

An Oracle White Paper on Enterprise Architecture
May 2011

Enterprise Information Management: Best Practices in Data Governance

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Introduction

As companies realize the importance of the data and the challenges they face to unify these assets, more and more of them turn to data governance. To achieve real benefits, thoughtful planning is required as there are various decisions that need to be made throughout the process.

The aim of this white paper is to provide you with some insights on how to establish, expand, and mature your data governance capabilities effectively.

Definition, Goals, Deliverables

To start with, let's take a look at what data governance entails.

What Data Governance Is

There are numerous definitions of data governance. Here are a few:

MDM Institute defines data governance as "the formal orchestration of people, processes, and technology to enable an organization to leverage data as an enterprise asset."

Forrester defines data governance as: "The process by which an organization formalizes the fiduciary duty for the management of data assets critical to its success".

The Data Governance Institute states that "data governance is a system of decision rights and accountabilities for information-related processes, executed according to agreed-upon models, which describe who can take what actions with what information, and when, under what circumstances, using what methods."

So to summarize, data governance is the specification of decision rights and an accountability framework to encourage desirable behavior in the valuation, creation, storage, use, archival and deletion of data and information. It includes the processes, roles, standards and metrics that ensure the effective and efficient use of data and information in enabling an organization to achieve its goals.

What Data Governance Is Not

Understanding what data governance *is not* can help focus on what it *is*. The list below illustrates the types of projects where data governance is essential to be ultimately successful. However, these types of technology projects often ignore serious considerations for the principles and processes of data governance.

In particular, data governance is not:

- Change management
- Data cleansing or extract, transform and load data (ETL)
- Master Data Management (MDM)
- Data warehousing
- Database design
- Database management and administration

Data Governance Goals

Data governance is not meant to solve all business or IT problems in an organization. The main goals and objectives of data governance include the following.

- To define, approve, and communicate data strategies, policies, standards, architecture, procedures, and metrics.
- To track and enforce conformance to data policies, standards, architecture, and procedures.
- To sponsor, track, and oversee the delivery of data management projects and services.
- To manage and resolve data related issues.
- To understand and promote the value of data assets.

Data Governance Deliverables

Some of the key deliverables for data governance include:

Data Policies

Data policies are a collection of statements that describes the rules controlling the integrity, security, quality, and use of data during its lifecycle and state change.

Data Standards

While data policies guide what to do and what not to do with regard to data, data standards are more detailed rules on how to do it. Sample data standards include naming standards, data modeling standards, and other data architecture standards.

Resolved Issues

Data governance controls the procedures of addressing data related issues including data quality issues, data naming and business rules conflicts, data security issues, and service level problems.

Data Management Projects and Services

Data governance function coordinates data management projects and service development effort across the organization. As a result, it drives better data management projects to have higher success rate, deliver more value, and reduce time to deliver and cost to implement.

Quality Data and Information

An obvious outcome of data governance is data with improved quality, easier access, and managed and auditable security. Quality data and information, as a result, is the core deliverable of the data governance function.

Recognized Data Value

One of the information architecture principles is to treat data as an asset. A key output of data governance is to value core enterprise data assets – what business processes they support, how critical are these processes, how critical are these data elements in support of these processes, what are the ramifications and risks to the organization if they are unavailable or incorrect.

Focus of Data Governance

Data governance touches various components of enterprise information management and will have a different set of objectives and implementation approach while taking on a focus in one these specific areas.

Policy, Standards, and Strategy

The focus on data policies, data standards, and overall data strategies are usually the first step when an organization initiates a data governance function. Enterprise initiatives including major business and IT transformations can also benefit from such a program focus.

The main activities of a data governance program with a focus on policy, standards, and strategy include:

- Identify stakeholders, establish decision rights, and clarify accountabilities
- Establish, review, approve, monitor policy
- Establish, review, approve, and monitor standards
- Establish Enterprise data strategies

Data Quality

The desire to improve the quality and usability of the data is the main driver for this type of data governance. It is sometimes initiated by merger and acquisition activities within an organization. Major revenue generating business objectives including cross-sale and up-sale can raise the data quality priority. It is likely that quality efforts are initially applied to master data. These types of programs normally involve data quality software including data profiling, cleansing, and matching engines. They may begin with an enterprise focus, or efforts may be local to a department or a project.

Below are the key activities for a data governance program with a focus on data quality:

- Identify stakeholders, establish decision rights, and clarify accountabilities
- Set direction for data quality
- Monitor data quality
- Report status for quality-focused initiatives

Privacy, Compliance, and Security

Regulatory and compliance requirements are usually the main drivers that put these types of program into existence. Companies within the Financial Services and Health Care industries are main adopters of these programs for apparent reasons.

The program are usually mandated from top down and implemented through a combination of IT and business resources.

These programs generally begin with an enterprise scope, but often efforts are limited to specific types of data including personal identification (social security number), financial information such as credit card and bank accounts, and health records.

These programs always include technologies to locate sensitive data, to protect data, and to manage security, access, and auditing policies and controls. An enterprise-scale data security architecture with various components is essential to protect all sensitive data in-flight and at-rest.

The main activities of these types of program include:

- Help protect sensitive data through support for access management and security requirements
- Align data security architecture frameworks and initiatives
- Help assess risk and define controls to manage risk
- Help enforce regulatory, contractual, architectural compliance requirements Identify stakeholders, establish decision rights, and clarify accountabilities

Data Architecture and Data Integration

An organizations focus on cost reduction and operational efficiency improvement always drive the need to simplify data integration architecture.

The cost of change and lack of agility are the main symptoms of sub-standard data architecture and data integration capabilities. Data governance helps an organization to take a holistic view and to manage data in the context of business process, and to support application integration needs. Different components of data architecture include data modeling, data design, and data delivery architecture. Technology capabilities including Service Oriented Architecture (SOA) and Data as a Service (DaaS) often take center stage.

Typical activities in this type of program include:

- Identify stakeholders, establish decision rights, clarify accountabilities
- Ensure consistent data model and definitions
- Support architectural policies and standards
- Support Metadata Programs, SOA, Master Data Management, and Enterprise Data Management (EDM)
- Bring cross-functional attention to integration challenges

Data Warehouses and Business Intelligence (BI)

This type of program focuses on the analytical needs of the data management spectrum. Data governance activities are sometimes included in the overall charter of a Business Intelligence Center of Excellence function to establish an organization ability to mature the decision making capabilities.

Activities include:

- Identify stakeholders, establish decision rights, clarify accountabilities
- Establish rules for data usage and data definitions
- Establish check-points within SDLC with data governance steps
- Clarify the value of data assets and data-related projects

Key Functions of Data Governance

Strategic Planning

- Determine enterprise data needs and data strategy
- Understand and assess current state data management maturity level
- Establish future state data management capability
- Establish data professional roles and organizations
- Develop and approve data policies, standards, and procedures
- Plan and sponsor data management projects and services
- Establish data asset value and associated costs

Ongoing Control

- Coordinate data governance activities
- Manage and resolve data related issues
- Monitor and enforce conformance with data policies, standards, and architecture
- Communicate and promote the value of data assets

Key Metrics

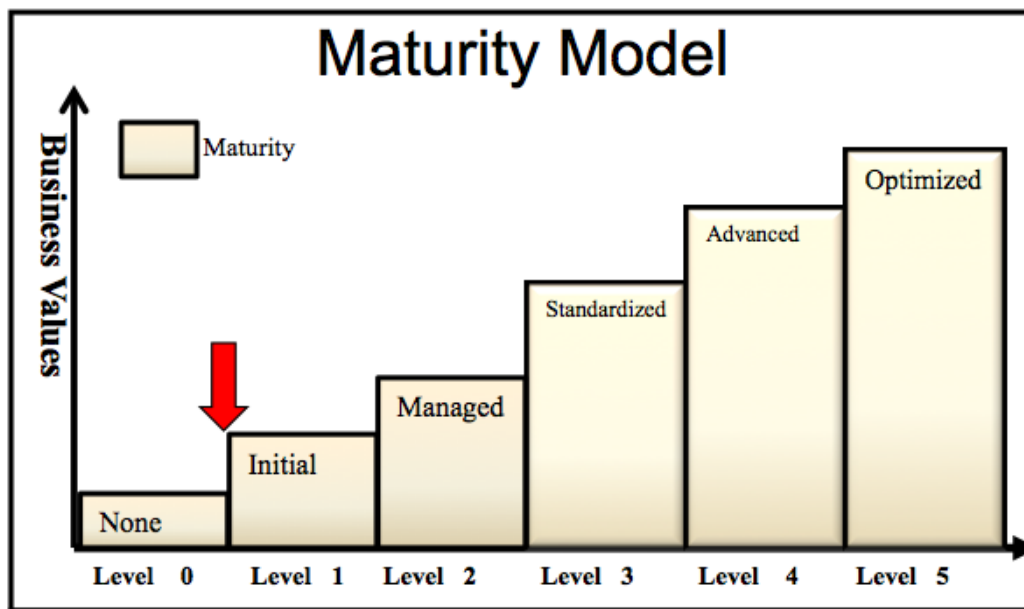
- Data value
- Data management cost
- Achievement of objectives
- Number of decisions made
- Steward representation and coverage
- Data professional headcount
- Data management process maturity

Adopting An Iterative Approach

Effective data governance does not come together all at once. Before adopting an approach, it is important to assess the current state maturity of the data governance capability.

Maturity Model

Below is a diagram that depicts the Data Governance Maturity models with 6 major miles stones: None, Initial, Managed, Standardized, Advanced, and Optimized.



Milestone One: None

- No formal governance process exists, data is by-product of applications

Milestone Two: Initial

- Authority for data exists in IT but wields limited influence on business processes
- Business and IT collaboration is inconsistent and heavily reliant on individual data-savvy champion in the business in each LOB

Milestone Three: Managed

- Ownership and stewardship may be defined in individual LOB
- Loosely defined processes exist around key applications in LOBs, and data problems are typically dealt with reactively without systematically addressing the root cause
- Standardized processes are in early stage among LOBs

Milestone Four: Standardized

- Business is engaged, a cross-functional team is formed and data stewards are explicitly appointed with clear responsibilities.
- Standardized processes and consistency are established across LOBs
- A centralized and easily accessible repository of data policies is established, and Data quality is regularly monitored and measured

Milestone Five: Advanced

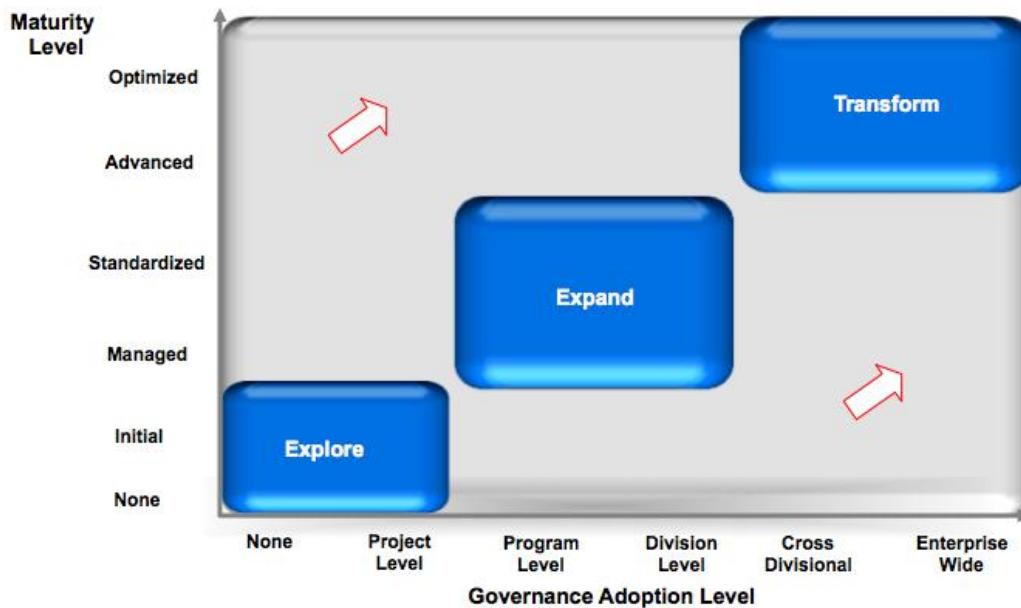
- The organizational structure for data governance becomes institutionalized and viewed as critical to business across all functions
- Business takes full ownership for data content and data policy making
- Quantitative quality goals for both process and maintenance are set

Milestone Six: Optimized

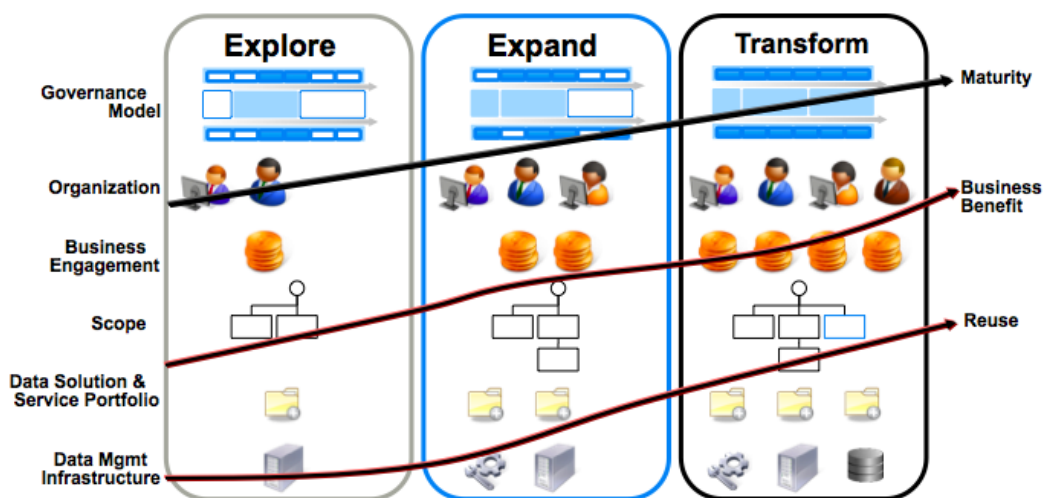
- Data governance is a core business process and decisions are made with quantifiable benefit-cost-risk analysis
- Quantitative process-improvement objectives for the organization are firmly established and continually revised to reflect changing business objectives, and used as criteria in managing process improvement

Maturity and Adoption Method

To improve data governance maturity over the time, it is recommended that a phased approach should be taken with targeted focus and growth. As the governance scope grows and expands, the maturity level also steps up. It is accomplished most effectively as an on-going program and a continuous improvement process.



Three phases in governance activity as maturity increases:



Let us discuss what occurs at each of these three phases.

Explore Phase:

Overview

The main theme of this phase is to build a solid data governance foundation and creating data governance leaders. Building a data governance organization is like building a “Government of Data” within the enterprise. It might start at a local level, but it requires thinking globally with a holistic vision in mind.

The starting point of a data governance program is usually in cooperation with “host” project or initiative including a major business or IT transformation, application rationalization, and/or functional system transformation. It includes identifying initial set of key metrics for quality improvement and putting forth initial infrastructure investment such as data governance management and data quality management software and systems.

Approach

The main objectives of the Explore phase include the following.

First and far most, it is important to understand and prioritize data governance needs. Although it may seem ideal to tackle all data issues at once, it is far more effective to target specific assets to start. Implementing data governance in a targeted way sets a firm foundation for taking it across the enterprise. Objectively assess where business improvement can bring the most benefit to the organization immediately, and establish a beachhead there. It is critical that this assessment is objective, better done through leveraging an outside point of view.

Second task is to create planning document for implementation. Creating a framework to ensure the confidentiality, quality, and integrity of data – the core meaning of data governance – is essential to meet both internal and external requirements. Select a data governance framework based on the best fit for the main objectives, business priorities, organization structure, and overall culture and maturity level. Define mission and vision of the data governance program. Establish and define goals, governance metrics and success measures, and funding strategies. It is important to understand that these planning activities may be performed on a recurring basis.

Another step is to establish data governance council. It is an organization that has enterprise-wide authority over data management. Make sure to have senior management representing both departmental and enterprise perspectives to sit on the council as executive data stewards.

The priorities of this phase include demonstrating immediate business benefit to provide cover for data governance infrastructure development, ensuring principles and objectives of data governance align with business goals, and providing leadership via building core skills.

There are specific challenges associated with this stage of data governance development. For example, it is not always easy to develop the right skills in leaders and champions. In addition, it's not uncommon to have too ambitious targets for data quality improvement. Although it may seem ideal to tackle all data issues at once, it's far more effective to target specific assets to start. Implementing data governance in a targeted way sets a firm foundation for taking it across the enterprise. Last but not least, avoid disillusionment by over promising and under delivering.

Activities

Macro data governance activities during the Explore phase include the following:

- Define & distribute data governance principles, benefits and policies
- Define data governance program KPIs
- Establish data governance Council
- Data governance education program
- Data governance communication plan

Micro data governance activities during the Explore phase are:

- Data governance champions to engage with key projects
- Outline data governance process
- Define data standards and policies
- Define data governance process
- Key data governance compliance checks

Expand Phase:

Overview

The main themes of data governance during the Expand phase include extending data governance coverage from local project implementation to division level. Continue to think Globally and start to act collaboratively cross-division. The Enterprise Data Governance Platform will start to take shape during this phase. Growth in data governance participants beyond initial leaders is expected to occur also.

The cut over point from Explore to the Expand phase is usually during the third or forth project with proper data governance. At this point, data governance as a standalone program and platform scale-up from initial foundation. Another characteristic of this phase is the establishment of investment model for maintenance and growth of the data governance program.

Approach

One of the main objectives of data governance during the Expand phase is to increase the scale of the data governance with broader coverage and deeper impact. Establishing a centralized data repository at the enterprise level can facilitate cross-functional and cross-divisional collaboration and information exchange.

The key priority of this phase is to continue focusing on realizing business benefits and to demonstrate such business value realization. Mechanising the data governance lifecycle including the review of and implementing checkpoints into the SDLC procedures to ensure seamless integration with existing development activities and processes. Another focus is to ensure on-going quality improvement of core data and metrics.

Some of the challenges in this phase include the intricate balance of maintaining flexibility as data governance program expands. Maintaining architecture compliance and KPIs can also be daunting as the program scope expands. Discipline & process compliance with a larger team will also command focused attention to ensure on-going participation of all relevant parties and continued collaborative decision-making.

Activities

Macro data governance activities during the Expand phase include the following:

- Create federated data governance
- Stronger enforcement of data quality evaluation and automation
- Data governance roadmap with Expand development

Micro data governance activities during the Expand phase are:

- Respond to data modelling and data architecture change requests
- Tools for more complex data quality improvement implementations
- More sophisticated data security

Transform Phase:

Overview

The main theme of the Transform phase is Enterprise-Level Data Governance. It is when “Think Globally” finally transforms into action – “Act Globally”. The discipline of data asset valuation is also established and matured during this phase. New data governance business models might also emerge as a result of the enterprise scope of the data governance focus of this phase.

The cut over point is usually signified as data governance is business as usual and when Enterprise-Level Data Governance platform is to be established.

Approach

The main objective of this phase of data governance is to optimize cost of data service delivery and data quality improvement. It is also targeted to ensure all aspects of data management and information architecture meet business need.

This phase prioritize on ensuring sustainability of data service implementation and operation, and identifying transformational opportunities with efficient & cost-effective data services and optimized data quality management.

Some of the challenges of this phase might include the potential loss of agility and flexibility for uniformed enterprise-scope governance method. It is extremely important to balance the centralized control vs. distributed management to account for unique local and departmental requirements.

Activities

Macro data governance activities during the Transform phase include the following:

- Automated data quality dashboard to monitor KPIs
- Data governance process optimization
- Data Integration / Distribution Service and DW/BI environment SLA monitoring

Micro data governance activities during the Transform phase are:

- Evaluating, documenting, and communicating data asset valuation results to the enterprise
- Managing new data service consumer contract instance and SLA monitoring
- DW/BI and Data Integration / Distribution Services test results

Data Governance Best Practices

Not all data governance efforts yield expected results. Major obstacles exist that affect the value and success of the program. They include cultural, political, and organizational challenges that can lead to resistance to the changes that are required to move forward with the governance initiatives.

Here are some steps that help bring success and address the above-mentioned challenges.

Best Practice #1: Take a holistic approach but start small

As was illustrated in the earlier section of this article, data governance is an iterative process. Start with the people, politics and culture, and then move on to the data governance and stewardship processes as well as technology. It takes a number of steps to gradually move up the maturity scale. However, start with an end in mind. Balance out strategic objectives and tactical compromises to ensure the overall program is moving towards the desired direction at reasonable pace.

Best Practice # 2: Obtain executive sponsorship

Data governance involves significant behavioral and cultural changes. Funding for projects and technology tools are also required. Without strong backing from the executive level, none of the above will happen. Analyze your stakeholders and align and get on board key decision makers who represent core functional areas and lines of businesses, who have the strong influence and decision-making power. With them as your champion, the foundational changes have a higher possibility to be successful.

Best Practice # 3: Define data stewardship during early stage

The main responsibility of the data stewards is to ensure effective control and use of data assets. The best data stewards are found, not made. Take your time to identify and build a data steward team that includes subject matter experts from all business areas.

Difference of opinion exists with regards to whether or not to establish an official position and title for this role. The answer is: it depends. It depends on the stage you are in developing your data governance program and it depends on the political and cultural environment of your organization. What's most important is that the definition of this role is included in the job descriptions of these individuals and proper time allocation is applied to the stewardship work.

Best Practice # 4: Establish quantifiable benefits by building business case

An effective data governance program brings tremendous benefits to an organization in a long run. However, some of the effects might or might not be visible immediately. As a result, it is not always easy to obtain and justify funding for the program cost. Focus on the relationship of the key data elements and the business processes they support. Calculate the cost of managing these data elements through repeated and duplicated manual integration and validation. Quantify the business risk of such data elements becoming unavailable or incorrect such as missing transaction

or loss of customer. Identify clearly the opportunities quality data brings in terms of generating and improving revenue through better customer service and insight, through up-sale and cross-sale.

In short, building a business case to articulate and highlight quantifiable benefits is essential to get buy-ins and support towards the program.

Best Practice # 5: Establish, collect, and report on metrics to measure the progress

Choose a combination of tactical quick wins and longer-term strategic improvements as a starting project. Measure the immediate returns of the quick wins to gain positive feedback, sustain engagement, and obtain more support. Measures should be determined at the beginning of the project and focus on quantitative metrics that support the objectives of the project as well as the overall program. Metrics need to convey business values and some sample metrics include data value, data management cost (before and after), number of decisions made, and data management process maturity. A data governance KPI dashboard is a good way to automate the reporting of the progress.

Best Practice # 6: Link and build in incentives to award and re-enforce participation

One of the most challenging aspects of data governance is adequate participation at an on-going basis. Data stewards are usually tasked with multitude of operational duties and business units often vary significantly on resource allocation. The collaborative nature of a data governance program, however, depends heavily on leveled and prioritized commitment from all business functions. Building an incentive-based reward system that links performance to participation can re-enforce priority and thus gain more and sustained commitment from all required parties. It is also important to note that incentives do not have to be all financial-based. Formal and Informal recognitions go a long way in showcasing good examples, instilling sustained enthusiasm, and promoting desired cultural changes within an organization.

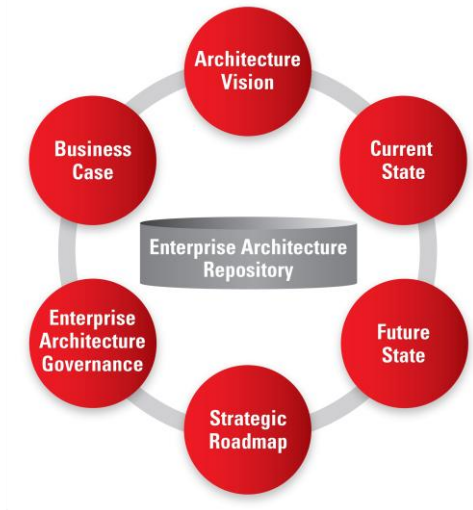
Summary

Data governance is one of the most important components of Enterprise Information Management. It is interrelated with all other disciplines of data management functions. The level of dependency might vary from function to function. Master Data Management, as an example, would not succeed without effective data governance. Styles and different focuses of data governance require unique data governance activities to meet these specific requirements. However, as the term “Governance” indicates, the foundation of any governance involves certain levels of control. Practicing data governance is about finding the right amount and right level of control. Taking an iterative approach will mitigate implementation risks and help an organization focus on the right level of control to be effective and successful in managing their most important asset – data.

Enterprise Architecture and Oracle

Oracle has created a streamlined and repeatable process to facilitate the development of an architecture called the Oracle Architecture Development Process (OADP).

Oracle Architecture Development Process



The OADP divides the development of an architecture into the phases listed above. Oracle Enterprise Architects and Information Architects use this methodology to propose and to implement solutions. This process leverages many planning assets and reference architectures to ensure every implementation follows Oracle's best experiences and practices.

For additional white papers on the Oracle Architecture Development Process (OADP), the associated Oracle Enterprise Architecture Framework (OEAF), other enterprise architecture topics, and to participate in a community of enterprise architects, visit the <http://www.oracle.com/goto/EA-Welcome>.

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Hardware and Software, Engineered to Work Together