mplementing and maintaining an enterprise-wide PLM system is a significant undertaking that requires cooperation between the configuration team, which often resides inside engineering, and corporate IT for back-office support.

This article is intended to provide guidance for setting up the PLM environment, as well as suggestions for improving the relationship between the PLM configuration team and IT. The following four concepts are critical:

- Create a Test environment that allows for easy rollback if a configuration change fails

- Perform a full-volume restore on Test to ensure the data is similar to Production

- Implement a systems environment that allows users to help themselves

- Communication is the key to success

"By working closely with the PLM team and the business, IT can form a cooperative and productive alliance," said Brad Draeger, IT Systems Architect at Mercury Marine. "Providing guidance on hardware and network requirements based on industry best practices and the unique requirements of PLM systems is very important because the environment sets the foundation for the whole user experience."

Environment Strategy

As an industry best practice, it is important to have at least two robust environments. One for Test, and another for Production. However, we also recommend having a third environment for Sandbox.

Sandbox provides an environment where the PLM system is configured out-of-the-box so the PLM configuration team can experiment with new versions of the software, install trial licenses for new modules, and in general just play with the base system to understand how it works. Mercury Marine uses VMWare ESXi for snapshots in case rollbacks are necessary from failed configuration changes. (Figure 1)
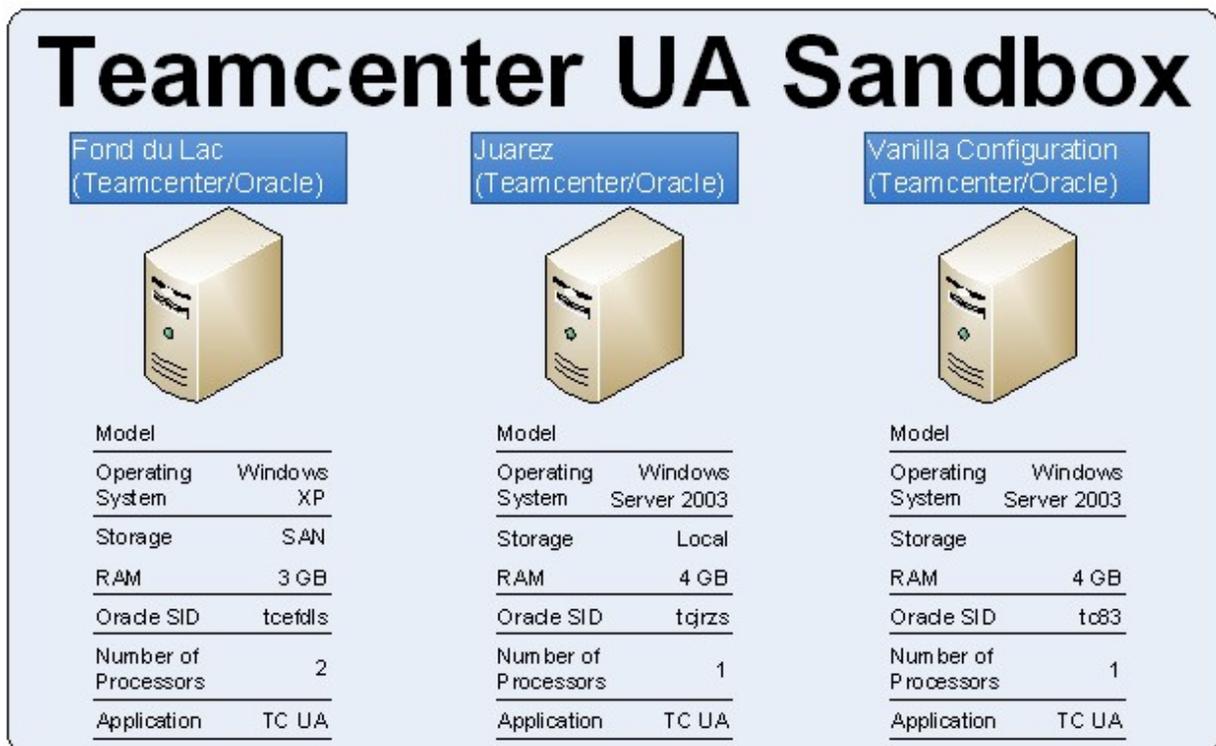
Figure 1

Teamcenter UA Sandbox

	Fond du Lac (Teamcenter/Oracle)	Juarez (Teamcenter/Oracle)	Vanilla Configuration (Teamcenter/Oracle)
Model			
Operating System	Windows XP	Windows Server 2003	Windows Server 2003
Storage	SAN	Local	
RAM	3 GB	4 GB	4 GB
Oracle SID	tcefdls	tcjrzs	tc83
Number of Processors	2	1	1
Application	TC UA	TC UA	TC UA

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Figure 2

Teamcenter UA Test

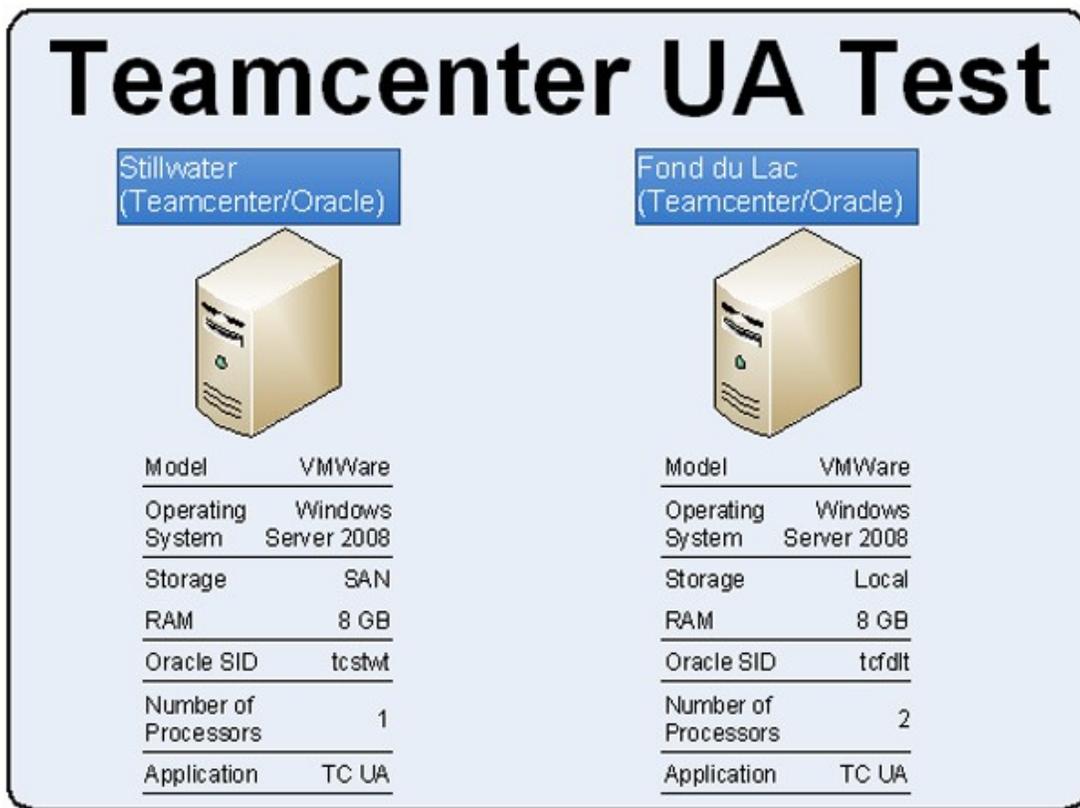|	Stillwater (Teamcenter/Oracle)		Fond du Lac (Teamcenter/Oracle)
Model	VMWare	Model	VMWare
Operating System	Windows Server 2008	Operating System	Windows Server 2008
Storage	SAN	Storage	Local
RAM	8 GB	RAM	8 GB
Oracle SID	tcstwt	Oracle SID	tcfdlt
Number of Processors	1	Number of Processors	2
Application	TC UA	Application	TC UA

Once the new configuration is understood, the next step is to move it from Sandbox into the Test environment. From our perspective, Test should be a full refresh of Production. However, the Mercury Marine team has also refreshed two production sites within Test to allow for multi-site environment testing. The team uses VMWare for snapshots and rollback throughout Test as various changes are validated. (Figure 2)

The Production environment should be sized adequately to allow for the rigors of moving and storing large amounts data required to support an enterprise-wide PLM system. In the case of Mercury Marine, that includes four Windows servers and one AIX database server along with a remote volume. There are currently four multi-site configurations, although several are likely to be consolidated in the future. The team uses Oracle database backups and VMWare snapshots for Production environment rollbacks. (Figure 3)

Client Deployment Strategy
To efficiently distribute client updates, there is a configuration share at each user facility with a master located in the corporate data center. Mercury Marine uses this configuration because it helps keep the systems in sync. Updates replicate to the remote shares nightly occur nightly so the next day everyone has the same configuration. Mercury uses a self-help area for users to perform a client re-

install if necessary. This allows local users to fix basic issues such as a full re-install or perform diagnostic steps independently. One master client with all site definitions is used and the launch script modifies the configuration for the user based on which environment the user needs to work in. With this configuration, it is easy to deploy changes to the configuration of Teamcenter and ensure all clients receive the updates.

A centralized IT ticketing system is used to alert the PLM configuration and IT teams regarding system issues to efficiently manage user requests. Remote screen sharing and local administrator rights are suggested for the best end-user support.
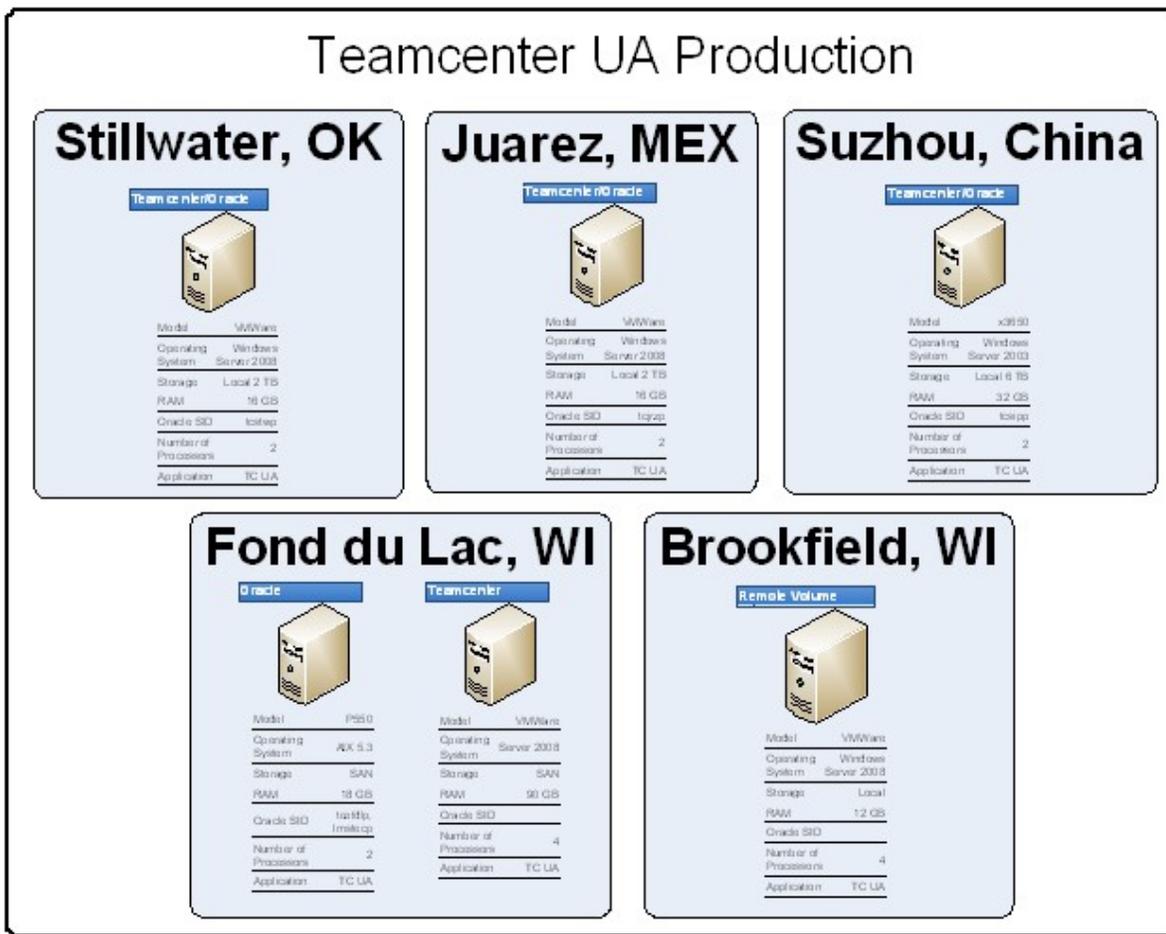
Remote Site Support
When working with remote sites, relationship building between the corporate IT and local support teams is critical. For example, a Windows operating system was chosen for the remote sites because that operating system is most familiar to the local team. Both teams coordinated the initial installation and support guidelines going forward.

Off-shore Connectivity
To allow contractors and off-shore teams into the Production PLM environment, one straightforward solution is an SSL VPN connection to several remote desktop systems located

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Figure 3

Teamcenter UA Production

Stillwater, OK — Teamcenter/Oracle
Model	VMWare
Operating System	Windows Server 2008
Storage	Local 2 TB
RAM	16 GB
Oracle SID	tcstwp
Number of Processors	2
Application	TC UA

Juarez, MEX — Teamcenter/Oracle
Model	VMWare
Operating System	Windows Server 2008
Storage	Local 2 TB
RAM	16 GB
Oracle SID	tcjrzp
Number of Processors	2
Application	TC UA

Suzhou, China — Teamcenter/Oracle
Model	x3650
Operating System	Windows Server 2003
Storage	Local 6 TB
RAM	32 GB
Oracle SID	tcszp
Number of Processors	2
Application	TC UA

Fond du Lac, WI — Oracle
Model	P550
Operating System	AIX 5.3
Storage	SAN
RAM	18 GB
Oracle SID	tcstfdp, lmstcp
Number of Processors	2
Application	TC UA

Fond du Lac, WI — Teamcenter
Model	VMWare
Operating System	Server 2008
Storage	SAN
RAM	90 GB
Oracle SID	
Number of Processors	4
Application	TC UA

Brookfield, WI — Remote Volume
Model	VMWare
Operating System	Windows Server 2008
Storage	Local
RAM	12 GB
Oracle SID	
Number of Processors	4
Application	TC UA

in the data center. This allows the user to fetch data to a local system in the datacenter and then move it to his offshore computer to make the changes. Once the changes are complete, the data is copied back to the datacenter desktop and checked into PLM.

Relationship Building

Since the PLM system is often not an IT-sponsored system, but carries the same critical priority as an ERP system, it may not receive the same visibility and support. By having corporate IT representation working with the PLM team, this will help ensure success when working through the road blocks and politics that often accompanies a large enterprise-wide deployment.

"As part of the corporate IT team, we have access to back-end systems and resources that an engineering-based PLM team typically does not," explained Draeger. "By being integrated with the PLM team, we can provide the infrastructure skills to properly size and support the hardware, while also being able to support PLM system patch and upgrade deployments. Working closely with the PLM team has proven to be a successful combination over time."

Mercury PLM Services Unique Perspective

Mercury's differing approach concentrates on understanding your process as a must for success. A process-centric approach requires businesses to review and question existing work streams to understand "why," "what," and "how" work should be done to establish efficient cross-functional work flows that are consistent, repeatable and scalable for growth.

Mercury also offers a unique perspective for helping organizations that are considering a Product Lifecycle Management implementation because Mercury lives and breathes PLM from a manufacturing business user's vantage point.

Because Mercury works in a dynamic, global product-development environment that supports a worldwide manufacturing footprint, Mercury has a user's perspective that helps drive results and realize improvements. Several of Mercury's experts also have been deeply involved with our ISO 9000 certification effort, as well as configuration management, and engineering document-management practices. ∎

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