence, enterprise expansion, and new service deployments that require you to combine many different technologies—including physical and virtualized devices—into a single network infrastructure. Such networks must handle massive amounts of traffic, while delivering the quality of experience that mission critical applications demand. To succeed during times of change you need to measure where you are, what the change will bring, and the success of the outcome. This paper will focus on how testing helps you manage change to have more successful projects, roll-outs, and updates.

Recent research from The Ponemon Institute shows that early discovery of issues provides massive savings. They found that bugs found in development are over 90 times cheaper to fix than when found in production. Creating updates for live services without affecting customer experience is far costlier than making changes prior to release. However earlier detection is just one of

> TO MANAGE CHANGE YOU HAVE TO MEASURE IT, AND TO MEASURE IT YOU HAVE TO TEST IT.

the ways that testing provides positive ROI and predictability. This paper will provide an architecture to help you think through how testing can turn change into a strength for your teams while improving ROI, controlling costs, and keeping projects on track.

DEVELOPMENT	BUILD	QA/TEST	PRODUCTION
95x Cost Reduction	30x Cost Reduction	8x Cost Reduction	$7,600/ defect
$80/ defect	$240/ defect	$960/ defect	

IXIA ATI REASEARCH CENTER COMBINES PROFICIENCY IN CYBERSECURITY THREATS AND APPLICATION PROTOCOL BEHAVIOR.

WHY IS TEST CRITICAL NOW?

Why is testing critical now when it was only used in specialty applications years ago? Don't vendors take care of this? What changed? In short, complexity. Complexity is the enemy of delivering reliable, fast, and secure applications on time. For example, in 1997 there was only one wireless standard we needed to worry about in a typical enterprise environment – 802.11. Now there are over 10 active wireless standards just in the 802.11 family – a, b, g, n, etc. This holds true in Ethernet, storage, virtualization, SDN and more. No longer can a single network engineer/server engineer/I.T. guru could do it all. You need some dedicated, deep, and expensive people – CCIEs, Security Specialists, SDN Architects to understand these areas. As complexity increases you need more than the domain expertise, you need to understand the impact your network and changes have on your application across the entire service delivery path. This is where testing comes in. Testing at critical times of change, such as upgrading your office WLAN or bringing a new product to market. It helps you ensure you are on time with a reliable solution. Since testing is now crucial, where do you test in this new world?

YOUR CHALLENGE DETERMINES YOUR TESTING STRATEGY
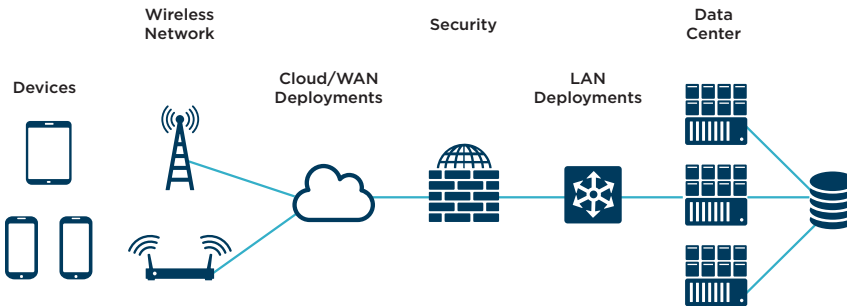
Where you test often depends on the challenge you are responsible for. If you are validating an application delivery path, or a change in that path – such as a new security device – you will focus on **End-to-End Testing**. This requires that you test every component in your application delivery path end-to-end, from your data center to your core and access network, perimeter security, devices, and applications. Here are some examples of end-to-end testing:

- Ensuring your network can handle a new application rollout
- Making sure protocols are handled properly to the lowest level
- Ensuring you are making educated decisions in selecting the right vendor tools that provide you best security and performance for your investment
- Making sure that the application or device you are about to deploy is stress tested at the application and security levels
- Finding and fixing vulnerabilities before you go live
- Finding issues before others do
- Validating the most basic components of protocols, up through entire devices, then on to an end-to-end network

End-to-end testing scales with the needs of your environment, but is still focused on particular devices and deployments, ensuring they are on time and perform to the needs of the business. It also can be end-to-end across a network, data center, cloud instance, or just within a single device. Within a device you can validate performance, security, and compatibility end-to-end. But, what if your challenges tend to be broader?

If your challenge is to manage the constant change and flow of projects across an I.T. environment you will have a lifecycle focus. Instead of a specific device or project you are working on, you have a more holistic focus on delivering change on time and on target over and over again. This is where **Continuous Testing** comes into play.
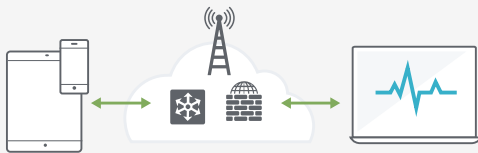
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You are testing continuously – from development to deployment to training to operations, ensuring performance, security, and reliability. There are three building blocks to continuous testing:

- In **development**, challenge your product from every angle before you ship. Understand your user experience from application to protocol, network performance to connections, user load to traffic type scalability
- Before you **deploy**, ensure the service rollout, and all dependencies such as the network configurations and application and security policies meet your business SLA and initial technical design requirements
- Validate new software updates, hardware rollouts, and security policy changes prior to going live. **Optimize** to ensure performance and security are stable or improving with each release
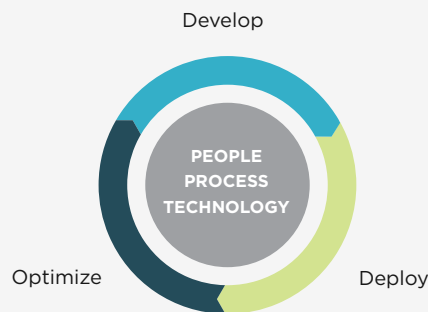
CONTINUOUS TESTING LOOKS AT THE PEOPLE, PROCESSES, AND TECHNOLOGY NEEDED TO BRING YOUR SOLUTIONS TO YOUR CUSTOMERS.

360° Test—Trust Your Solution

END-TO-END TESTING
Whole Ecosystem and Device Test

### CONTINUOUS TESTING
Throughout Your Development Lifecycle

Develop

PEOPLE PROCESS TECHNOLOGY

Optimize

Deploy

Each of these lifecycle stages offer opportunities to validate changes going into your product or solution.

DEVELOPMENT TESTING

Development is when change is the most rapid, and when it is the most cost-effective to fix issues that creep their way into a product or service. Testing in this phase brings many benefits to performance and predictability of delivery. Here are a few cases where early stage testing improves success during change:

- **Vendor Selection** – When selecting a vendor, proof of concept (POC) testing allows you to see how a product performs against the alternatives. Testing in a repeatable lab environment with data that mirrors your environment improves the repeatability of results so it is easier compare performance on a level playing field, and prove that a product works well for your needs
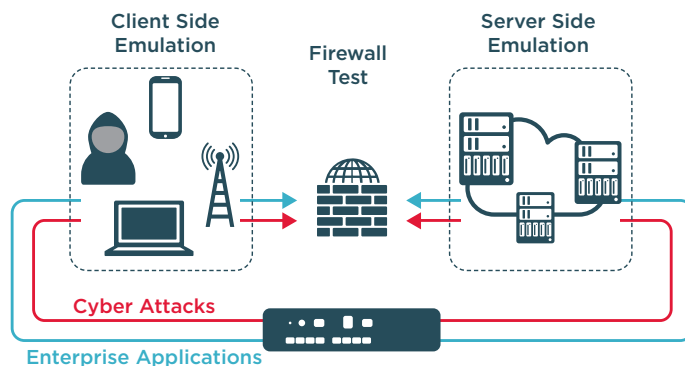
- **Solution Validation** – When you have multiple components coming together in a new solution such as a data center rack or a WLAN rollout testing helps you ensure these components perform reliably together and no surprises lurk in compatibility or security
- **Product Design Verification** – When your team is bringing a new product to market testing gives you the ability to run real-world traffic across it in physical and virtual environments. Validating security resilience is even possible before real attacks occur using products like Ixia's BreakingPoint. It allows you to load up regular application traffic to your product then layer thousands of attacks over the top to ensure that common vulnerabilities are not present

DEPLOYMENT TESTING

In many projects the first stage after planning is deployment. Here testing can be very critical. It ensures that the plans translate to real world success so last minute changes to design or updates do not surprise you. Some common areas testing is imperative during deployment are:

- **Service Level Agreement (SLA) Benchmarking** – Whether you own or outsource infrastructure, your team is still responsible for service availability. SLA benchmarking ensures that production systems can handle the demands in load and resilience. Ixia's IxLoad can test these systems to ensure they meet and exceed SLAs. Ixia's Hawkeye can continuously identify points of failure in a distributed cloud/network environment through proactive monitoring
- **Service Turn-up Validation** – If you are bringing up a service such as a web page, timing is critical. Research has found that even a 4 second load time can cause 25% abandonment[2], costing millions. Ixia tools such as IxChariot and IxLoad can help you ensure services are responsive and reliable
- **Solution Performance** – Have you ever taken over another project or had to absorb technology through an acquisition? Testing up front gives you a great baseline on performance so you plan for the changes that need to be made to bring systems up to standards, or meet SLAs. You can also monitor real-time performance with Hawkeye so you know about issues before your users do

OPTIMIZATION TESTING

Lastly, you are constantly optimizing your network and application with new software updates, hardware rollouts, and security policy updates. How do you ensure your latest IPS firmware update does not cause 80% degradation of performance? Amazingly, one of our customers found this before putting it into their live network! Ixia helps you validate optimization changes are secure and will improve the performance to surprises. Some examples are:

- **Policy Validation Testing** – Prove how a security policy change affect firewall performance, or how system resources change when you add a new license to your edge routers
- **New Technology Adoption** – When upgrading your WLAN with the latest 802.11 standard, you need to ensure there are no hidden challenges. Ixia's IxVeriWave family helps you test to ensure Wi-Fi actually has the fidelity you need with no capability surprises

- **Change Management Verification** – Testing gives you a repeatable way to validate that changes described in a policy or technical document have been successfully implemented in the real world environments where success matters. One customer, a financial exchange, recently added a DDoS mitigation service to protect their exchange. Using Ixia's BreakingPoint technology they were able to not only validate their service was functioning, but using the test data they worked with the vendor to improve response times 10x. For a large financial institution this improved response provides massive ROI and protection against financial turmoil

Summary

Testing has become a crucial part of the lifecycle of networks, products, and services across technology as change becomes more rapid and complexity increases. Testing not only helps project meet or exceed expectations, but also improves ROI and security up to 10x. At Ixia, we help 76 of the Fortune 100 master changes in their environments and successfully adopt new technology to get the competitive edge. Only Ixia gives you the ability to build this trust in your products and solutions through end-to-end and continuous testing. You can learn more about testing benefits, best practices, and how to implement it within your organization at our test home page on Ixiacom.com.

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