Tivoli® software

Establish a platform for effective IT service management that integrates with and extends the value of existing processes.
Deploy the open, federated IBM Tivoli Change and Configuration Management Database.

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Overview

For an organization to be able to manage IT like a business, it needs more than traditional IT management tools that focus only on monitoring various types of IT resources. IBM IT Service Management is designed to provide customers with the capability to understand their IT infrastructures and implement processes that help them manage IT like a business.

At the heart of IBM IT Service Management is IBM Tivoli® Change and Configuration Management Database (CCMDB) — a platform for integrating data, workflow and policies across IT management processes. Broader than the IT Infrastructure Library® (ITIL®) configuration management database (CMDB) notion, Tivoli CCMDB provides data as well as people integration, through a workflow engine and built-in best-practice processes. Tivoli CCMDB can federate data from companies' existing configuration databases and operational management products to help them manage the complexity of today's IT and business environments so they can focus on optimizing the services IT delivers to the business.

This white paper will help you understand how Tivoli CCMDB enables organizations to benefit from innovations in application discovery, data federation and application integration — and how it automates IT processes to help minimize the impact of organizational complexity. Read on to learn about the central role Tivoli CCMDB plays in IBM IT Service Management.

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Integrate data, workflow and policies to make IT service management a reality

IBM IT Service Management provides organizations of all sizes and in all industries with a leading strategy to help achieve the optimal intersection of people, processes, technology and information – as well as the concrete, innovative IBM tools for making that strategy a reality. IBM IT Service Management includes:

- *IT operational management products (OMPs)* — IBM solutions automate tasks to help address operational management challenges related to applications and business services.
- *IT service management platform* — Tivoli Change and Configuration Management Database is a single point of integration for IT service management processes and data. It provides unique and efficient ways to access and share data with users and other solutions.
- *IT process management products* — IBM Tivoli process management products are innovative tools that drive responsiveness and flexibility by automating IT management processes within silos and coordinating processes across silos in conjunction with Tivoli CCMDB.
- *Best practices* — IBM helps customers make ITIL and other best-practice frameworks actionable in their environments and augments that effort with practices derived from IBM's extensive customer engagements.

IBM IT Service Management
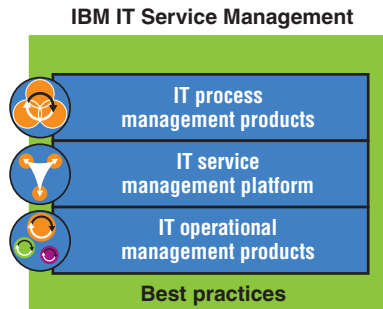
Tivoli CCMDB is the IT service management platform within IBM IT Service Management.

You can see that Tivoli CCMDB occupies a central role in IBM IT Service Management. When it comes to establishing a platform for effective IT service management, it's not enough to merely store configuration data from across the organization. The information becomes most valuable when the people in

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the organization can use it and act on it. In other words, a CMDB can't be a retooled configuration database − it needs to offer capabilities that help an organization manage its IT infrastructure.

That's why IBM designed Tivoli CCMDB from the ground up to help organizations:

- Discover, integrate and share current, accurate data across a complex enterprise. Tivoli CCMDB features a leading solution for agentless, automated discovery of configuration items and application dependencies — as well as for rich application mapping. It finds and collects information about the IT infrastructure and stores or federates it for use during assessment, planning, management and analysis.
- Automate process workflows to quickly and accurately enforce business-critical policies. It not only includes automated, preconfigured and customizable process workflows for the change and configuration management processes, it also provides the integration platform for IBM Tivoli process management products, so that an organization can consistently manage process creation, workflow, monitoring and reporting.
- Integrate processes with operational management products to help maximize efficiency and performance. Tivoli CCMDB helps business staff run processes effectively and efficiently. It features an application programming interface (API), GUI reporting and an IBM WebSphere®–based workflow engine to enable integration of management applications.

Use best-of-breed data management capabilities to integrate data from across the organization
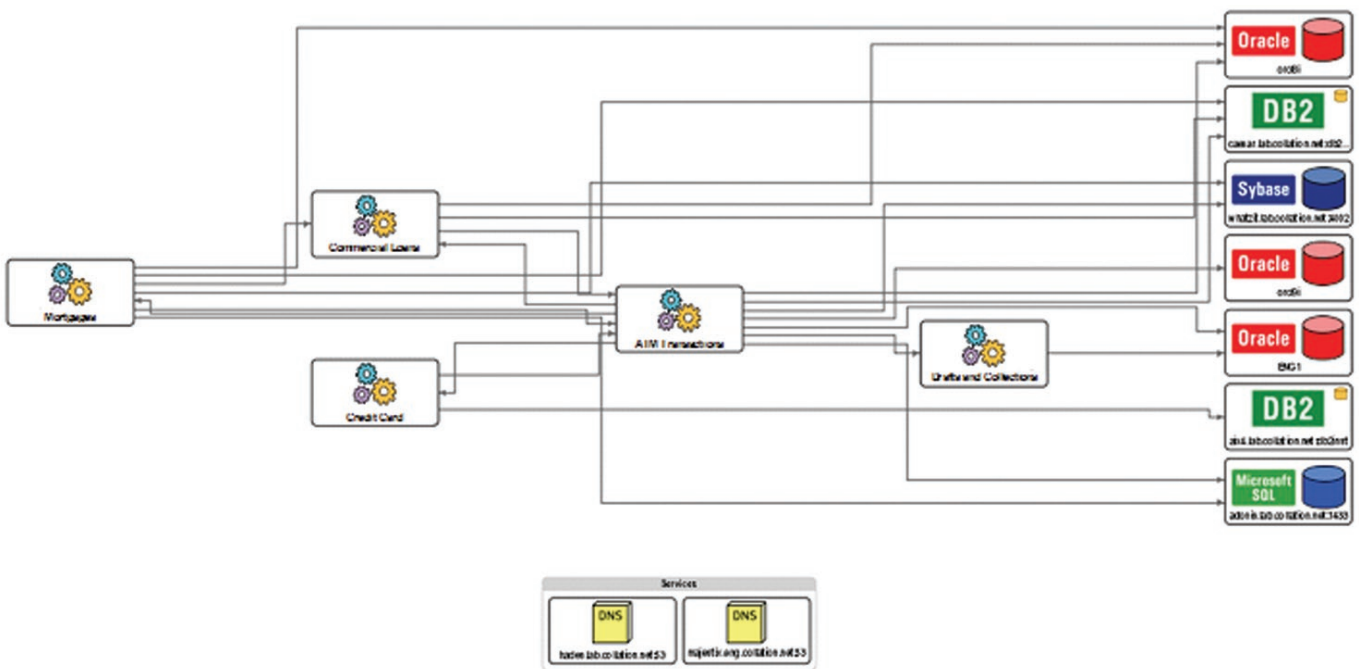
Tivoli Change and Configuration Management Database was designed to deliver the critical functions of a configuration management database:

- Native discovery and application mapping
- Data integration and federation
- Reconciliation
- Synchronization

Native discovery and application mapping

Tivoli CCMDB delivers native discovery capabilities that an organization can use to obtain a detailed understanding of its supporting infrastructure, including down to layer-2 network devices, storage devices, cross-tier dependencies and run-time configuration. Unlike products with limited abilities to visualize infrastructure, Tivoli CCMDB provides detailed maps of business applications and their relationships to one another. IT organizations can leverage automated maintenance of these application maps and the ability to easily integrate this data with other enterprise information to help:

• Support cost-effective and successful implementation of business service management initiatives using "out-of-the-box" integrations with IBM Tivoli Business Systems Manager and other business service management tools.
• Dramatically lower the business risks of service failures and inconsistencies.
• Facilitate efforts to comply with technology and regulatory standards.
• Significantly reduce problem isolation times.

Discover transactional relationships between components and applications.

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Tivoli CCMDB provides the breadth and depth of application infrastructure visibility that organizations need to coordinate and help manage configuration changes and processes throughout an enterprise. With more than 200 sensors available "out of the box," the database provides complete visibility into operating systems; Microsoft® .NET, Java™ 2 Platform Enterprise Edition (J2EE™) and custom application platforms; middleware; network routers and switches; and packaged applications.

Within applications, Tivoli CCMDB provides visibility into all of the relevant information needed to optimize service delivery and agility, including:

- Changes to deployed application modules.
- Dependencies between individual software processes, whether they are running in Microsoft Windows®, Linux®, UNIX® or mixed environments.
- Dependencies on critical network services such as Lightweight Directory Access Protocol (LDAP), Network File System (NFS) and Domain Name Service (DNS).
- Software logic dependencies on the physical network (including layer 2) and storage layers.

Tivoli CCMDB can also be rapidly extended to meet specific customer needs. For example, users can create custom templates in minutes, making them first-class objects for discovery and change tracking.

Data integration and federation

To enable customers to take data from virtually any source and bring it into Tivoli Change and Configuration Management Database, IBM developed the *discovery library*. It uses an XML specification called Identification Markup Language (IDML) to enable collection of data from IBM OMPs, ISV OMPs, customer spreadsheets and more. IBM will provide access to the IDML code −

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called Discovery Library Adapters (DLAs) — for many IBM and ISV OMPs, including the following:

- IBM Tivoli Provisioning Manager
- IBM Tivoli Configuration Manager
- IBM Tivoli Monitoring software
- Tivoli Business Systems Manager
- BMC Remedy
- HP Peregrine ServiceCenter
- Many other Tivoli and third-party operational management products

Tivoli CCMDB maintains the connectivity to (and relevance of) that source data through federation. That is, the database represents a logical aggregation of many real databases. While only certain inventory or asset management application attributes — typically, those that are configurable and belong under change control — are actually populated in Tivoli CCMDB, there are many additional attributes that may need to be accessed at any given time. Tivoli CCMDB uses IBM WebSphere Information Integration technology to obtain real-time access from source OMPs. This technology enables an organization to create a single master view of business objects from disparate sources and augment Tivoli CCMDB with additional rich content.

Reconciliation
Combining multiple data sources into a single logical view might create duplicate entries of the same configuration items if that data were not reconciled. Typically, multiple OMPs manage the same configuration items (CIs) but each application has its own local data store and CI representation, generating the possibility of inconsistencies and errors.

IBM has written this reconciliation logic into the Tivoli CCMDB common data model for each CI type. Consequently, as the database imports data from management applications, it also compares the data using the reconciliation logic and corrects duplicate instances of the same CI.

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Address growing IT operations costs

By using Tivoli CCMDB, IT organizations can automate and help speed IT operations tasks that would normally require staff time. Examples include helping eliminate manual discovery efforts, integrating new and changed systems into the infrastructure, rapidly isolating problems at their sources and meeting the requirements of regulations and audits. Because Tivoli CCMDB can consistently execute process workflows and deliver data to process managers and operational management products throughout an organization, it can free resources for projects with high business value.

Synchronization

One of the main challenges IT organizations have with their existing approaches to managing change is a poor ability to manage and monitor configuration drift. That's why Tivoli CCMDB can synchronize configurations with a "golden master" that reflects approved changes – and identify where discrepancies from the master exist, down to the attribute level.

The database also provides a reporting capability for monitoring where the configuration drift (the variance from your desired-state configuration) is greatest: applications, networks or servers, for example. Consequently, the IT organization can quickly understand what level of unauthorized change activity is going on in the environment.

Leverage enterprise workflow capabilities to bring application integration to IT operations

Workflows are prescribed, consistently executed sequences of steps that control the interaction between the information and the people or tools that access that information. They are particularly valuable because IT organizations have many different silos of IT operators that have different responsibilities or subject-matter domains. Workflows allow organizations to perform similar activities consistently across the organization and to involve the right individuals and information as an activity moves from start to finish.

A distinguishing feature of a true configuration management database – as opposed to a retooled configuration database – is the integration of workflows. When a CMDB captures and preserves information at each step along a workflow, it helps staff make good decisions, collaborate and perform tasks in the context of a shared business goal.

Tivoli CCMDB and service desks
Although service desks provide a valuable central contact point for end-user management, their databases do not serve as true configuration management databases. They typically cannot federate data, offer a collaborative environment that coordinates activities across organization silos or facilitate the automation of a wide variety of processes.

Tivoli CCMDB is not designed to replace service desks, but rather provides the IT service management platform that integrates with service desks — and many other existing applications throughout an organization. The database leverages information from service desks and other sources to enable IT operations teams to act in accordance with business policy when changes are needed — and automate the tasks that help maximize the availability and performance of the services that customers rely on.

In a configuration management context, workflows (also called processes) provide an efficient, repeatable way to gain control over the changes or activities that take place in the IT environment. For example, they can:

- Define the interaction of a CMDB with discovery tools.
- Establish the user roles and security policies for accessing and modifying the information contained in the database — and provide awareness about those modifications.

One thing that makes Tivoli CCMDB a valuable tool that can actually *manage* configurations − and distinguishes it from a mere configuration database − is its ability to manage change and configuration workflows.

IBM workflows are executed using the capabilities of IBM WebSphere Process Server, which is included with Tivoli CCMDB. These workflows can be dynamically configured based on how the organization categorizes the type of activity being performed. For example, a Request for Change (RFC) for patches could have a different workflow from an RFC for storage.

Additional workflows that integrate with Tivoli Change and Configuration Management Database are called process managers. Tivoli process management products share a common run time and user interface. Examples of Tivoli process management products include:

- *IBM Tivoli Release Process Manager* — takes a holistic view of change to manage, audit and coordinate the correct execution of simple and complex release tasks. This productivity tool helps the right people complete release tasks in the right order, and thereby enables consistently successful deployment. Users can go to one place to manage all their release activities using ITIL best practices and their own release processes.
- *IBM Tivoli Availability Process Manager* — provides critical information to individuals involved in availability and incident management, especially tasks such as categorization, prioritization and resolution of incidents and problems. This process manager draws on information stored in Tivoli CCMDB to help service-desk analysts and subject-matter experts determine the failing component, assess the business impact of an incident, and accurately classify and prioritize incidents. It then helps subject-matter experts restore disrupted services using the appropriate products.

- *IBM Tivoli Storage Process Manager* — helps organizations manage data growth and storage inci-dents, configure storage environment and manage data compliance. To facilitate standard change, release and availability processes, it provides for the creation of configuration item types for storage objects. It can help decrease costs by reclaiming storage space and reducing redundancy; improve effectiveness with sustainable improvements in storage and information management efficiency; and manage risk and streamline compliance through intelligent information retention policies and integrated search capabilities.

In addition to automating processes, it is important for organizations to be able to automate the tasks within the process using the appropriate OMPs. IBM has built integration modules which connect its process management products with IBM OMPs. In the case of Tivoli Release Process Manager, for example, customers can leverage the capabilities of Tivoli Configuration Manager, Tivoli Provisioning Manager and IBM Rational® ClearCase® – all from the process manager interface.
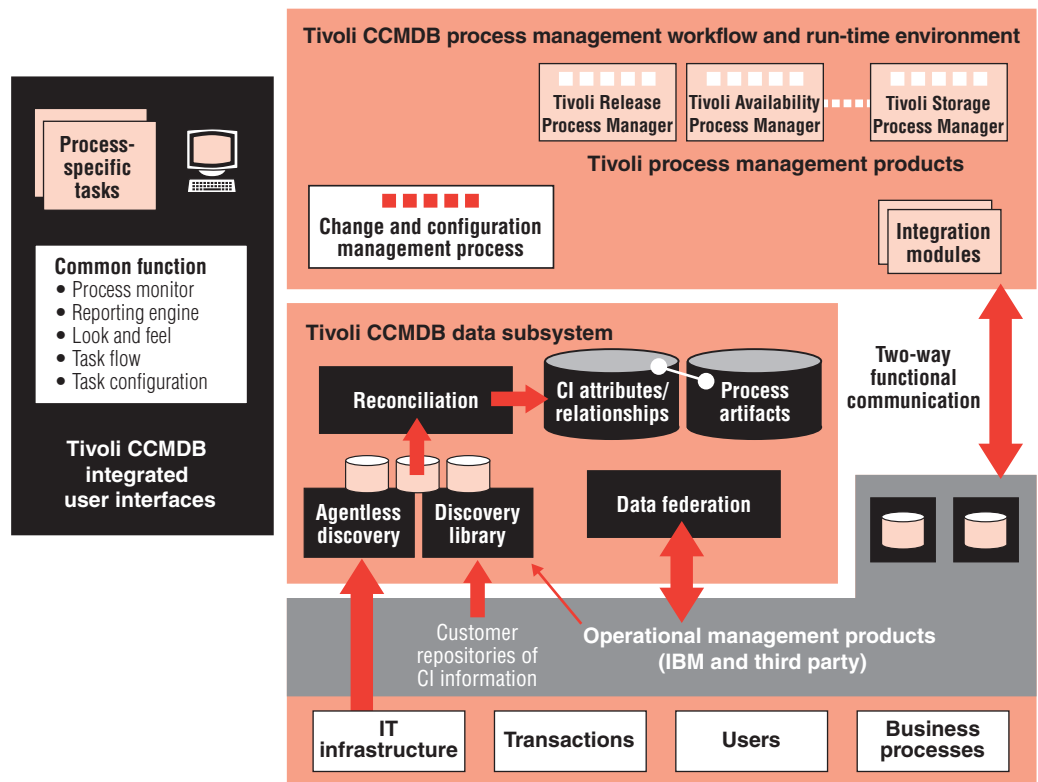
The high-level architecture of IBM IT Service Management shows how Tivoli CCMDB integrates with both operational management products and process managers.

Support compliance efforts

Compliance initiatives demonstrate how IT has become completely intertwined with business processes. Failure to establish compliant processes — for access and identity management, archiving, retention and destruction of data, and managing change to business applications — or to demonstrate compliance in response to audits can be deadly for a business and pose significant personal consequences for its officers.

To help support compliance efforts, Tivoli CCMDB can do more than just help compare configuration items to a "master" to identify deviations from policy. It enables organizations to understand in much greater detail what assets they have and precisely what they do for the organizations. Customers can also use Tivoli CCMDB to assess the security privileges of configuration files for financial and other systems that can only be accessed by authorized users — making sure that they remain read-only, for example.

Audit and control changes to configuration items

Once the environment has been discovered, organizations want to understand how the environment is actually managed – especially how well it compares with what IT policy dictates. Being able to compare two or more configuration items is helpful in cases such as these. For example, an organization might reconcile the items to enforce a corporate policy that dictates that all Web servers in a particular demilitarized zone (DMZ) or cluster have identical configurations to maximize integrity and enable timely updates.

Change history

A key capability of Tivoli Change and Configuration Management Database is its ability to help users quickly and easily view how configuration items have changed over a period of time. Because IT problems can arise from poorly implemented changes, this capability is especially valuable during problem determination, when it helps expedite the isolation of the problem.

The change history report identifies not only which configuration items have changed in an application, but also allows users to quickly drill down to view which attributes have changed – with the old value and the new value displayed.
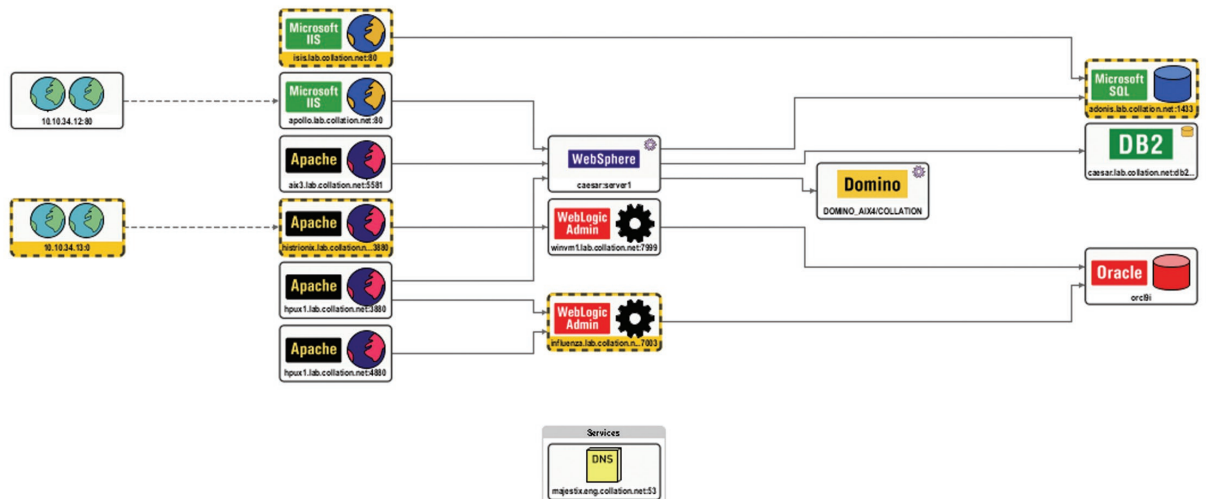
When administrators look at an easy-to-use configuration item change history report, they can quickly identify which configuration items have changed.

Understand the implications of frequent IT changes

On average, across all industries, 85 percent of problems are caused by changes to application infrastructure — not hardware or application failure.* But because IT changes are frequent and the interdependencies between the components of an IT environment are complex, it is nearly impossible for most organizations to understand all the implications of a change. Furthermore, the same challenges make it hard to find the cause of a problem when end users make the IT organization aware of one.

Tivoli CCMDB helps customers address these challenges by giving them visibility into the relationships and interdependencies between the components of their IT environments. When IT staff make a change, they can see in advance what impact it should have — and then verify that it had the expected results. When problems do occur, they know what changes have been made recently and can quickly hone in on the source of the problem — wherever it falls across the enterprise.

Workflow automation for change and configuration management

Tivoli CCMDB includes best-practice workflows for the configuration and change management processes.

The configuration management process augments the capabilities described on the previous pages with a rich set of audit capabilities. The workflow shares the configuration information within Tivoli Change and Configuration Management Database across IT at the right time to support intelligent decision making.

To exert control over the infrastructure and meet internal and external audit requirements, organizations can implement the change management process in Tivoli CCMDB. The fully functional, easily configurable change management tool includes "out-of-the-box" best practices derived from years of actual implementation experience with hundreds of customers around the world. It allows organizations to efficiently:

- Create, accept and categorize RFCs.
- Assess the impacts of RFCs on the infrastructure, using the standardized data available in Tivoli CCMDB.
- Approve, schedule and coordinate implementation of RFCs — in parallel or serially to enforce prerequisite steps.

To help maximize continuity when a change is significant, the change management process can tightly integrate with Tivoli Release Process Manager to pass all information from the RFC to the release manager to ensure continuity. This integration provides closed-loop implementation of changes. When the change has been successfully implemented and verified, the RFC can be closed out.

Change and configuration management processes enable improved collaboration across organizational silos.

Throughout the change management process, administrators can use the portal interface to view which activities have been completed and the current schedule for remaining activities. Each individual responsible for a task within the process can see information captured from prior tasks and subject-matter experts – facilitating continuity and collaboration across traditional IT silos.

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Conclusion

IBM provides the Tivoli Change and Configuration Management Database solution that is designed specifically to enable customers to manage by leveraging information from all their existing tools. IBM is able to address the critical functions of a configuration management database:

- Native discovery and application mapping
- Data integration and federation
- Reconciliation
- Synchronization

What's more, Tivoli CCMDB extends this solution with critical capabilities that include the following:

- Change history
- Workflow automation
- Process aggregation and bottleneck analysis
- Process and CI relationships
- Access controls
- Compliance
- Integration with other processes
- Integration with IBM and third-party OMPs
- Scalability
- High availability
- Extensibility

Because Tivoli CCMDB has been designed with integration and open data access at the forefront — and because it utilizes application integration technology — it represents a superior platform for any organization that seeks to implement an IT service management initiative.

About Tivoli software from IBM

Tivoli software from IBM helps organizations efficiently and effectively manage information technology (IT) resources, tasks and processes in order to meet ever-shifting business requirements and deliver flexible and responsive IT service management, while helping to reduce costs. The Tivoli portfolio spans software for security, compliance, storage, performance, availability, configuration, operations and IT lifecycle management, and is backed by world-class IBM services, support and research.

For more information

To learn more about how you can use Tivoli Change and Configuration Management Database as the foundation of your IBM IT Service Management initiative — or to obtain the IBM IT Service Management white paper for a more in-depth introduction to IBM IT Service Management solutions — please contact your IBM representative or IBM Business Partner, or visit **ibm.com**/tivoli/features/it-serv-mgmt

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