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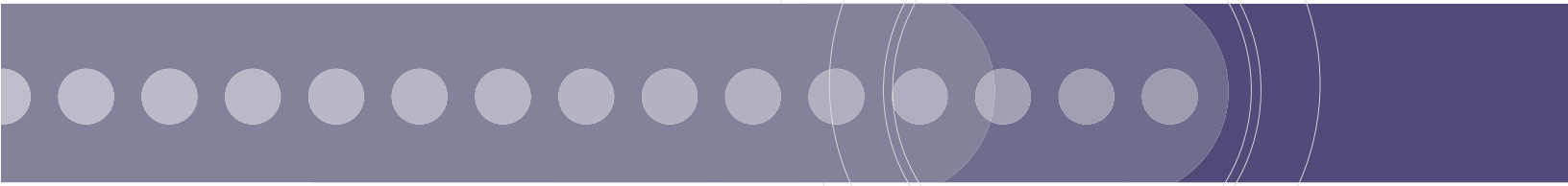
WHITE PAPER

How to Design and Implement an Integration Competency Center (ICC)

The What, Who, and How



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More Than an Integration Approach: ICCs Are a Competitive Advantage

For most companies, and across all industries, yesterday's application solution has become today's integration challenge. Companies began to bridge their "islands of information" in the 1990s by using layers of middleware infrastructure to enable interactions among disparate databases, application systems, and users in various business units. But this change didn't fundamentally solve the problem: "Integration is driving islands of automation to become archipelagos of automation (connected subsets of integrated applications)," as a recent Gartner report puts it.[1] Gartner predicts, "More than half of large enterprises will have two or more different integration brokers in production by year-end 2003; half will have four or more 'archipelagos' by year-end 2005."

These "archipelagos" are an improvement over "islands," but they still can't deliver the comprehensive scope of information and end-to-end process capabilities that companies need to maximize competitiveness. Leading companies know that they need to take integration to the next level—and that they can't reach that level using ad-hoc integration projects or piecemeal investments in new technologies. Many enterprises are now taking a more strategic and efficient approach to application integration by implementing integration competency centers (ICCs). Gartner predicts that by year-end 2005, more than half of large enterprises (those with more than $1 billion in revenue) will have an ICC, an increase from approximately 30 percent in 2003 (0.7 probability).[2]

Why establish an ICC? "Companies must recognize that integration is fundamentally different from software engineering," says John Schmidt, vice president of integration at Best Buy's System Integration & Middleware group. "It requires a disciplined approach to deal with the specific challenges imposed by large-scale complex systems." An ICC produces better, more cost-effective results because it focuses primarily on the business problem of integration, not on software engineering. Its mission is not just to integrate certain applications, but also to establish an optimal integration process. This is why Gartner views ICCs as a powerful tool for companies that want to connect their "archipelagos" into federated systems that can communicate readily across the enterprise. "Create an integration competency center, identify integration metadata, and develop a methodology for managing the integration metadata," the report advises.[3]

ICCs Deliver Business Value

Integrating the data that underlies an organization's operational systems is both an immediate and ongoing business challenge. Because ICCs focus on that challenge, they continually acquire high-demand, high-value knowledge about an organization's data infrastructure, and leverage it across multiple initiatives. ICCs reduce costs, increase customer value, and enable greater control of integration projects and visibility into operational systems for better responsiveness to changing business conditions.

What's an Integration Competency Center?

In contrast to ad-hoc integration projects conducted through different business units, an ICC is a shared IT function that enables project teams to complete a data integration effort rapidly and efficiently by following best-practice processes, leveraging the expertise of staff with integration-specific roles, and utilizing standard technologies.

Key objectives of an ICC:

- Lead and support integration projects with the cooperation of subject matter experts
- Promote data integration as a formal discipline
- Develop staff specialists in integration processes and operations and leverage their expertise company-wide
- Assess and select integration technology and tools
- Manage integration pilots

Today's best ICCs leverage service-oriented architectures (SOA) to create a modular set of universal data services (UDS). These deliver a consistent approach to defining and accessing data sources, enabling organizations to streamline their data integration architecture while enabling future flexibility and adaptability.

[1,2,3] 15 December 2003, Gartner Predicts 2004: *Integration Registries Will Be Required*

ICCs leverage best practices to improve software quality and reduce downtime. ICCs also enable businesses to consolidate system resources for reduced hardware, software, and maintenance expense. This way, businesses increase their return on investment and lifetime value of systems and software. Because standardizing procedures and technologies means the same skills apply across multiple systems, organizations can deploy developers more effectively across projects.

ICCs provide companies with the information they need to increase customer profitability, acquisition, and retention. Businesses gain a single view of the customer and of all purchased products for comprehensive visibility. Companies can then leverage that information to refine and focus their customer relationship management strategies. ICCs also deliver cost savings through supporting global procurement and product lifecycle management and optimizing extra-enterprise cooperation for better supply chain forecast and planning.

ICCs provide unprecedented insight into the nature and origin of every piece of information in a company's integrated systems. This insight enables companies to rigorously audit and track information to comply with government regulations such as Basel II, Sarbanes-Oxley, and the USA PATRIOT Act. These same features help companies manage the challenges of mergers and acquisitions, compliance with corporate directives, risk management and security, and globalization.

In addition, ICCs provide organizations with insight into the company-wide demand for integration services. As IT and business executives become more aware of this demand, they can more proactively manage integration-related issues, such as investments in both internal and external human resources, capital expenditure budgets, fixed and variable costs of the ICC department, and potential improvements to drive sustainable competitive advantage.

Create Your Own ICC

Because each type of ICC has its own advantages, organizations considering implementing an ICC should begin by defining the company's integration goals and the processes needed to accomplish them. Setting the goals and processes clarifies which type of ICC would be most appropriate, and which roles and technologies it requires.

Design the Processes

An ICC designs and implements processes for integration. Depending on staffing levels and ICC model, the ICC will either directly design and implement processes for a project or offer the project team documentation or consulting on design and implementation. ICCs usually establish three types of processes: standards, strategies, and procedures.

Standards are rules for sharing the data integration environment. They exist to facilitate the organization, identification, modification, and troubleshooting of project assets developed by several users operating in a shared environment. Some of the standards an ICC must set include standards for naming, methodology, and metadata.

Strategies are plans for achieving a desired goal. They offer project teams a broad range of available options and are adaptable to the needs of a specific project. ICCs typically adopt strategies for handling metadata, security, archiving, communication, and other infrastructure needs.

Procedures are detailed how-to guidelines that spell out the tool-specific actions or tasks that implement the strategy. They might, for example, set out procedures for change management, metadata handling, production migration, and operational support.

Quantifying the Benefits of an ICC

Informatica Professional Services conducted a survey of 50 non-ICC customer projects in 2003. The results of that survey showed that, on average, a data integration project cost $500K, took 270 person-days, and required more than 200 mappings to complete. Assuming a 35 percent reuse of development work from one project to the next over an average of 10 projects, the cost savings to an enterprise for deploying an ICC are extraordinary:

- Reduction in development cost:

  $500K x 10 projects x 35%
  = $1.75M

- Reduction in project lead time:

  270 person-days x 10 projects x 35%
  = 945 days

- Reduction in maintenance cost:

  200 mappings x 10 projects x 35%
  = 700 mappings

ICC Models and Required Roles

Roles	Best Practices	Technology Standards	Shared Services	Central Services
Business/Technical Analyst			X	X
Change Control Coordinator	X	X	X	X
Data Integration Architect			X	X
Data Integration Developer			X	X
ICC Manager			X	X
Knowledge Coordinator	X	X	X	X
Metadata Administrator		X	X	X
Product Specialist			X	X
Production Operator			X	X
Project Manager			X	X
Quality Assurance Manager			X	X
Repository Administrator			X	X
Security Administrator			X	X
Technical Architect			X	X
Technology Leader		X	X	X
Training Coordinator		X	X	X
Vendor Manager		X	X	X

Define the Roles

An ICC requires staff to take on certain roles to carry out its processes. The same person might take on more than one role—for example, a repository administrator might be the same person as the metadata administrator.

Depending on the type of ICC and its size, a company might choose to allocate roles among a number of different teams. For example, an ICC might comprise an ETL project team and a data integration services team. The ETL project team would have responsibility for ETL project development, acceptance testing, deployment, and maintenance. It would include ETL developer and data quality developer roles. The data integration services team would be responsible for the ETL environment: repository administration, ETL architecture, processes, and procedures. It would include the roles of ETL architect, repository administrator, and metadata administrator.

These are the most common roles within an ICC and its component teams:

- **Business/Technical Analyst**—Develops the process to gather and document integration requirements.
- **Change Control Coordinator**—Manages the migration to production of shared objects that may impact multiple project teams.
- **Data Integration Architect**—Provides project-level architecture review as part of the design process for data integration projects.
- **Data Integration Developer**—Reviews design specifications in detail to ensure conformance to standards and identify any issues upfront.
- **ICC Manager**—Manages outlays for services, support, hardware, software, and other costs.
- **Knowledge Coordinator**—Creates best practices, including but not limited to naming conventions, unit test plans, and coding standards.
- **Metadata Administrator**—Creates standards for capturing and maintaining metadata.
- **Product Specialist**—Sets up and activates new hardware as it becomes part of the physical architecture supporting the ICC.
- **Production Operator**—Provides daily monitoring of data integration load jobs.
- **Project Manager**—Provides full-time management resources experienced in data integration to ensure project success.
- **Quality Assurance Manager**—Provides data validation on integration load tasks.
- **Repository Administrator**—Ensures leverage and reuse of development assets and monitors repository activities.
- **Security Administrator**—Provides assess to the tools and technology needed to complete data integration development and overall data security.
- **Technical Architect**—Develops and maintains the physical layout and details of the hardware used to support the ICC.
- **Technology Leader**—Conducts and documents tests on hardware and software in the organization to establish performance benchmarks.
- **Training Coordinator**—Coordinates training of best practices, including but not limited to naming conventions, unit test plans, configuration management strategy, and project methodology.
- **Vendor Manager**—Selects vendors of the hardware tools needed for integration efforts that may span servers, storage, and network items.

Select the Technologies

Once an ICC has defined its objectives and the roles to carry them out, it will have a clearer view of the technical capabilities it needs. Most ICCs require technologies that provide a live, shared view of the entire production environment, and that support maximum reuse of systems, processes, resources, and interfaces. Designers should be able to create, debug, and test transformation logic once and make it available for reuse across teams, projects, and different operating environments. This "define once, use everywhere" approach drives accuracy and delivers unmatched productivity.

A flexible, open software development kit (SDK) for developing connectivity with real-time and batch sources makes the ICC's work much easier. Essential features for the SDK include native access to system metadata, interpretation of system-specific data types, high-performance extraction and loading that leverages native system interfaces, and changed data capture for mainframe and AS/400 systems.

Visibility into dependencies and assets helps the ICC optimize performance, so ICCs should seek out tools that graphically present data flows and dependencies across all systems and processes to provide intelligent audit trails. They should also look for tools that offer a highly extensible and searchable directory of an enterprise's information assets.

Support for team-based development is key for ICCs. Products must provide developers with check-in and -out object versioning, complete with compare utility and robust reporting, so that multiple developers can share and manage groups of objects across teams, projects, and environments. Distributed development and global/local repository management ensure full reuse and control of objects and processes from one unified environment. Version control and object management enable teams to maintain multiple versions of an object, control development on the object, track changes, and use deployment groups to provide superior control and automation of deployment across environments and locations.

An ICC needs a fast and accurate way of coordinating technical and business metadata from leading data modeling tools, source and target database catalogs, and any repositories. It then requires a single, open repository to ensure that metadata is always up to date, complete, and available. The repository should be robust and include embedded rules, relationships, and a model for sharing data.

To enable the ICC to enhance and extend existing systems and processes and keep pace with growing infrastructure complexity, some industry leaders are implementing Universal Data Services (UDS), a ubiquitous integration layer across the entire enterprise architecture. UDS supports the dynamic assembly of data services and can offer a set of flexible, easily deployed, and "smart" shared data services that help to eliminate data silos and simplify integration efforts, delivering consistent views of information across the organization. With this architecture, an ICC can extend the utility of existing systems without changing them, and substantially reduce costs and business risks of integration.

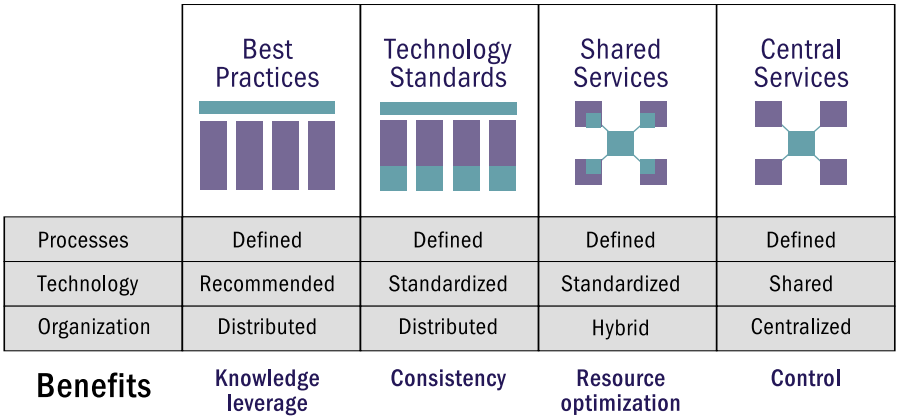
"Universal Data Services (UDS) from Informatica is one example of sound integration architecture, and it can serve as a valuable resource for information location and relevance. Informatica's consistent methodology is designed to help reduce the pain of integration and complements other integration technology. Because UDS serves as a library of reuse, it promises to save money and integration resources."

Eric Austvold, Research Director, AMR Research
"Integration Competency Centers: Cutting Millions Out of Integration Projects"
July 1, 2004

Diagnostic features help ICCs manage the changes to data structures and definitions that occur as data warehouses adapt to evolving business needs. These features should include the capability to validate data models, database catalogs, and other external metadata repositories for consistency. And, when tools help the team identify inconsistent metadata, the team should be able to analyze the impact of a change and selectively refresh the repository as needed.

To address scalability issues, most ICCs could benefit from additional processing capacity on demand through server grid technology. Multiple servers connected to the same repository make up a grid that automatically balances workflow across the machines. With this capability, an ICC can efficiently utilize hardware resources across departments to spread the risk and cost of the data integration project.

Implementation Models of Integration Competency Centers



Select the ICC Model That Meets Your Needs

ICCs are not all alike. They tend to fall into one of several categories: Best Practices, Technology Standards, Shared Services, or Central Services. A Best Practices ICC seeks to leverage knowledge by establishing and documenting effective integration processes. A Technology Standards ICC builds on the Best Practices ICC but goes one step further, providing consistency by specifying the technologies to be used for all integration projects. A Shared Services ICC incorporates the features of Best Practices and Technology Standards ICCs, and further optimizes use of resources by creating a shared environment for development, QA, and production. A Central Services ICC is the most comprehensive type, providing enterprisewide control over integration activities by specifying best practices, setting technology standards, providing integration services, and assuming responsibility for some or all aspects of every integration project in the organization.

Each model is appropriate for a different set of business requirements, and a company might well evolve through the different types. For example, it might first create a best-practices ICC. Following the ICC's success with a specific project, other groups might then start to follow the ICC's processes, choose to use the same technologies, or share the ICC's development environment. An organization might then decide to enforce the ICC's approach, and even centralize all integration services within the ICC.

Best Practices ICC

A Best Practices ICC is the easiest to implement, which makes it a good first step for an organization that wants to begin leveraging integration expertise. This type of ICC focuses on establishing proven processes across business units. To achieve this goal, a Best Practices ICC documents and distributes recommended operating procedures and standards for development, management, and mapping patterns. It also defines how to manage change within an integration project.

The people who lead this effort are typically those in the organization who have the most integration expertise. They form a virtual team, consisting of project managers and ETL lead developers from different projects. The most important roles in this type of ICC are the knowledge coordinator, who collects and distributes best practices, and the ICC manager, who ensures that the ICC anticipates business requirements and that business managers and customers turn to the ICC for assistance with integration initiatives. The primary function of this ICC model is to document best practices. It does not include a central support or development team to implement those standards across projects.

To implement a Best Practices ICC, companies need a flexible development environment that supports diverse teams and that enables the team to enhance and extend existing systems and processes.

Technology Standards ICC

A Technology Standards ICC provides the same knowledge leverage as a Best Practices ICC, but enforces technical consistency in software development and hardware choices. A Technology Standards ICC focuses on processes, including standardizing and enforcing naming conventions, establishing metadata standards, instituting change management procedures, and providing standards training. This type of ICC also reviews emerging technologies, selects vendors, and manages hardware and software systems.

The people within a Technology Standards ICC typically come from different development teams, and may move from one team to another. However, at its core is a group of best practices leaders. These most likely include the following roles:

- **Technology Leader**—Responsible for vendor selection, management, and standards governance
- **Metadata Administrator**—Creates standards for capturing and maintaining metadata.
- **Knowledge Coordinator**—Develops and maintains mapping patterns (templates).
- **Training Coordinator**—Coordinates vendor-offered or internally sponsored training in specific technology products.
- **Vendor Manager**—Selects vendors for the servers, storage, and network facilities needed for integration efforts.
- **ICC Manager**—Ensures that the ICC anticipates business requirements and that groups within the company turn to the ICC for assistance with integration initiatives.

A Technology Standards ICC standardizes all integration activities on a common platform, and links repositories for optimized metadata sharing. To support these activities, the ICC needs technologies that provide for metadata management; enable maximum reuse of systems, processes, resources, and interfaces; and offer a robust repository, including embedded rules and relationships and a model for sharing data.

Shared Services ICC

A Shared Services ICC optimizes the efficiency of integration project teams by providing a common, supported technical environment and services ranging from development support all the way through to a help desk for projects in production.

This type of ICC is significantly more complex than a Best Practices or Technology Standards model. It establishes processes for knowledge management, including product training, standards enforcement, technology benchmarking, and metadata management, and it facilitates impact analysis, software quality, and effective use of developer resources across projects.

The team takes responsibility for the technical environment, including hardware and software procurement, architecture, migration, installation, upgrades, and compliance. The ICC is responsible for departmental cost allocation; for ensuring high levels of availability through careful capacity planning; and for security, including repository administration and disaster recovery planning. The ICC also takes on the task of selecting and managing professional services vendors.

The Shared Services ICC supports development activities, including performance and tuning. It provides QA, change management, acceptance, and documentation of shared objects.

A world leader in the design and development of cardiovascular medical products was laboriously re-creating similar integration solutions with different development teams. It had no common processes across its integration projects, no efficiencies of reuse, and a never-ending learning curve. The compnay sought to share expertise so that everyone didn't have to go through a lengthy learning process. It established a Best Practices ICC that created a common development approach and proven processes for integration and reporting. Although the company's most experienced integration staff remained in their business units, they documented the best practices they had formulated, so that they could be leveraged across the organization. People across the company heard about the best practices, and have since launched four new integration projects that use those processes to increase integration effectiveness.

The supply chain integration project of a major car manufacturer required multiple teams and projects to share data and transformations. Although the projects had several source systems in common, the integration projects lacked a common approach, leading to considerable confusion and inefficiency. The company chose to resolve the problem by standardizing on Informatica, creating a best practices methodology, and establishing a global metadata repository to share common objects across multiple projects. After achieving reuse of mapping objects (such as source mappings, target mappings, and transformations) in excess of 40 percent, the ICC promoted its services to other lines of business with data integration requirements. Currently, the company's ICC supports eight data integration projects and has achieved reuse of development work in excess of 30 percent across projects for a customer profile hub, a corporate customer data warehouse, global warranty claim processing, a vehicles data warehouse, order management, financial services, and financial reporting.

The Shared Services ICC supports projects through a development help desk, estimation, architecture review, detailed design review, and system testing. It also supports cross-project integration through schedule management and impact analysis.

When a project goes into production, the ICC helps resolve problems through an operations help desk and data validation. It monitors schedules and the delivery of operations metadata. It also manages change from migration to production, provides change control review, and supports process definition.

The roles within a Shared Services ICC include technology leader, technical architect, and data integration architect—someone who understands ETL, EAI, EII, Web services, and other integration technologies. A repository administrator and a metadata administrator ensure leverage and reuse of development assets across projects, set up user groups and connections, administer user privileges, and monitor repository activities. This type of ICC also requires a knowledge coordinator, a training coordinator, a vendor manager, an ICC manager, a product specialist, a production operator, a QA manager, and a change control coordinator.

A Shared Services ICC requires a shared environment for development, QA, and production. The environment must also include a global repository of shared objects, metadata reporting, and capabilities for version control.

Central Services ICC

A Central Services ICC controls integration across the enterprise. It carries out the same processes as the other models, but in addition usually has its own budget and a charge-back methodology. It also offers more support for development projects, providing management, development resources, data profiling, data quality, and unit testing.

Because a Central Services ICC is more involved in development activities than the other models, it requires a production operator and a data integration developer. Like a Shared Services ICC, it also includes the roles of technology leader, technical architect, data integration architect, repository administrator, metadata administrator, knowledge coordinator, training coordinator, vendor manager, ICC manager, product specialist, production operator, QA manager, and change control coordinator.

To achieve its goals, a Central Services ICC needs a live and shared view of the entire production environment. Tools to maximize reuse of systems, processes, resources, and interfaces are essential, as is visibility into dependencies and assets. A Central Services ICC depends on robust metadata management tools, and tools that enable the team to enhance and extend existing systems and processes. Also, because of the scope and scale of this type of ICC, vendors must offer more than a toolset: They need to be able to act as technology partners.

Several business units at global investment management firm, T. Rowe Price, needed a more effective way to integrate data from multiple sources. The business units recognized the value of having “gold” type copies of data. In preparing for this strategic endeavor, the company proactively created a centralized shared environment with Informatica. It dedicated three headcount to supporting the shared environment and established team roles. The team then developed strategies, standards, and procedures for operating a shared environment. Although the team’s first project took six months to complete, more than ten projects were completed within the next six months. Created 18 months ago, the shared environment is the primary reason for significant cost savings and rapid implementation of projects that meet the business lines’ integration needs. It is reusing most of the integration processes and currently has almost 20 projects in production. T. Rowe Price believes that its Integration Competency Center will continue to produce significant cost savings in the future.

The integrated environment of a specialty retailer had become far too complex for any one person or group to understand all the dependencies. Creating a Central Services ICC retains company knowledge in a structured way. The company values even more the ICC’s focus on processes—the source of their competitive advantage. The ICC is organized as a metrics-based practice with contractual service levels driving continuous improvement. Service-level agreements apply to new development, the reuse of software and data, and support and operations activities. The company gathers metrics on the application portfolio, the number of interfaces, project statistics, variances from the standard, and staff certification. The ICC enables the company to consistently deploy and manage web services, reducing development cost and improving security measures and monitoring. The retailer has used its ICC frameworks for 37 projects so far, and saved more than $4 million to date.

Seize the Integration Advantage for Your Business

Most organizations have a wealth of data and technical resources that they can't fully leverage because of lack of integration. Integration is increasingly critical to the success of a business, but it can be tremendously complex and expensive to achieve, especially if companies approach each integration requirement on an ad-hoc basis. ICCs enable companies to integrate data and resources in a coherent, scalable, and cost-effective way to deliver an enduring competitive advantage.

Informatica is the leading enabler of ICCs, with an extensive track record of delivering the products and expertise that companies use to implement high-performing ICCs. Informatica's UDS architecture and service-oriented approach support the development of integration solutions that companies can leverage and reuse for sustained competitive advantage. Companies can ensure the success of their ICCs by leveraging Informatica products and services. These include guidance from Informatica consultants on ICC processes and best practices, and training classes that help staff learn the skills to succeed in their new ICC roles.

To find out more about Informatica and Integration Competency Centers, please visit www.informatica.com/info/iccwp

Why Companies Choose Informatica for ICC:

- Live/shared view of the entire production environment
- Maximized reuse (systems, processes, resources, and interfaces)
- Optimized performance (known dependencies and assets)
- Robust repository (embedded rules and relationships, sharing model)
- Service-oriented architecture and support for universal data services

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