SOA Governance:

Maximizing Reuse and Flexibility of IT Resources through SOA

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T here is a major transition underway in terms of how organizations view their information technology platforms. Indeed, since more aspects of the business have been automated over the past decade, organizations have realized that these applications and technology enablers are a key business asset. One of the reasons that IT is emerging as a potent enabler of business flexibility is the advent of Service Oriented Architectures. With Service Oriented Architectures (SOAs) organizations are able to codify key business rules and processes as business services that support organizational objectives. In brief, a Service Oriented Architecture is software architecture for building applications that implement business processes or services as a set of loosely coupled blackbox components orchestrated to deliver a well-defined level of service.

This paper will explain what SOA governance is in the context of corporate governance and IT governance. It will provide an explanation and roadmap to help organizations understand how to apply governance principles to managing their SOA efforts.

SOA Governance Is about How to Conduct Business with Technology

As SOA takes hold in companies, IT is charged with creating and managing business services. Business leaders understand the requirement to provide more structure and accountability as part of managing these valuable business resources. Governance is a complex issue for organizations to manage. Governance can be broken down into three main functions. It determines policies required to run the organizational in a responsible manner. Governance documents who is responsible for decision making at all levels and who is accountable for executing on those decisions. And finally, the organization must be able to implement measures and the controls to ensure that corporate policies are carried out in a responsible, repeatable, and predictable manner.

SOA governance is about structuring a process to achieve corporate objectives by enabling good decision making around the management of business services. To understand what this means in practical terms, let's first begin with definitions of corporate and IT governance, before moving into a detailed description of SOA governance.

Defining Governance

Governance has become the watch word for how organizations keep their policies, procedures, and strategies in line with internal and external laws and regulations.

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Therefore, the whole idea of governance has taken on an overarching persona within organizations. Overall governance does not represent only a single factor in the life of a company. It is a continuum of functions that safeguard the company and its ability to conduct business in an appropriate manner satisfying the needs of its all its various constituents. Therefore, to understand SOA governance, it is important to put it into context with corporate governance and IT governance:

- Corporate governance is how an organization defines itself as a business and the rules of conduct for that business. Corporate governance is about overall risk to the company and compliance with internal and external regulations.

- IT governance is a subset of overall corporate governance focused on safeguarding information technology that is implemented within the business. The primary focus of IT governance is to enable the right level of alignment between the goals of the business and the goals of the IT organization. IT governance requires that management understands the IT assets including applications, data, and processes. IT governance requires that the organization focus on the operational quality and integrity of the combined assets since they represent the implementation of corporate assets. What is included in this umbrella concept? The components of IT governance include:

  o Overall strategy and the management of It architecture
  o Management of the level of service provided to the business
  o Management of risk and compliance
  o Systems operations management
  o Management of IT assets
  o Management of changes and configuration of service components
  o Management of projects and the portfolio of services

What is SOA Governance?

SOA governance is a subset of IT governance focused on services. While IT governance is concerned with the overall operation of IT, SOA governance is the approach needed to create codified business services that will be reused throughout the organization. Simply put, SOA governance is not about technology – it is about providing methods and approaches that help organizations effectively create, manage, and safeguard their movement to SOA. Therefore, more than any other area of IT, SOA is an approach that requires collaboration across business and IT to determine what services will be codified to be used throughout the organization.

Services related to data, business process, and business rules have to be created, monitored and managed in a cohesive manner. Therefore, SOA governance addresses three primary issues:

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- Establish executive support that cuts across organizational boundaries. This approach should be driven by the need to create business services that supports cross departmental business processes.

- Establish an organizational change process that enables SOA to happen in a predicable manner based on corporate governance requirements.

- Create a cohesive plan that moves the organization from its current way of leveraging technology for business agility through the transition state to the target objectives.

Establish Executive Support. SOA governance can't happen in a vacuum. It will only take shape if there is a formal process for planning a roll out of business services in a consistent manner. Therefore, there must be executive level support for SOA governance to be successful. The first step is to establish a cross functional teams, typically in the form of a Center of Excellence. A Center of Excellence provides the organization with a highly knowledgeable business and IT team that can help the organization learn new skills and approaches that are different from current practice. Through this structure, the team creates a formal process for planning for a business service-based approach. The team takes the responsibility for ensuring that there is clear communication across organizational boundaries.

A Center of Excellence is a way to centralize the management of adoption of SOA across the organization from a governance perspective. This center consists of member of the cross-functional team who are charged with ensuring that SOA happens in a way that is consistent with corporate goals and objectives. In addition, is intended to provide oversight of SOA best practices, adherence to standards.

Establish an organizational change process for migration to SOA. SOA migration is more than simply implementing a new technology platform. While there are technologies to learn and components to be built, SOA is more directly related to putting processes in place that keep track of what services are being developed and changed.

Trust is at the heart of SOA governance. Therefore, there have to be checks and balances put in place that can be measured. An organization will trust a SOA environment only if they have predictable measures in place. If ten different departments are actively using a service, it could cause chaos if it is changed without notification and approval from those depending on that service. There needs to be codified rules that everyone within the organization agrees to in order to ensure stability and trust of business services. Therefore, there needs to be measurements in place to ensure that there is appropriate oversight.

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Since these services correlate directly to business operations, they will have to be monitored carefully so that they adhere to overall governance requirements. For example, which department has to sign off on the fact that a particular service accurately reflects an accepted business process? Does the process conform to industry or governmental regulations? If this process needs to be changed because circumstances have changed, who is responsible for ensuring that the change is made? Are there multiple services that use the same process? Are there several different versions of the same process? If so, are they all centrally controlled and managed? Managing change is as important as actually creating a SOA service. It is therefore important to establish and assign decision rights for managing business services.

It is also important that an organization be explicit about which executive or team is responsible for deciding on the appropriate content for a business service. Since the service will be essentially a "blackbox" – a sealed container – someone needs to assure the rest of the organization that it, in fact, conforms to the proper business rule or process. If management doesn't trust the reliability of a business service, it will not be used. Since the service will be designed to be used in many different business situations, SOA governance requires that a team is given management authority to certify that the service represents the way the company conducts business. This includes determining a chain of authority to clarify who is accountable for decisions relating to creating, publishing, and managing business services.

Create a comprehensive plan. Establishing SOA as the core of the approach to leverage IT resources in context with business goals requires consistent planning. While the technical details are important, they are simply a means to an end. Therefore, a plan is needed to ensure that procedures are in place to create the right set of services that are well managed in the real world.

This takes some forethought about what it means to have services that work for the organization. What is a service? There needs to be a clear understanding both at the technical and business level about the nature of a good service. For example, if a service is too small it may be hard to use; if it is too big, it may apply to very few business situations. On the other hand, a service that is too massive may only be useful in a few select situations. Planning for SOA means that everyone needs to have a common understanding about how to construct a service and what should be included. There needs to be an organized process of codifying that service and making sure that the right individuals understand the service and most importantly approve of that service. There needs to be a process for testing the use of services as well as monitoring results on an ongoing basis. In addition, there needs to be a set of policies and tools that support this effort. As we mentioned above, the starting point for SOA will be establishing a Center of Excellence.

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As part of the overall plan, we recommend that you focus on the following four issues:

- **Understand corporate goals and objectives of the business.** Without this understanding, your SOA governance approach will not move forward. Therefore, establish a governance process before your organization builds services. Decompose each business goal so that you can identify how each goal impacts the way business is operated on a day to day basis. Consider using a modeling package as a tool to support this effort.

- **Ensure that each business service has value to the business and is consistent and predictable.** While this may sound obvious, it should be the governing principle of any SOA initiative. Make sure you understand what a service is, who controls the rules within that service, and finally who signs off on that service and who is authorized to change that service.

- **Establish processes for use of services.** This means that each service must be secured for appropriate use. Some services, for example, might be used outside of the firewall and therefore require additional security. You also need to think about which services are centralized and which ones are controlled at the departmental level. While it is important to have metrics for your use of services, it must be proportional. Too much oversight can be as bad as too little.

- **Establish SOA governance with a proper balance.** How much risk can your company afford to take? While governance is extremely important to keeping your company safe and in compliance, it is important to have the right balance. There may be certain areas that require an extremely high level of oversight both at the corporate and the IT level such as financial reporting data. On other hand, there may be corporate assets that are of little risk that can be managed with less stringent checks and balances – both in terms of time required and costs.

The Lifecycle of Business Services

Once an organization has put SOA governance process in place, it is important to recognize that the process is incorporated into the overall SOA lifecycle. To properly manage the SOA lifecycle requires an eight stage process. The process begins with a thorough understanding of the business processes that support the business goals.

1. Decompose parts of business process. Begin by determining the scope of the business service. What does this business process do within a department and how does it impact other departments? For example, something as straight forward as processing a claim within an insurance company has rules and relationships with

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other departments. A customer for one product line may be a customer of another product within the same company. Are these two departments so siloed that the organization cannot see a single view of that customer? What are the processes that enable a company is link between different department and product lines to improve the overall service to the customer? To accomplish this corporate objective of improving customer service, management needs to understand the details that are included within the overall business process. What are the sub business processes? Find the connections between these decomposed business services. Use this knowledge to define the way services work across the organization.

2. Identify the service owner. For SOA governance to be successful there must be a designated owner. Ownership will depend on how the organization is structured. How are business roles defined in your organization? For example, the owner of the claims processing service could be the head of the claims department. However, he may delegate ownership of this function to a different director who has better direct knowledge of those processes. Are there different managers responsible from one department to the next one?

3. Identify the source of funding. It is often best to tie funding required for the development, maintenance, deployment, and new versions of the service to the department that will own and control that service.

4. Macro level design of services. Once business services are created, tested, and certified by the appropriate business owners, they can be used in combination to create new cross-organizational processes. When services are linked together, governance needs to be managed from an end-to-end process perspective so that the services are not viewed as a set of isolated elements..

5. Micro level design of services. Once organizations understand their business goals and requirements, they need to be able to leverage their existing and newly defined assets as a set of well-constructed services. Creating a service does not necessarily mean starting from scratch. Most organizations have well defined services and processes that are embedded in existing applications. These can be repackaged as reusable services.

6. Ongoing support for business services. Just because you can design services doesn't mean you can ensure success. Services must be supported and managed. Who is going to support the services? What software and hardware will be required to make the project a success? How many users will need to access the service? What is the plan to maintain the right level of quality for the services users will be dependent on? If you haven't planned for the deployment phase, the organization will not be successful with the movement to SOA.

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7. Ongoing management of business services. A management plan has to be put in place for SOA to be successful. It is important to set metrics that help determine how well the plan is working. Each service must be monitored to ensure that it executes in the right way. Is the service secure? Are there multiple versions of the same service? If so, who is managing all the services to ensure that they are in synch with each other? When the business changes, who in your organization is managing the state of all services? Over time, you want to ensure that services are meeting corporate objectives through active management of the services within your SOA infrastructure.

8. How are services meeting corporate objectives? Metrics need to be established that will monitor how business services are measuring up to business objectives. Creating services that match business objectives can be a complex process. Getting the right level of granularity is only one issue that the business needs to understand. SOA governance requires that the organization should decide what will be the best approach to creating services that address issues such as separation of concerns and the granularity and control of a service. This is accomplished as a continuum. A service may go through many stages as the organization's needs change. Some services will be dramatically changed and republished; other services will be retired when they aren't needed any longer. Organizations need to constantly check to make sure that the services are still in synch with corporate mandates and policies.

IBM Offerings for SOA Governance

SOA governance needs to be part of any SOA initiative from the outset as it is a way of providing the framework, intelligence, and security that organizations need to run their businesses with SOA. While there are many different ways an organization may choose to begin their initial SOA implementation and all organizations will have different priorities, the significance of a SOA governance plan is common to all. IBM has many offerings ranging from consulting services to development tools that are designed to help companies create a strong SOA governance approach that will allow the business to manage and grow their business with SOA.

IBM has either developed new methodology and technology or enhanced and repurposed existing technology to create a set of offerings that can be combined to assist companies in following a best practices approach to establishing a SOA governance initiative. A business approach to SOA governance must be consistent internally and externally to support customers, partners, and employees. Some of these policies are explicitly defined and some are more implicit in day to day engagements. IBM's products and solutions for SOA governance are meant to enable business to bring a consistency to the definitions of policies, processes, responsibilities, and measurement of those responsibilities throughout the organization.

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IBM's offerings for SOA Governance include:

- SOA Governance and Management Method
- Rational Method Composer
- Rational Data Architect
- Rational Portfolio Manager
- Tivoli Change and Configuration Management Database
- WebSphere Service Registry and Repository

SOA Governance and Management Method

This IBM Consulting offering is based on best practices established through engagements with IBM customers, including a Center of Excellence Service Offering, to assist in creating one. Consulting engagements may include the services of IBM SOA specialists and experts in areas such as process modeling and organizational change. These consultants have codified and documented best practices for SOA to provide a starting point for the mapping of customer business requirements in SOA engagements with customers. IBM recommends that companies begin with the framework suggested by this method and then make adjustments in order to create a governance framework that reflects the goals of the business.

IBM intends that SOA Governance and Management approach should be used by the organization in a continuous feedback loop as organizations are in a constant state of change and development. The SOA Governance process will need continued refinement to ensure that business goals are being met.

The IBM SOA Governance and Management Method is published so that others can access this approach. Users of the IBM Rational Method Composer (RMC) product can download the SOA Governance and Management Method for free as a plug in to RMC. It can also be accessed as a download from IBM developer works.

IBM has identified four phases of the SOA governance lifecycle that are described in detail in The SOA Governance and Management Method. These four phases include:

- **Plan.** Document and understand the current governance structure at the organization in relationship to the overall business goals and strategy. Define the scope of the SOA governance model.

- **Define.** Define the governance process moving forward and clarify how this will keep pace with the expected rate of change at the organization. In most situations, it is recommended that a SOA Center of Excellence be established.

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- **Enable.** Put the SOA Governance plan into action and implement the SOA infrastructure.

- **Manage.** Monitor and measure the rules and policies of the SOA implementation on an ongoing basis. How effective is the SOA governance process? What is the impact on the organization?

This approach was based on the experiences of many of IBM's customers. One IBM automotive manufacturing customer has used this method to help plan the implementation of their SOA Governance framework and define the processes and policies the company needs to follow. Working with the IBM consulting team, the customer used the SOA Governance and Management Method to guide them in their approach to SOA Governance.

This customer established a SOA infrastructure to help the company achieve two major goals. First, the company wanted to increase customer satisfaction and customer service across product lines. A second, and related goal, was to increase the flexibility of their IT systems so they could respond more quickly to business needs. Following the best practices approach highlighted in the IBM SOA Governance and Management Method, they established a Center of Excellence (CoE) early on in their SOA initiative. The CoE was structured to help the company learn from experienced professionals how to increase service reuse, govern the services, and maintain control of IT costs.

This customer initiated a focus on organizational management to ensure that everyone in the company was committed to the new process. The goal of the organizational change management program is to manage risks and ensure that the governance model is designed appropriately lead to a successful implementation. One of their top priorities is to promote acceptance of services on SOA based infrastructure and to increase reuse of services.

The governance model was designed to focus on key aspects of IT transformation. By establishing a governance model focused on business and IT alignment, understanding the ownership of services, establishing a high level of trust and communication around services, and measuring against performance objectives led to many areas of success. This automobile manufacturer has achieved the following:

- Improved customer satisfaction
- Improved data quality by reducing duplicate customer data
- Development of a single view of the customer
- Improved access to vehicle information in near real-time
- Improved business responsiveness to customers and market opportunities
- More flexible infrastructure and services that are shared across the organization
- Providing dealers with better access to vehicle and customer data

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They recognize that the gains they have achieved by implementing a SOA infrastructure are incremental. They see this as a journey and expect to achieve additional benefits as time goes on.

IBM Rational Method Composer (RMC)

The IBM RMC is framework for developers to follow when developing software. Developers use this framework to keep them on track and to maintain a high level of consistency throughout the development process. It is meant to be used throughout IT Lifecycle Management (ITLM). Developers can identify and keep track of project goals, and identify all the resources they will need to finish a project on schedule. It is generally recommended by IBM that members of a project development team use the RMC tool to share information with each other as a way to unify project goals monitor all the major milestones for a project. One major goal of encouraging collaboration among developers is to ensure a more consistent software development process.

The Rational Method Composer is built on the open source development platform, Eclipse. It is a replacement for a tool called Rational Process Workbench. The new tool was updated and extended to include new best practices. The process framework software included in RMC is called the IBM Rational Unified Process (IBM RUP) methodology.

The framework and guidelines are provided in the form of templates that can be followed by developers. These templates guide developers by providing suggested starting points and a particular order or approach that has been tested and proven to be successful in similar projects. The templates are meant to enhance developer productivity, consistency, and accuracy. In addition the templates indicate activities that may be most likely to be reused in certain processes. Checklists are included so it is easy for developers to see how they are doing. RMC includes process guides to the development of many different types of projects. SOA and SOA Governance projects are just one of the types of projects that are included.

These guides are provided in the form of plug-ins that the developers can use to build up a library of different processes. They pick what they need when they need it. There are plug-ins for many different technologies such as J2EE, .NET, and WebSphere Business Modeler, as well as for different focus areas like SOA Governance. The Rational Method Composer plug-in for SOA Governance can be used by organizations as a starting point for their SOA governance framework. The best practices identified in RMC can be merged with the company's existing IT processes. New processes can be added over time.

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IBM Rational Data Architect

IBM Rational Data Architect is another tool for developers intended to improve productivity and standardization. Like RMC, it is built on the open source Eclipse platform. It is used for the data modeling and mapping required for integrating complex systems of data. Data architects can use this tool to help understand the relationships and dependencies of various information assets. This deep level of understanding is critical to developing a strong SOA governance framework.

Rational Data Architect can be used for documenting decisions and automating tasks that are likely to recur. This structured form of documenting activities (mapping data sources, creating federated model, mapping federated data sources, and generating federation code) that occur in the information integration process will help to set up a governance framework.

IBM Rational Portfolio Manager

The IBM Rational Portfolio Manager is a collection of reusable standardized templates that can be used to help in the management of software projects and groups of associated projects (portfolios). The process of collecting and analyzing important data about the projects is automated within the Rational Portfolio Manager. This helps with the management of software projects from the initial stages through to the execution and completion of the project. By centralizing all this information and placing it in a unified and standardized format, IT is in a better position to align with the business objectives.

One of the key features is a portfolio dashboard with visual displays of project status that helps users to set and adjust priorities. This helps companies to more effectively manage limited human and financial resources and identify which projects may be at risk. Other tools in the IBM Rational Portfolio Manager help with identifying project capacity issues, managing collaboration and workflow, and identifying project risks. The templates and the portfolio dashboards can be tailored to meet with specific company IT governance policies and procedures.

IBM Tivoli Change and Configuration Management Database (CCMDB)

The Tivoli CCMDB is a platform that organizations use to implement their IT service management. One of the key requirements for a strong SOA Governance framework is the ability to keep standard information on all the changes that take place in an IT

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environment. The CCMDB helps organizations keep track of changes and where they came from. It helps maintain an accurate and recognizable history of all the changes. By enforcing policies and tracking the changes (what policies and what changes) across the organization, the company can ensure compliance for both internal and external regulations.

This product can be used to automate the process of discovering applications on the organizations computer systems, network devices, applications, middleware, and databases. There is a portal to manage change requests.

WebSphere Registry and Repository

The IBM WebSphere Service Registry and Repository is designed to support SOA governance by enabling a consistent and standards-based approach to the management of business services. It forms the core of the SOA governance framework. A registry and repository is a requirement for managing a SOA infrastructure and ensuring that the IT environment is properly aligned with the objectives and policies of the business. This application runs on a WebSphere Application Server and stores metadata in a relational database. There are two key components of this product: a service registry and a metadata repository. Each serves a slightly different function, but are used together to help companies manage the lifecycle of business services and govern the use of services.

 The SOA registry is a central point of reference for locating descriptions of all the business services available for use. In order for a business service to be described (or published) in the SOA registry the business should have acknowledged that the service represents the business process appropriately and that the service meets with all business and IT rules and policies.

The information catalogued in the registry follows Universal Description, Discovery and Integration (UDDI) standards for describing services. In addition to a description of the service, the SOA registry contains legacy and security information about the services such as who created the service and who can use or change the service. This information becomes a way for the consumer of the service (person or application) to actually find the right service and use it. It also provides information so that services can be reused and new services can be developed that will be consistent and complementary with existing services.

The SOA repository is the framework designed to hold the business services so they can be located, maintained, and used. While the registry is used to point to the location of various services, the repository is the place to find the actual software code, documentation, and a historic record of different versions of the services. This

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is critical to SOA governance because it allows for various versions to be managed and monitored with a focus on consistency in the services used by the organization. The structure of the repository helps organizations maintain an audit trail of all the many changes that are likely to occur as services are changed to reflect shifts in business policy. The mappings and documentation maintained in the repository will help to provide a record of the software development that has occurred over time.
The IBM WebSphere Service Registry and Repository is intended to maximize the level of reuse that can be achieved with business services by making sure they are properly documented and can be easily located and changed to reflect business priorities.

By maintaining information on services in a standard way, analysts, architects, developers, and administrators are able to get the information they need to publish sand use services that accurately support business goals. The role of the Registry and Repository is to help businesses maintain the integrity and consistency of business services as they are used within a controlled SOA environment over time. Services are classified by the IBM WebSphere Service Registry and Repository according to their phase in the lifecycle making helping to ensure that the right services will be used and services that are no longer useful will be retired.

The Registry and Repository is used to answer many of the key questions that should be asked in any SOA governance process, such as:

- How do I find business services with the right capabilities to match the business process?

- How do I make sure that business services are available to be used when needed?

- How do I keep track of the changes to the services that will occur as business priorities change?

- How should services interact with or depend on each other?

- How can I identify which services adhere to business policies and are approved by the business?

- How can I identify which services have not been approved or are redundant and should be eliminated?

The structure of the repository helps organizations maintain an audit trail of all the many changes that are likely to occur as services are changed to reflect shifts in business policy.

Conclusion: How to Get Started with SOA Governance

A checklist: Seven questions you should ask before beginning to work on SOA governance:

1. How are you going to approach services reuse so you can track the lifecycle of that service.
2. How can you raise the visibility within the organization and understand where and how they are being used?
3. How can you optimize the services within your organization so they meet business needs? How can you deduce the number of redundant services?
4. Do you have an approach to classifying services that is meaningful to the business?
5. What is that status of the service? Are you monitoring each service and its stage in the life cycle? Has the service been published? Does it need to be updated or retired?
6. Has your organization decided who owns a service and who has authority to change or retire that service?
7. What is the structure for funding a service on the business side?
8. Does my organization understand the business context for a service so that it is used in the right way?
9. Is there a process to prevent unauthorized services from getting into the environment? This involves a fully developed security strategy.
10. Services must be used in the context of a systems view. These services have to perform in accordance with the required service level demanded by the business.

While it is understandable that SOA is an architectural approach to building business services, it might not be so apparent at first glance why SOA is the key to conducting business in a new way. Without a business focus, SOA simply does not work. SOA demands that organizations codify business process into reusable services and those services are linked together though web services interfaces. These services are now part of the business fabric since they actually codify the way business is actually conducted. This fact changes the relationship between the business and technology owners. Both IT and the business units have the responsibility for ensuring that the software reflects best business practices.

About Hurwitz & Associates

Hurwitz & Associates is a consulting, research and analyst firm that focuses on the customer benefits derived when advanced and emerging software technologies are implemented to solve pragmatic business problems. The firm's research concentrates on understanding the business value of software technologies, such as Service-Oriented Architecture and Web services, and how they are successfully implemented within highly distributed computing environments. Additional information on Hurwitz & Associates can be found at www.hurwitz.com.

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