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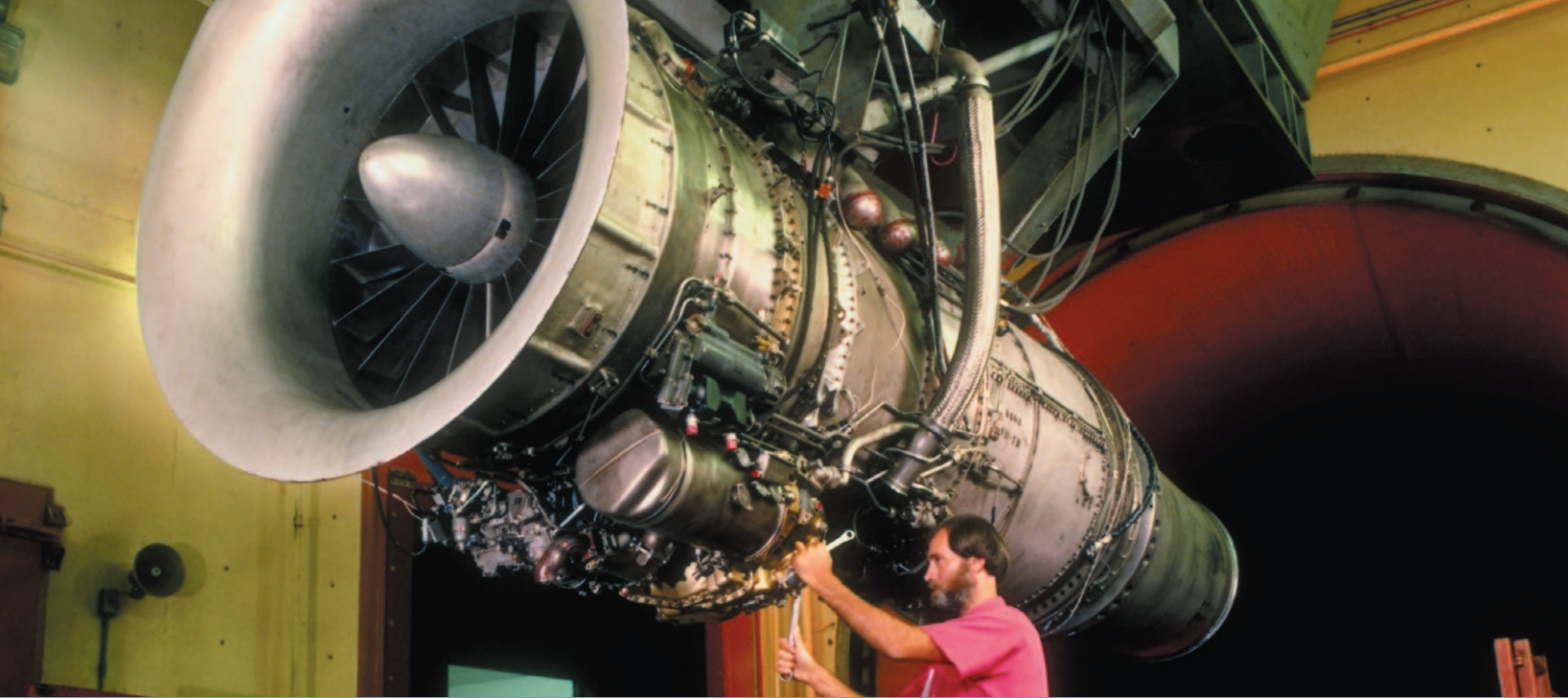


Answers for industry.

Teamcenter MRO solutions

For service lifecycle management to sustain complex assets

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Business challenges

OEMs, owners and service organizations that support and sustain complex capital assets (such as aircraft, ships, power plants, machinery, medical devices and infrastructure elements) face a demanding array of challenges, including the need to:

- **Leverage design manufacturing and service data.** OEMs need to be able to leverage their design/build knowledge to establish a market advantage when they compete as service providers. OEMs also need to capture as-maintained results from asset owners and other service providers to improve their product offerings.
- **Implement service level and performance-based contracts.** Many of today's customers want their service contracts to measure performance issues that are more meaningful than conventional hourly rate and parts replacement metrics. These contracts need to measure asset availability/reliability and organizational performance factors that reflect a better understanding of assets, parts and supply chain activity.
- **Reduce service cycle time.** Service teams need to minimize the turnaround time needed to resolve service events.
- **Minimize service costs and improve the use of resources.** Work capacity needs to be increased through leaner operations.
- **Increase service team productivity.** Service organizations can improve productivity by sequencing tasks to reduce redundancy and by minimizing the time required to perform nonessential tasks (such as searching for instructional information or performing "paperwork"),

thereby freeing technicians to resolve their assigned service events. Best practices should enable lean operations and facilitate the capture of intellectual property that ensures the productivity of newly hired service technicians.

- **Maximize operational availability and reduce unscheduled downtime.** Capital assets need to remain operational as long as possible. Sustained operability improves return on asset investment, while enabling individual assets to fully complete their critical missions.

To address these issues, Siemens PLM Software provides Teamcenter®-driven maintenance, repair and overhaul (MRO) solutions that address service lifecycle management environments across industries. Teamcenter product lifecycle management (PLM) technology enables organizations to establish a service management environment that can capture, organize, optimize and utilize knowledge throughout the entire lifecycle of a complex product – particularly while the product is being maintained and serviced. This environment is extended for service providers with service process management applications enabling accurate maintenance planning and execution. By providing the entire service value chain with the ability to access a single source of product and asset definitions, Teamcenter facilitates a collaborative capability for performing asset management, service planning and execution on a lean basis.

Introducing Teamcenter MRO solutions

Teamcenter solutions enable OEMs, owners and service organizations to support complex capital assets with a service management environment. Companies can use this PLM-enabled environment and the following Teamcenter solutions to communicate asset definitions and maintenance information within a service-oriented context that facilitates the accurate and rapid performance of multiple service functions.

- Service Asset Management provides total visibility to configuration and service knowledge for complex long-life capital assets, including each asset's in-service status and history. Service event management enables OEM and service providers to capture the results of service activities performed in-house or outsourced elsewhere in the service value chain. The service dashboard provides insight into metrics necessary to effectively manage to commitments such as PBL (performance based logistics) and SLA (service level agreement) contracts.
- Service Planner enables organizations to develop detailed maintenance plans that form the basis for proactive service operations using preventative, conditional and reliability-based service models.
- Service Scheduler provides development and visibility into service schedules allowing optimization of resources and service events to improve turnaround time and asset availability.
- Service Technician brings service information and task assignments to the technician to execute service tasks accurately, capturing service and asset information to improve first-time fix rates and reduce asset downtime.
- Content Management enables organizations to author and publish service documentation that can be tailored and delivered to the point of need specific to the asset and end user.
- Reporting and Analytics allows organizations to examine operational information so they can discern trends in asset performance and reliability, as well as track and analyze asset and organizational KPIs.

By managing asset information in a secure web-native PLM environment, Teamcenter facilitates faster service response. Service teams can access this asset knowledge at anytime from anywhere.

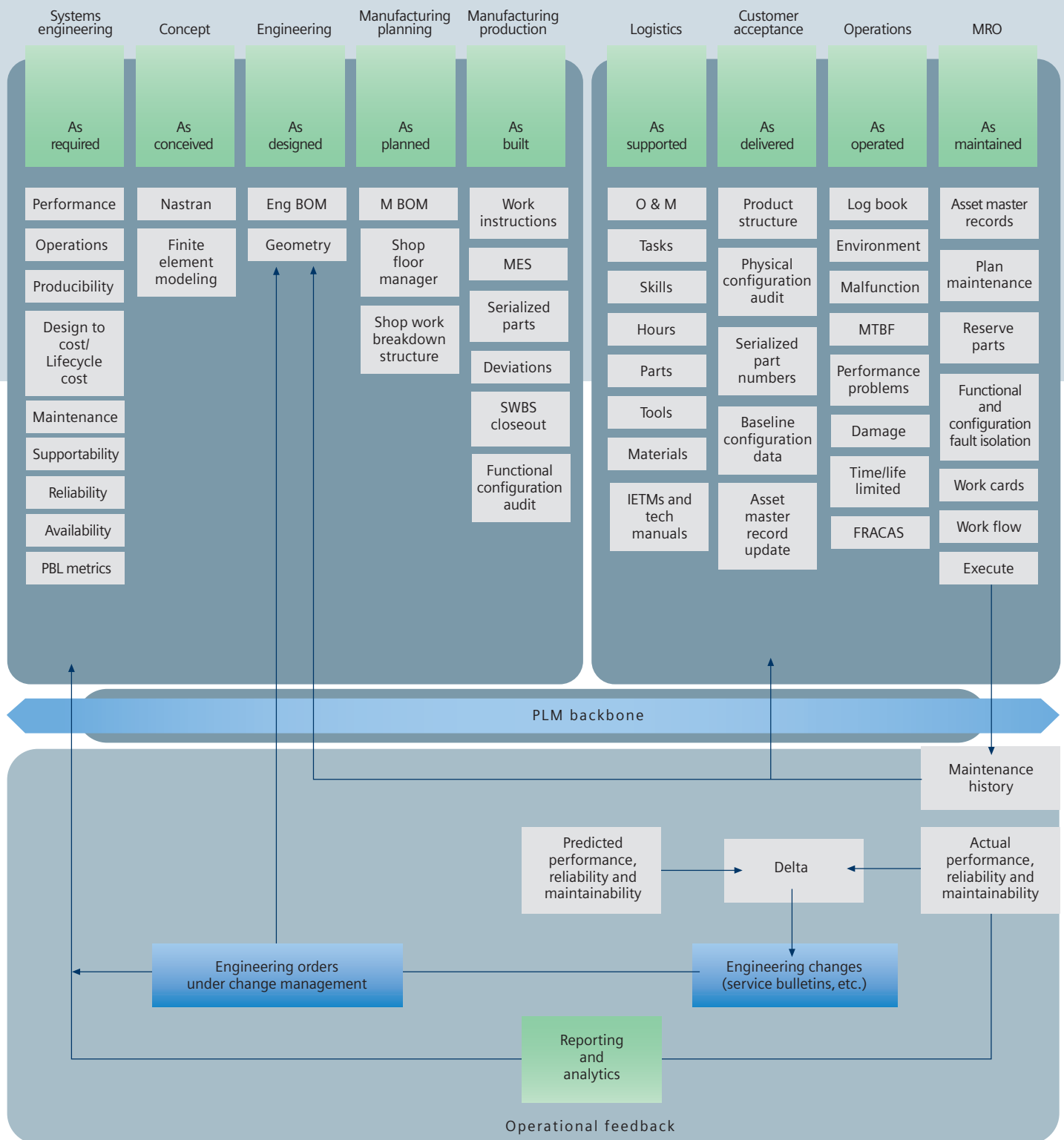
By providing PLM environments with workflow, change, document and configuration management capabilities, Teamcenter allows service teams to work with engineering teams in closed loop processes that drive today's optimized inventory, warranty improvement and "build-in" initiatives. In addition, best practices and lean processes can be implemented and tracked across the entire service chain.

By deploying community-oriented collaboration capabilities across a PLM environment, Teamcenter enables widely dispersed service technicians to visually exchange ideas in real-time conferences, share applications and translate their point-of-service concerns into re-usable intellectual capital.



What makes Teamcenter MRO solutions special?

Factor	Differentiation
Configuration-driven service	<p>As product configurations evolve into as-maintained asset configurations, OEMs and service teams have a compelling requirement to maintain configuration control, ensure regulatory compliance and tightly integrate their operations with product engineering. Teamcenter configuration-driven service capabilities provide the technological base for meeting this need.</p> <p>By capturing, organizing and accessing asset information within the context of its configuration, organizations can rapidly and accurately improve maintenance planning and maintenance execution activities.</p> <p>Organizations can leverage Teamcenter to establish feedback loops that bring the service concerns of field technicians to the product and service engineers who develop and support today's complex products.</p> <p>Teamcenter enables service teams to understand an asset's ongoing requirements and compliance constraints. By leveraging a configured structure, service organizations can retain and access all of the information about an asset within a service-related context, including inspection reports, deviations, maintenance procedures, service requirements and lifecycle limits. Teamcenter also provides the complete history of the asset and its associated support information and monitored parts.</p>
Marketplace success	<p>Siemens PLM Software's impressive experience across a client base of 71,000 customers includes highly respected and experienced companies in the aerospace, defense, manufacturing, energy, health care and high tech and electronics industries.</p> <p>Teamcenter is recognized by industry analysts as the leading PLM platform in the world with more seats installed than all of its competitors combined.</p>
Proven PLM platform	<p>Teamcenter-driven PLM solutions manage much of intellectual capital that defines today's highly complex assets before they reach the in-service stage. Teamcenter is uniquely positioned to link existing product and engineering data into maintenance and material improvement programs.</p>
Scalability and openness	<p>Teamcenter provides modular and highly scalable solutions that enable companies to address their highest business priorities first – without sacrificing security or export control. Organizations can deploy Teamcenter one step at a time, in a phased approach that ensures a rapid return on investment. Teamcenter-driven PLM environments can be expanded in seamless increments to satisfy the needs for growth, technology enhancement or service-team integration.</p> <p>Teamcenter-driven MRO solutions are delivered on an open PLM foundation that protects investment while facilitating vendor independence. This open foundation allows organizations to integrate Teamcenter with other mission-critical systems, as well as to rapidly accommodate new service providers and other partners.</p>
Comprehensive lifecycle coverage	<p>Teamcenter MRO solutions are part of the Teamcenter larger portfolio of digital lifecycle management solutions. Organizations that own product responsibility from concept planning to end-of-life disposition can leverage Teamcenter to manage their entire product lifecycle.</p> <p>Product teams can capture maintenance and reliability requirements determined during the product development cycle and feed these requirements to service organizations to properly assign service objectives and procedures.</p> <p>Similarly, service teams can capture operational observations (such as mean time between failure, time-for-service procedures, failure codes and operational logs) and feed this information back to product and service engineering via closed loop processes.</p>





Teamcenter service asset management solution

Facilitating total asset visibility and lifecycle collaboration

Teamcenter service asset management (SAM) solution provides a single source of service data that supports manufacturers as well as service providers with the knowledge they require to be effective in their portions of the lifecycle. For the manufacturer, SAM bridges the gaps between product engineering, manufacturing, logistics and services with a single knowledge source that improves collaboration in any direction of the product lifecycle. The service provider utilizes SAM to manage service information anywhere it originates in the service value chain to support service operations. SAM's service dashboard provides OEM and service providers with insight via dashboards and reports into product, asset and process performance metrics that are critical to achieve commitments such as PBL and SLA contracts.

Service Asset Management captures, manages, and provides data and metrics on a wide range of operational knowledge including:

- Configuration information that describes the complete status of an asset
- Comprehensive change and event histories that describe individual assets and their related parts
- Compliance standards and regulatory requirements that the operational asset must satisfy
- Baselines and common information that combine configuration information, change/event histories, technical information and compliance standards/regulatory requirements for each class of managed asset



- External service event actions and information
- Changes to the asset configuration (such as removal/replacement of serialized components)
- Logs of overhauls, inspections, fault codes, service bulletin incorporations and field orders
- Operational utilization information against the asset or its components, including life characteristics, life limits and location
- Deviation authority and reasons for removal/change
- Discrepancies and their corrective actions

Manufacturers leverage Teamcenter configuration management capabilities to link physical product configurations (i.e., configurations that incorporate serialized part and lot tracking) with as-designed engineering configurations to link operational feedback with products for next-generation improvements.

Owners, operators and third-party service providers use Teamcenter to capture, develop and manage asset and service information in-house and from the service value chain. Subsequently, service teams can access all allowable configurations to determine what approved parts and alternate/substitute parts can be used to resolve a service event as quickly as possible.



Teamcenter service planner solution

Managing the advanced service environment

Teamcenter service planner solution addresses the requirements of service organizations executing advanced operational models where detailed service planning information is required for preventative, conditional or reliability-based maintenance. Complex products in many industries require more aggressive services to prevent safety failures or operational interruptions. Adoption of performance-based and service-level contracts requires a more proactive approach for servicing assets and meeting business objectives.

Service Planner enables service organizations to:

- Establish service plans around the configurations of products and assets
- Define service requirements and frequencies for classes of assets and specific assets

- Create and manage service tasks, work instructions, resources and estimates to satisfy service requirements
- Utilize workflows to sign-off on service planning elements
- Establish safety and hazardous notices for material and service tasks
- Roll up estimates for service tasks (cost and time)
- Import and export service planning information with other systems

By facilitating an environment that provides advanced services for complex assets, Teamcenter ensures that service can be accurately and effectively planned. The service organization using Service Planner can organize service information to reduce risk, cost and cycle time while improving asset availability and reliability.



Teamcenter service scheduler solution

Managing the service schedule

Teamcenter service scheduler addresses the needs of both reactive and proactive service organizations by providing the creation of and visibility into service schedules. Enabling optimized tasking and scheduling, Teamcenter reduces asset downtime and maximizes service effectiveness.

With visibility into schedules, service operations can maximize the effectiveness of service events to increase asset availability and customer satisfaction, reduce service costs and cycle time and optimize service operations.

Service Scheduler enables service organizations to:

- Manage customer contact
- Create service catalogs of standard service offerings with estimates
- Manage service activities including reactive and proactive service requests
- Create work orders and service tasks and assign per schedule, skill and resource availability
- Sequence service tasks to reduce redundant tasks and effort



Teamcenter service technician solution

Focusing and getting the work done

Teamcenter service technician brings asset and service knowledge to the point of need to enable the technician to focus on completing the work at hand accurately and quickly. Work assignments arrive in the technicians work list along with all relevant information to reduce wasted time and effort.

Teamcenter allows the service technician to execute service work accurately and with reduced effort to improve first time fix rate and asset reliability. By reducing the effort to accomplish service assignments, Teamcenter improves overall service operations and throughput.

Service Technician empowers the technician to complete work through:

- Access to asset and service information including history
- Delivery of service procedure documentation
- Capture of asset utilization and part movement for asset configuration updates
- Processing of service events to capture external service activities

Teamcenter for MRO benefits

Solutions	Benefits
Service Asset Management	<ul style="list-style-type: none"> • Provides total visibility to an organization's assets under configuration control • Improves asset tracking and life usage by leveraging fully defined lifecycle BOMs • Enables rapid generation and digital distribution of service bulletins • Injects event-driven service experiences into closed-loop product-to-service improvement processes • Incorporates service team concerns into early product lifecycle phases • Delivers global point-of-service knowledge • Manages all asset-related knowledge while providing access within the context of the asset's configuration • Enables manufacturers and service integrators to capture and incorporate asset knowledge and configuration changes that originate elsewhere in the service value chain • Provides a service dashboard that facilitates insight into asset and process performance via key performance indicators that enable successful PBL and SLA business contracts
Service Planner	<ul style="list-style-type: none"> • Enables service compliance and planning by establishing service plans for assets and product variants • Improves service efficiency by facilitating accurate and detailed service event planning • Increases asset availability and reliability by defining service requirements and frequencies that support advanced service operational models • Enhances service quality by ensuring that approved service procedures are defined and followed • Encourages hazard and safety compliance by defining notices that are applicable to specific materials, parts, service tasks or work cards • Improves service cycle performance by facilitating faster diagnostic and service procedures tied to fault codes
Service Scheduler	<ul style="list-style-type: none"> • Improves service quotes by establishing catalogs of standard offerings • Controls costs by capturing actuals and comparing to estimates • Improves service operations with visibility into schedules for future, active and closed work • Increases utilization of resources through visibility into work assignments • Increases asset availability through increased effectiveness of service events to reduce asset downtime
Service Technician	<ul style="list-style-type: none"> • Improves service execution with workflow assignment delivery and tracking • Improves service integrity through rapid access to applicable technical knowledge for each service task and asset • Increases asset management effectiveness through capture of configuration changes, utilization and service measures • Improves service and asset performance by retaining and delivering service experience and knowledge to the point of service

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About Siemens PLM Software

Siemens PLM Software, a business unit of the Siemens Industry Automation Division, is a leading global provider of product lifecycle management (PLM) software and services with seven million licensed seats and more than 71,000 customers worldwide. Headquartered in Plano, Texas, Siemens PLM Software works collaboratively with companies to deliver open solutions that help them turn more ideas into successful products. For more information on Siemens PLM Software products and services, visit www.siemens.com/plm.

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