

WHITE PAPER

Accelerating Test Management through Self-Service Provisioning

Automating the Tedious Task of Test Setup and Teardown



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Testing Software Applications in Complex Environments

Wouldn't it be great if the software you are developing or testing would only be used in a single configuration in one standard environment? But the reality is that as new technologies emerge and multiply, the environments in which your software must run only get more complex and diversified.

In fact, most modern software systems will most likely exist in a distributed computing environment. This means that each system is required to:

- Render correctly in a variety of browsers
- Run on an assortment of application servers
- Interact with a collection of database systems
- Integrate with directory servers, mail systems, single sign-on servers, firewalls, VPNs, network infrastructure components, domain controllers and enterprise management systems
- Reliably pull from and push data into any number of line-of-business applications, both packaged and custom-built

As a result, software testers are faced with the daunting task of setting up large numbers of physical test environments to achieve the coverage required for quality assurance. Clearly, as systems become more complex, this task consumes more time – some organizations report that as much as 80% of their test time is wasted on test preparation, leaving only 20% of their time for productive testing activities.

Reproducing Software Defects on Demand

Beyond initial test preparation, developers and testers face additional system provisioning challenges when it comes to reproducing bugs. If you work in testing or QA, you have undoubtedly heard someone say “but it works fine on my machine.” While that may be true, it doesn't get you any closer to being able to reproduce the defect. Instead, you must undertake the time-consuming, tedious task of replicating the complex, multi-machine software configuration where the defect was discovered.

A typical situation might go something like this: During the test phase of a software project, the quality assurance team finds a defect in a specific test scenario. Often this defect is directly related to the combination of systems. For example, “Build 2333 exhibits undesirable behavior on BEA WebLogic 6 SP3 when the client is Internet Explorer 6 on Windows XP Pro SP2, and the database is Oracle 9i on Red Hat 6.2.” The QA engineer then

files a defect report that is routed to the appropriate developer. Once the bug report arrives, the developer tries to reproduce the problem in his or her sandbox environment. More often than not, the problem can not be reproduced in the test lab.

At this point the developer can either gather all of the systems and software needed to recreate the exact environment in which the problem was observed by QA, or challenge the QA organization to demonstrate the problem. Of course testing activities have proceeded since the bug report was filed, and systems have been reconfigured to accommodate another test scenario. Now QA is unable to reproduce the problem either. For organizations with distributed development and test teams (across time zones or even continents), the inability to reproduce bugs is further exacerbated.

If the problem is deemed critical, reproducing it can become a key development “mission,” consuming large amounts of organizational energy and draining productivity. But these costs are actually quite low when compared to the cost of having the problem reappear once the application has gone into production.

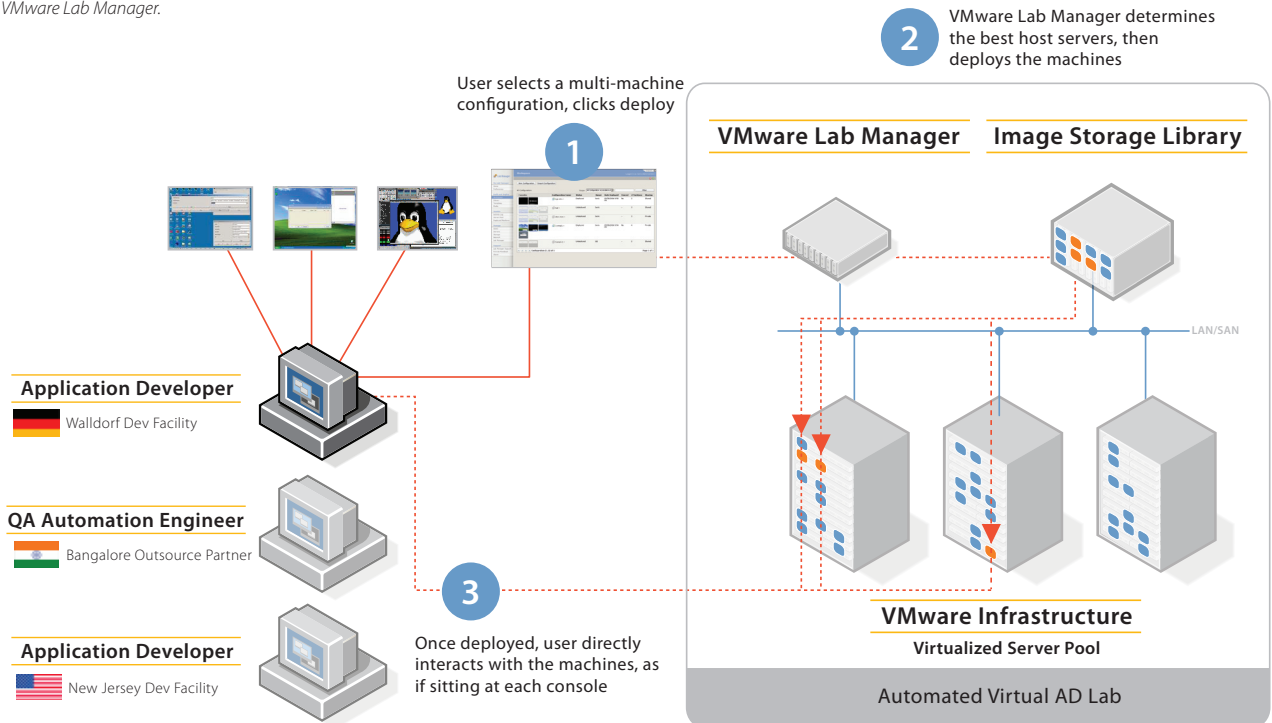
Automating with VMware Lab Manager

VMware Lab Manager greatly reduces the time and resources required to reproduce complex software environments. As the most comprehensive virtual lab automation system, VMware Lab Manager automates the rapid setup and teardown of even the most complex multi-machine software configurations. VMware Lab Manager enables self-service provisioning for the entire software development and test team and solves the problem of non-reproducible bugs, and, as a result, shaves months off of software development projects.

Building on VMware Infrastructure, VMware Lab Manager enables software developers and QA engineers to suspend, then capture to a shared storage library, the complete state of a “complex configuration” – that is, a collection of running, interdependent computer systems that span multiple machines (e.g., a server hosting a browser, connected to a middle-tier application server, attached to server hosting a database system). Over time, an organization builds up its library, including test scenarios, production environments, and customer configurations. These configurations are available “on demand” to developers and testers, and made easily accessible via a browser interface.

When a configuration in the library is later needed for development or test purposes, for example to test a new software build in the context of a customer production environment, VMware Lab Manager can instantly deploy the entire configuration to the best available resources in a pool of managed servers – exactly as it was captured, running and ready for use.

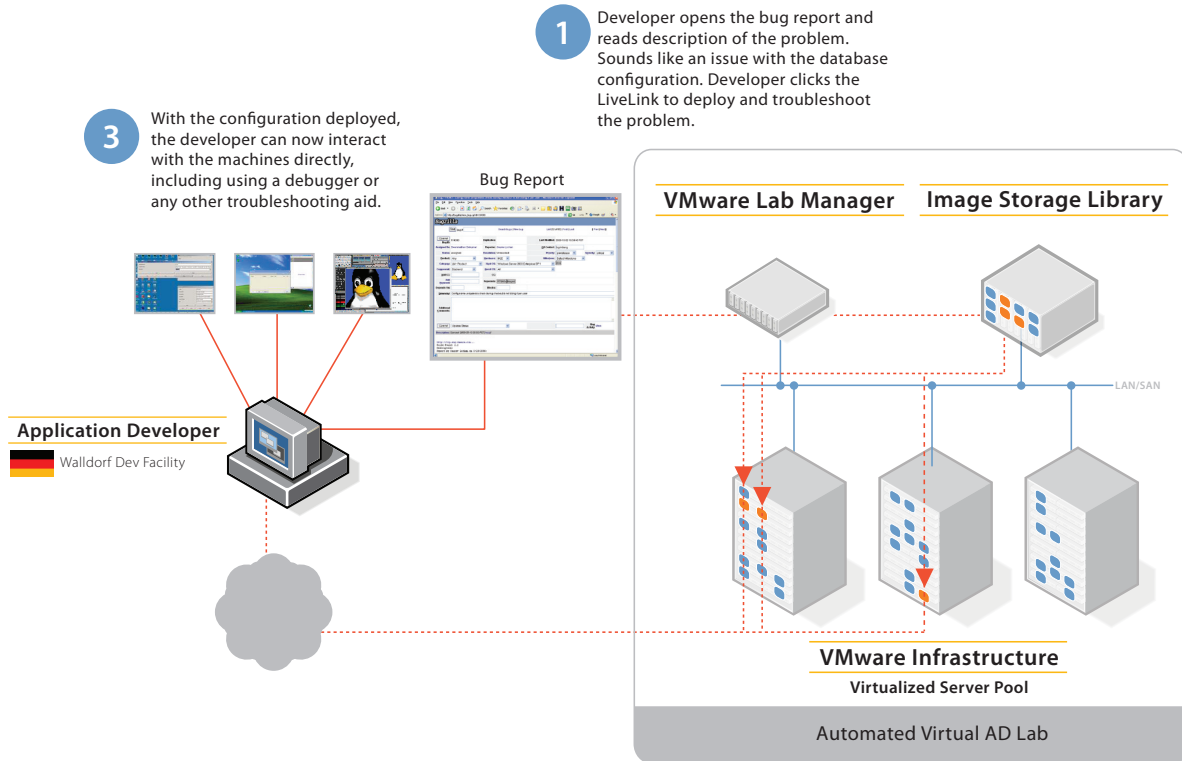
What normally takes hours or days to set up can literally be completed in seconds with VMware Lab Manager.



VMware Lab Manager capture-and-restore operations literally take seconds. What would normally be a painstaking, multi-hour exercise (gathering machines, installing operating systems, installing and configuring applications, establishing inter-machine connections) is now a self-service provisioning exercise, accomplished with a single click of the mouse or a single API request from an automated test management system, like Mercury's Quality Center.

VMware Lab Manager eliminates the difficulty of reproducing software defects. When a problem is discovered, the entire multi-machine configuration can be suspended and captured as a named unit to a storage library. A LiveLink URL representing this captured configuration is generated and pasted in the defect report. The capture operation can be user-initiated through the browser-based user interface or via a single API call from an automated test script as shown in the following diagram.

VMware Lab Manager instantly makes available to the developer the precise environment in which each problem manifests itself.



1 Developer opens the bug report and reads description of the problem. Sounds like an issue with the database configuration. Developer clicks the LiveLink to deploy and troubleshoot the problem.

3 With the configuration deployed, the developer can now interact with the machines directly, including using a debugger or any other troubleshooting aid.

2 When the developer clicks the LiveLink, Lab Manager deploys the configuration giving the developer access to the entire test configuration exactly as it existed when the test failure occurred.

When the defect report arrives, with the embedded LiveLink, the developer simply clicks the link and the entire configuration is restored to the server pool, unsuspended and ready for debugging. Restoring the configuration to the server pool is roughly a 30-second process. No more hours are wasted trolling the halls for servers, CDs, and license keys in order to cobble the environment together in hopes of reproducing the defect.

VMware Lab Manager makes reproducing even the most complex, configuration-dependent defects effortless. By doing so, it simultaneously accelerates the development cycle while dramatically reducing latent defects that find their way into production.

Conclusion

VMware Lab Manager captures multi-system configurations to a shared library and gives you on demand, self-service provisioning, the ability to reproduce bugs reliably, shorter debug phases, and a reduction in the number of latent software defects that slip into production.

VMware Lab Manager optimizes resources and allows you to save significant time on software development projects by enabling you to:

- Pool and share server, networking, storage and other resources between development and test teams and individuals
- Automatically and rapidly set up and tear down complex development and test configurations
- Maintain a complete library of multi-machine customer and production system environments – and instantly recreate them as needed
- Capture a multi-system configuration exhibiting a bug or unexpected behavior during test, ensuring reproducibility at debug time. The VMware LiveLink capability allows instant sharing of the running error state
- Provide every developer or test engineer the equivalent of their own fully-equipped data center with dedicated provisioning staff
- Efficiently move and share multi-machine configurations across software development and test teams and facilities



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6,711,672, 6,725,289, 6,735,601, 6,785,886, 6,789,156, 6,795,966, 6,880,022, 6,961,941, 6,961,806, 6,944,699, 7,069,413;
7,082,598 and 7,089,377; patents pending.

