



Better Methods. Better Outcomes.

Webinar Series

TMIP VISION

TMIP provides technical support and promotes knowledge and information exchange in the transportation planning and modeling community.



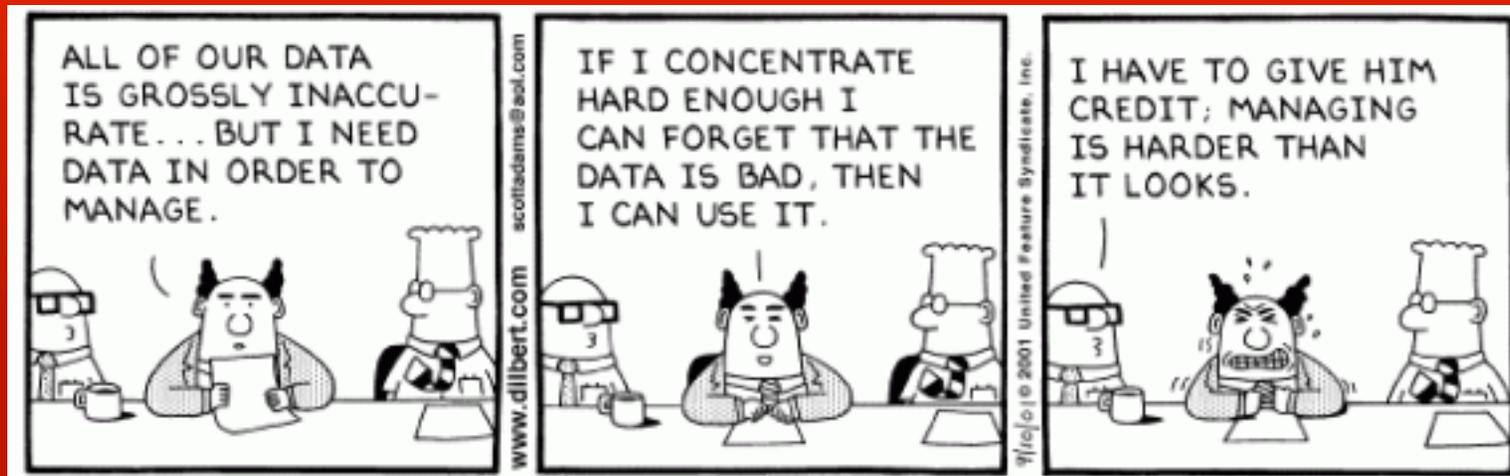
DISCLAIMER

*The views and opinions expressed during this webinar are those of the presenters and do not represent the official policy or position of FHWA and **do not constitute an endorsement, recommendation or specification by FHWA.** The webinar is based solely on the professional opinions and experience of the presenters and is made available for information and experience sharing purposes only.*

ORACLE®

Data Governance

Zeke Bishop
Enterprise Architect
Oracle Public Sector



Safe Harbor Statement

The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development, release, and timing of any features or functionality described for Oracle's products remains at the sole discretion of Oracle.

Speaker Background



Zeke Bishop
Enterprise Architect

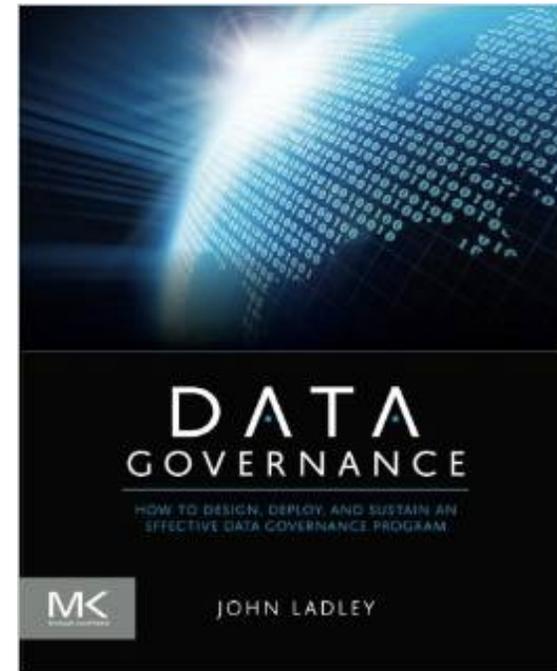
- Oracle Enterprise Architect, focused on Public Sector in North America
- Over 16 years of experience in Public Sector
- Deputy CIO of Business Applications at the City of Phoenix prior to Oracle
- Certifications & Focus Areas
 - TOGAF 9.1
 - ITIL v3
 - LEAN
 - FEAC, OEAF, OADP

Data Governance – How to Design, Deploy, and Sustain an Effective Data Governance Program

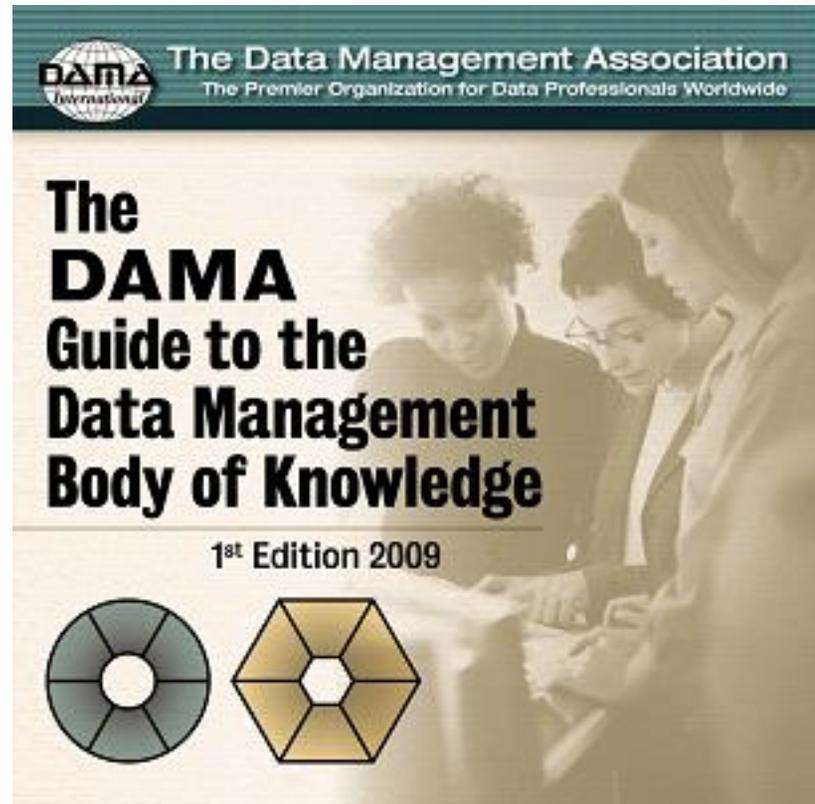
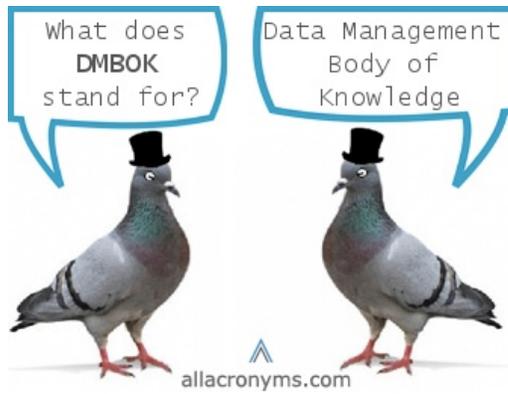


John Ladley

The bulk of content discussed and illustrated today is taken from John Ladley's Data Governance book, which can be purchased from www.imcue.com



DMBOK



Pragmatic Material Ahead





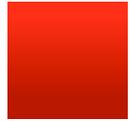
Agenda

- Definition & Concepts
- Overview of Data Governance Program
- Business Case
- Process Overview for Deploying Data Governance
- Artifacts & Tools



Agenda

- Definition & Concepts
- Overview of Data Governance Program
- Business Case
- Process Overview for Deploying Data Governance
- Artifacts & Tools



Definitions & Concepts

Concepts behind data governance

- Data Management
- Enterprise Information Management
- Data Architecture



Data Management (DM)

According to DMBOK

1. The business function that develops and executes plans, policies, practice and projects that acquire, control, protect, deliver and enhance the value of data and information.
2. A program for implementation and performance of the data management function.
3. The field of disciplines required to perform the data management function.
4. The profession of individuals who perform data management disciplines.



Enterprise Information Management

EIM

- The program that manages enterprise information assets to support the business and improve value.
- EIM manages the plans, policies, principles, frameworks, technologies, organizations, people and processes in an enterprise toward the goal of maximizing the investment in data and content.
- EIM represents more of the direction, philosophy, and mindset required to manage data assets.



Data Architecture

- Technology Definition:
 - A master set of data models and design approaches identifying the strategic data requirements and the components of data management solutions, usually at an enterprise level.
 - In some common usage, the physical technology infrastructure supporting data management including database servers, data replication tools, and middleware.
- Business Definition:
 - The diagram or picture of the information management environment, its components, and their interactions. This diagram interrelates the framework, people, processes, projects, policies, technologies, and procedures to manage and use valuable information assets.

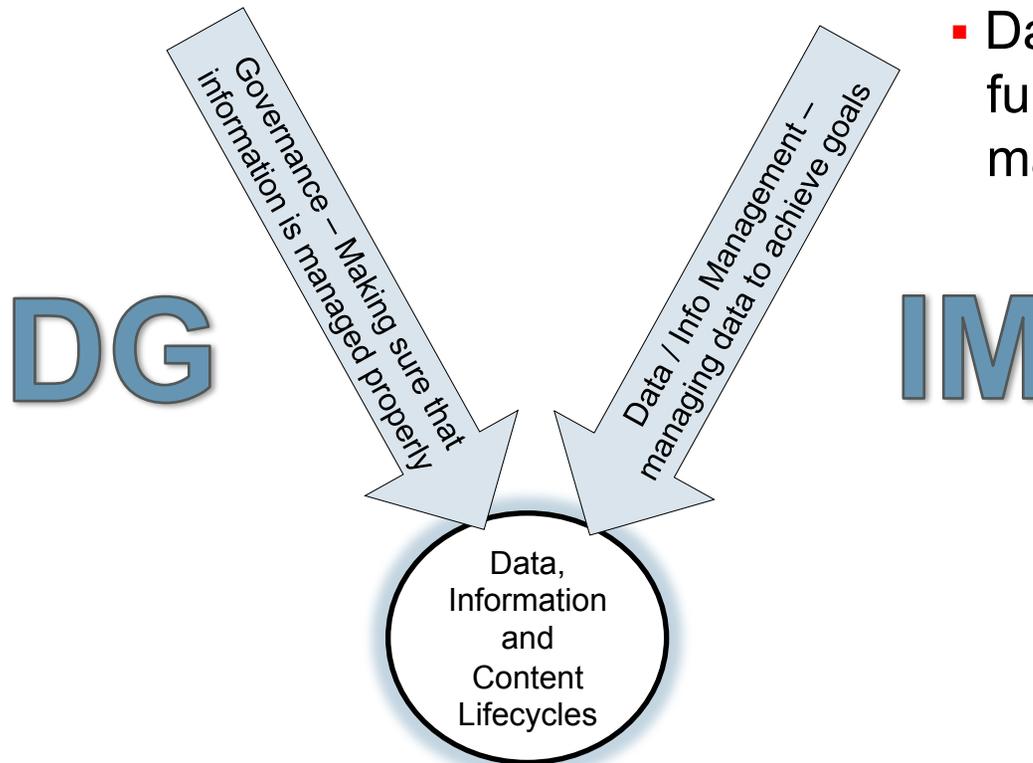


Data Governance

Definition

- Data governance is the organization and implementation of policies, procedures, structure, roles, and responsibilities which outline and enforce rules of engagement, decision rights, and accountabilities for the effective management of information assets.
- DG is the use of authority combined with policy to ensure the proper management of information assets.
- Is not the management of data assets, but rather ensuring data is managed.

Data Governance “V”



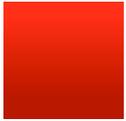
- Data governance is NOT a function performed by those who manage information



UDOT Definition for DG

This internal definition takes the generic definition of DG, incorporates the Governance V, and adds UDOT organizational characteristics.

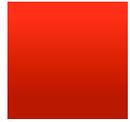
- Data Governance represents the program used by UDOT to manage the organizational bodies, policies, principles, and quality that will ensure access to accurate and risk-free data and information. Data governance will establish standards, accountabilities, responsibilities, and ensure that data and information usage achieves maximum value to UDOT while managing the cost and quality of information handling. Data governance will enforce the consistent, integrated, and disciplined use of information at UDOT.



Why do we treat information different?

Program (Function), Govern, Activity





Solutions

- Master Data Management
- Data Quality
- Business Intelligence



Solutions

- One key theme is critical
 - Regardless of the type of data or content being governed, data governance is essentially done the same way.
 - From a “how to” data governance perspective, none of the solutions defined make a difference in how UDOT deploys data governance.



Master Data Management

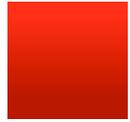
MDM

- Customer Data Management evolved into Master Data Management and is often times referred to as the “gold copy”.
 - Examples include: Customer, Assets, Products, Vendors, Address
- The “Single Source of Truth”
- Processes that ensure *reference data* is kept up to date and coordinated across UDOT’s enterprise.
- If MDM represents the process to manage a category of data across UDOT’s enterprise, then DG needs to come into the picture.



DG Supports MDM

- Ensures standards are defined, maintained, and enforced
- Ensures MDM efforts are aligned to business needs and are not technology-only efforts.
- Ensures data quality, process change, and other new activity that are rooted in MDM are accepted and adapted by UDOT.



Data Quality

- The root cause of the majority of data and information problems.
- Remediating data quality is one of the main drivers of data governance and MDM.



Data Quality

Definition

- Data quality is the degree to which data is accurate, complete, timely, consistent with all requirements and business rules, and relevant for a given use.
- Data quality is that the content in question has to be effective or fit for its purpose
 - This means if UDOT feels that asset data is not of “good quality”, we need to understand what **purpose**, **action**, or **context** is involved and how the shortfall is measured.
- Bad data is corrected by a change in **process** or **habits**, or both.
- Without governance, data quality efforts become costly one-off exercises.



DG Supports Data Quality

- Ensuring that data quality standards and rules are defined and integrated into development and day-to-day operations.
- Ensuring that on-going evaluation of data quality occurs.
- Ensuring that organization issues related to changed processes and priorities are addressed.



Business Intelligence

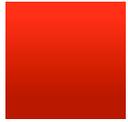
Definitions

- Query, analysis and reporting activity by knowledge workers to monitor and understand the financial and operational health of the enterprise.
- BI means – *using information to achieve UDOT's organizational goals.*



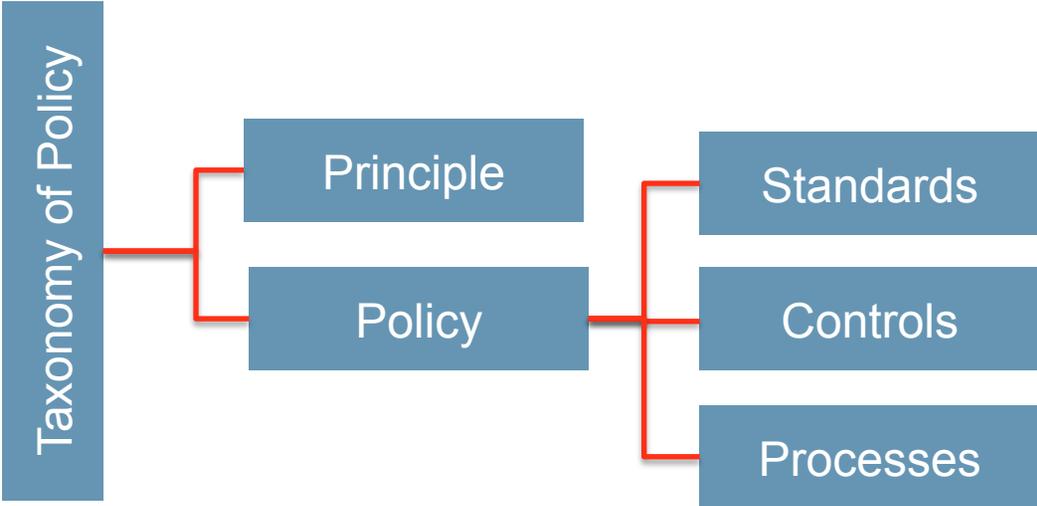
DG Supports and Enhances BI

- DG is used to ensure BI activities are aligned with UDOT business activities.
- DG ensures that data quality is defined and supportive of BI.
- DG is used to ensure consistency in data standards and algorithms.
- DG is important to enforcing the defined BI delivery architecture (i.e., make sure UDOT avoids exponential growth of spreadsheets, Access DBs, and uncontrolled redundancy).



Key Terms – Taxonomy of Policy

Principles & Policy





Key Terms

Principles

Principle

- Principles are statements of Philosophy
 - The bill of rights
- Remember rules do not have the weight of belief, and they are hard to maintain and are inflexible.
- Data Governance is a behavior change effort



Information Principles

Principle	Description
Content as Asset	Data and content of all types are assets with all the characteristics of any other asset. Therefore, they should be managed, secured, and accounted for as other material and financial assets.
Real Value	There is value in all data and content, based on their contribution to UDOT's business/ operational objectives, their intrinsic marketability, and/or their contribution to UDOT's overall image in the State of Utah.
Going Concern	Data and content are not viewed as temporary means to achieve results (or merely as a business by-product), but are critical to successful, ongoing business operations and management.
Risk	There is risk associated with data and content. This risk must be formally recognized, either as a liability or through incurring costs to manage and reduce the inherent risk.
Due Diligence	If a risk is known, it must be reported. If a risk is possible, it must be confirmed.
Quality	The relevance, meaning, accuracy, and life cycle of data and content can affect the financial status and citizen perception of UDOT.



Information Principles cont.

Principle	Description
Audit	The accuracy of data and content is subject to periodic audit by an independent body.
Accountability	UDOT must identify parties which are ultimately responsible for data and content assets
Liability	The risks in information means there is a financial and public image related liability inherent in all data or content that is based on regulatory and ethical misuse or mismanagement.



Key Terms

Policies



Policies

- A statement of a selected course of action and high-level description of desired behavior to achieve a set of goals.
- The real essence of policy is that it is a codification of principles.
- Policies are enforceable processes.
- Policies need to be repeatable, and easily trained.
- Standards, which are important to governance, are a type of policy, or even a characteristic of a particular policy, such as data naming standards or data quality standards.



Information Asset Management

IAM

- Describes a business-based approach to ensure that data, information, and content are all treated as assets in the true business and accounting sense – avoiding increased risk and cost due to data and content misuse, poor handling, or exposure to regulatory scrutiny.



Questions

IAM

- What other corporate asset can function without;
 - Standards of use
 - Accurate financial tracking
 - Statement of value to the organization
 - Assignment of accountability and responsibility

- EIM, DG, MDM and all the concepts discussed exist to manifest IAM!



Agenda

- Definition & Concepts
- Overview of Data Governance Program
- Business Case
- Process Overview for Deploying Data Governance
- Artifacts & Tools



Overview

DG program really has one goal – to disappear

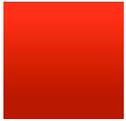
- True mark of success is UDOT treating its information as it treats its roads, bridges, vendors and customers.



Scope

Are we governing everything?

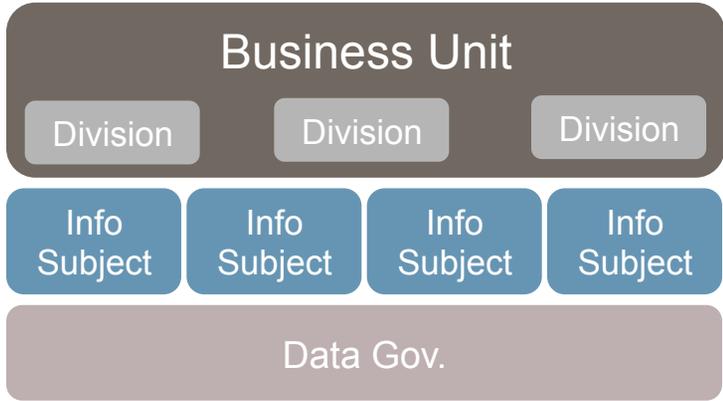
- Three factors effect the scope of DG
 - *Business Model*: The type of organization, its hierarchy, and its operating environment. (What type of business model is UDOT)
 - *Content Being Governed*: The type of content, its location, and its business relevance.
 - *Degree of Federation*: The extent or intensity by which different content is governed at UDOT.



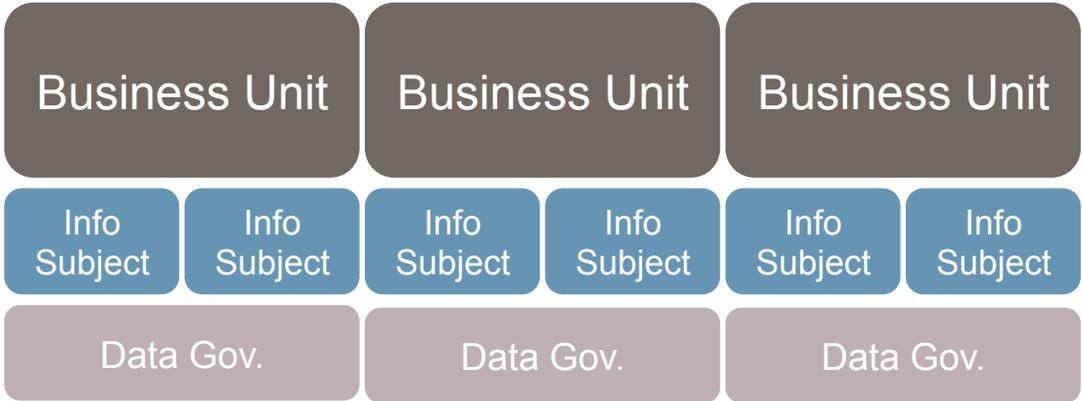
Business Model

DG program should match UDOT's business model

UDOT



Large Enterprise (GE)





Content

What types of content should we focus on?

- Types of content being governed will influence the detailed governance processes being embraced.
 - Address
 - LRS etc.
- Differing content types will have unique life cycles.
- Different technologies / tools are needed to manage content.
 - ETL, DB, SOA etc.



Federation

One of the most important concepts affecting SCOPE!

- Federation of DG = Defining an entity (DG Program) that is a distinct blend of governance functions where the various aspects of DG are touched by UDOT.
- Where and How standards will be applied across various layers and segments of UDOT.
- Think of the United States Government – Some elements will require central and tight governing, while others will be afforded greater flexibility.



Federation

Scope factors that affect the federated layers and activities are:

- Size of Enterprise
- Brands
- Countries – (PS = Departments, Agencies)
- IT Portfolio Condition
- Culture and Information Maturity



Elements of Data Governance Programs

DG is no different than any other business program at UDOT

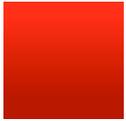
- Organization
- Principles
- Policies
- Functions
- Metrics
- Technology and Tools
- CSFs for DG



Organization

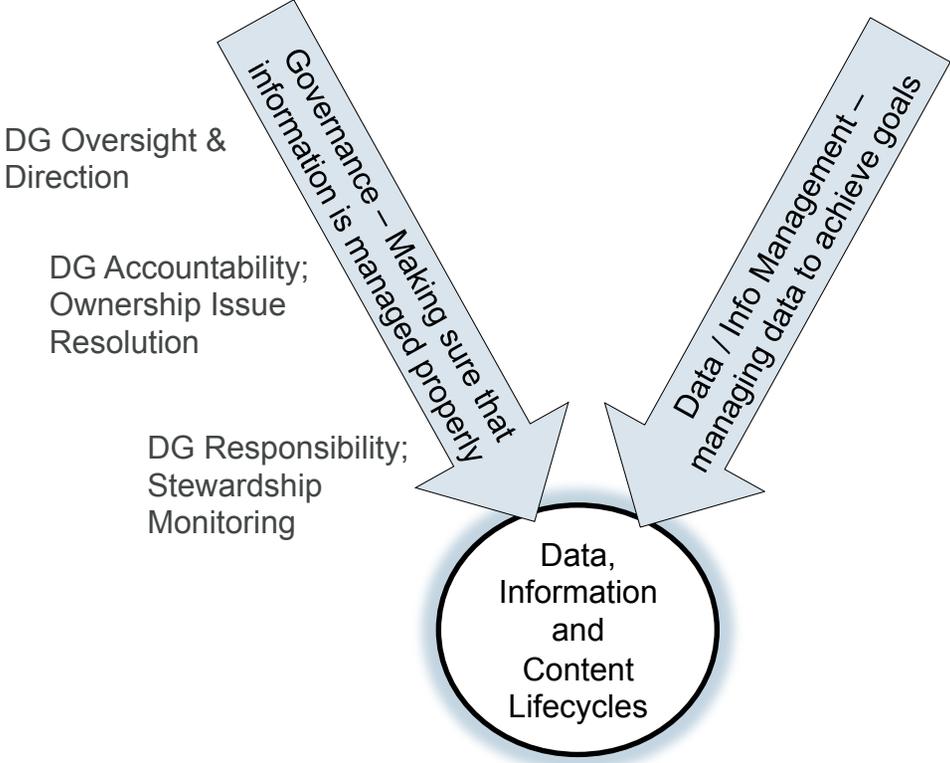
Official designation of Accountability and Responsibility are key

- Most important for new DG programs is the concept of accountability for data.
 - To be clear, it will seem very new and different to hold someone accountable for data quality. This accountability must be tied to performance and compensation at UDOT.
- Responsibility = Stewards or Custodians
- Take away = Some form or structure, hierarchy and organization is critical to success of the program.
 - Remember DG does not exist to “manage” information, but rather “guide and “monitor”.



DG “V” Structure

Typical assignment of roles on the DG Side

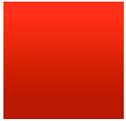




Principles

General adopted rules that guide conduct & application of data philosophy

- Principles will succeed where rules and policies will not
- Revisit and Repeat principles often
- Print and publish for easy access across UDOT



DG Principles

Principle	Description
Master Principle	We will manage all Enterprise Data and Content as a corporate asset.
Federation	We will specify enterprise standards for all content and data structures.
Information Efficiency	Relevant data, information, and content needs to be available at the right time, at the right place, and in the right format to authorized users/consumers, at an efficient cost.
Business Alignment	Information management applications and technology will be acquired in response to business needs verified through a formal annual process.
Information Quality	All enterprise data/information will be managed and measured for quality. Quality will be consistently measured to ensure the data can be utilized for its intended purpose.
Risk Management	Appropriate due diligence will be conducted to comply with all relevant statutory and federal laws, policies, and regulations.
Collaborate	Enterprise data will be a shared resource across UDOT. Data is not a resource which can be “owned” by specific business areas.



Policies

Codification of Principles

- Policies include Standards
- The marriage of principle with policy ensures UDOT executives can support the DG program and hold teams/regions accountable.



Functions

The “What” has to happen in DG

- Points out what team members must do
- Reviewing functions (Bridges, Pavement, Safety etc.) required by UDOT typically aids in determining which areas or individuals will be accountability and responsibility
- Specifies HOW the V operates
- Defines the “right things to do”



Metrics

UDOT can't manage what it does not measure

- UDOT's DG program must create a means to monitor its own effectiveness
- Common Metrics
 - IMM Index: Information Management Maturity
 - DG Stewardship Progress: # of individuals trained in DG
 - DG Stewardship Effectiveness: # of issues resolved by the DG bodies
 - Data Quality: Data profiling results calculated into a DQ index
 - Business Value: How is DG supporting the business



Technology and Tools

Does a tool = success? NO

- As the program evolves UDOT will know immediately where tools are needed to satisfy the demands of the business.



CSFs for Data Governance

Critical Success Factors

1. Data governance is mandatory for the successful implementation of any project or initiative that uses information. Any project requiring reports, BI, cleansing of data, or development of a “single source of truth” requires DG to be sustainable and successful.
2. Data governance has to show value explicitly. This means UDOT cannot do data governance in a vacuum. Something has to be governed, even if it is data quality and UDOT implements data governance as a means to improve data quality. UDOT must show benefit, and that means tying the DG effort to a visible initiative.



CSFs for Data Governance

Critical Success Factors

3. UDOT must manage organizational change. Orient, train, educate, communicate, encourage, and offer incentives. Overall, behaviors and processes must change!
4. Data Governance must be viewed as an enterprise effort. UDOT can implement DG in segments, but the enterprise perspective must be retained.



Agenda

- Definition & Concepts
- Overview of Data Governance Program
- **Business Case**
- Process Overview for Deploying Data Governance
- Artifacts & Tools



Contents of the Business Case

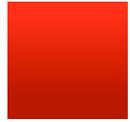
- Objectives
- Vision
- Program Risks
- Business Alignment
- Costs of Data Quality
- Costs of Missed Opportunities
- Obstacles, Impacts, and Changes
- Presentation of the Case



Objectives

Direct Benefits

- Improvements in efficiency
- Increase in revenue, citizen value
- Reduction in risk
 - Privacy
 - Data Security
 - Civil Liability
 - Incorrect Decisions
 - Regulatory



Objectives

Indirect Benefits

- Support activities that ensure good data and information is available to accomplish business goals
- Support business programs that work towards increasing revenue, lowering costs, and reducing risk



Objectives

Build a response to historical shortcomings of IT projects

- Perception:
 - Data and information initiatives always fail
 - Spending on “pure” information management projects is wasteful
- Historical criticism of IT
- Ongoing complaints that the IT data is not correct
- A growth of “stealth” or shadow IT in reaction to a poor perception of IT
- List of projects that “we will get running with these shortcomings and then fix them later.” Late never happens!



Objectives

Recap – The DG business case needs to accomplish the following:

- Identify where it can support UDOT regions and business directly – such as risk avoidance
- Identify where information is used to move UDOT's business forward
- Associate DG with those IM activities (MDM, BI, etc.)
- Address historical shortcomings of IT projects



Vision

The “big picture” is incredibly important for the acceptance of DG

- What will a day in the life look like when DG is in place?
- What will you see changed at UDOT?
- What business goals will be more achievable?

- Help team members and executives understand:
 - Data accountability is there issue.
 - Data does not belong to IT



Vision

UDOT's Vision

UDOT will manage its information assets to increase citizen value and reduce enterprise risk.



Program Risks

What risks does the DG program itself create?

- *Business Risks* – The DG program fails to do its part toward adding citizen value and preserving revenue.
- *Regulatory Risk* – DG fails to connect with compliance requirements and there are violations of regulations.
- *Cultural Risk* – UDOT fails to engage in the DG process and continues poor data asset management practices.



Business Alignment

Call out specific value points or scenarios DG will enable

- Actual business benefits of DG at UDOT will come from major initiatives in the regions and divisions. Be sure to find these “hot topics” and use DG to add value.



Cost of Data Quality

Data quality issues consume an enormous amount of cost and resources

- Data Quality is the primary manifestation and metric of a functioning DG program.
- UDOT's business case must mention the current costs and risks associated with data quality.



Cost of Missed Opportunities

What will happen or continue to happen without DG

- Recap existing issues with data at UDOT
 - Reporting
 - Dashboards
 - Poor content management
 - Compliance issues
 - High cost of ownership due to redundancy in data management environments



Obstacles, Impacts, and Changes

Culture, culture, culture, culture, culture, culture

- It is fair to cover possible cultural and any other organizational challenges that exist at UDOT.
- Any obstacles?



Presentation of the Case

This is a business document

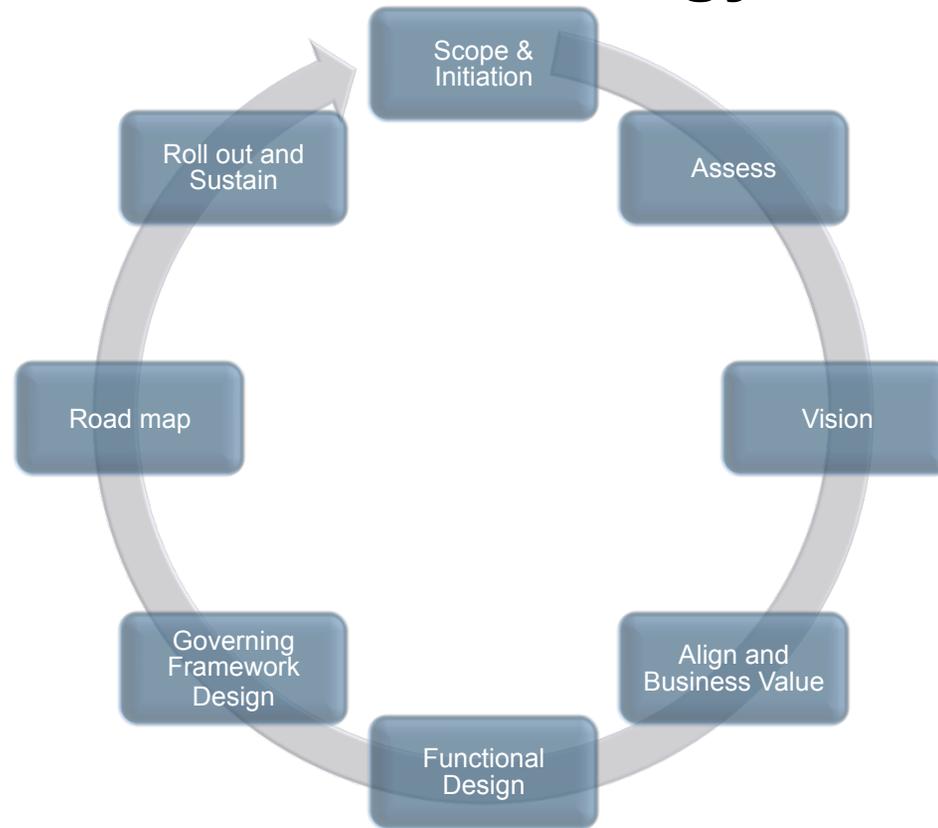
- Since IT is creating this document at UDOT:
 - Avoid three letter acronyms
 - No techno babble
 - No exotic abstract pictures
 - Be crystal clear and conversational



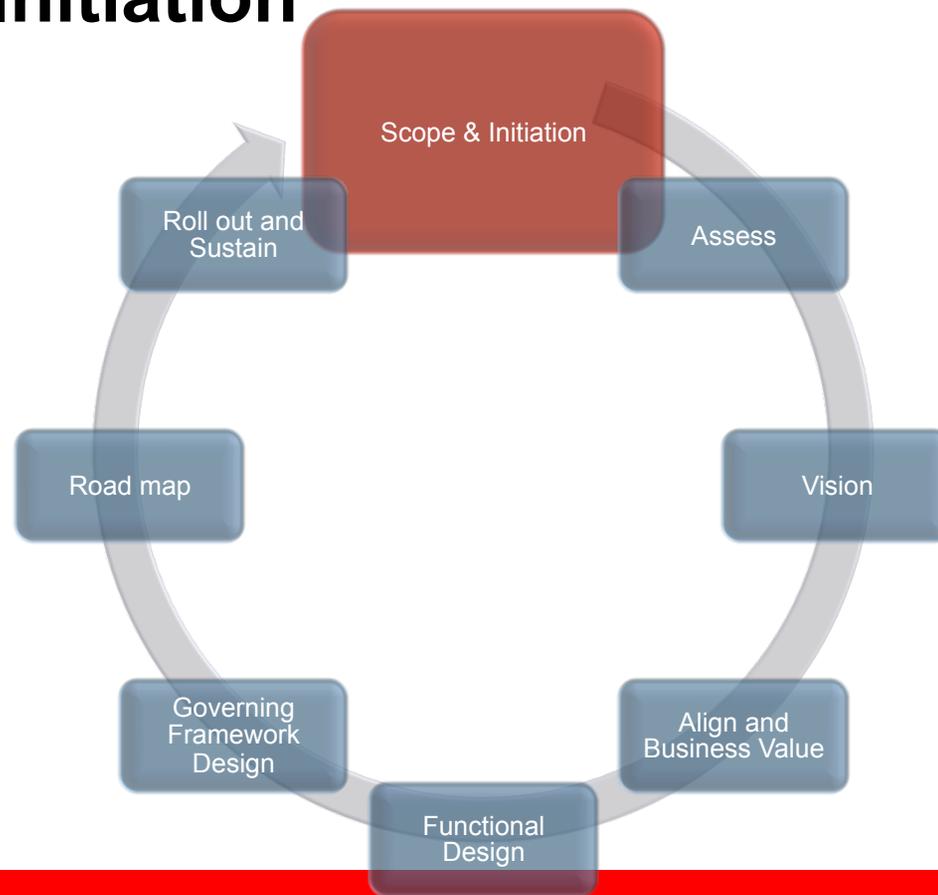
Agenda

- Definition & Concepts
- Overview of Data Governance Program
- Business Case
- Process Overview for Deploying Data Governance
- Artifacts & Tools

Data Governance Methodology - Process



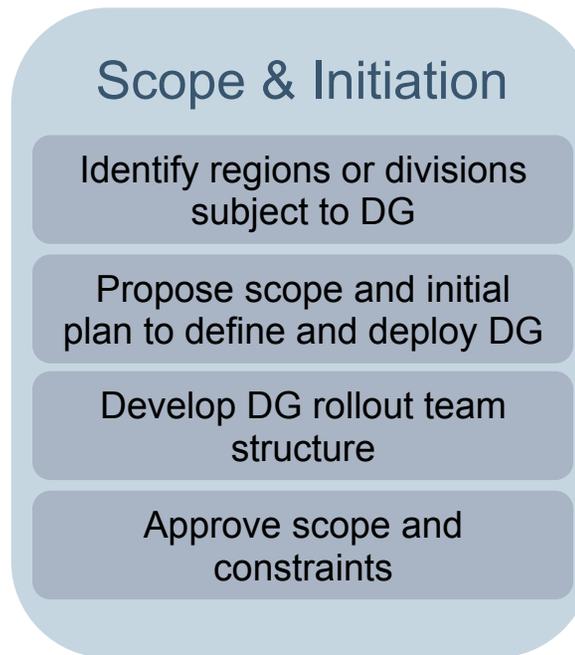
Scope & Initiation





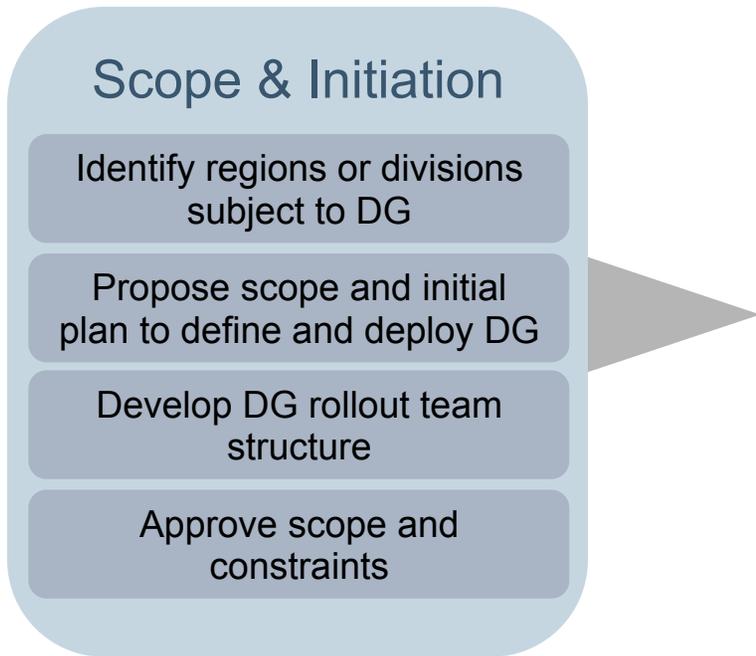
Scope & Initiation

“In preparing for battle, I have always found that plans are useless, but planning is indispensable.” – Dwight D. Eisenhower





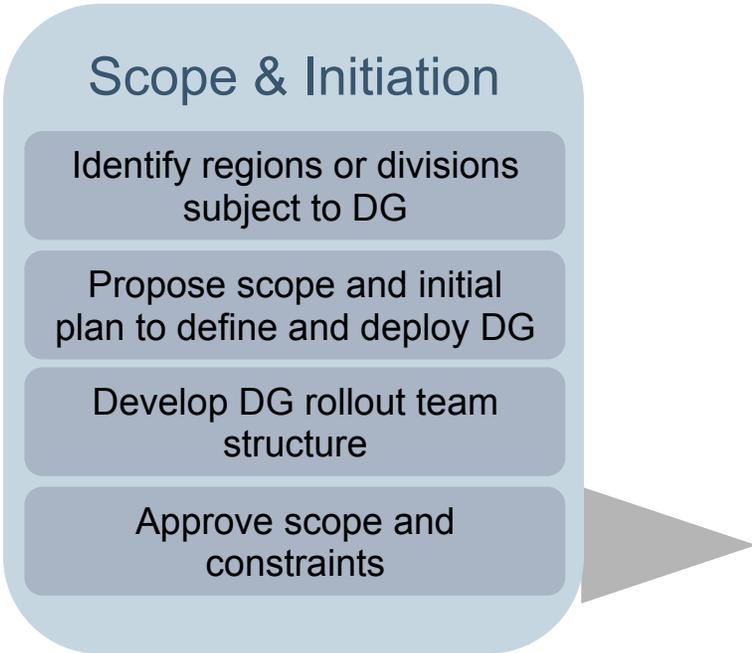
Objective	Determine candidate regions or divisions that can come under the oversight of the DG program.
Purpose	Begin to understand the possible span and depth of the DG program.
Inputs	Business model, organization charts
Tasks	<ol style="list-style-type: none">1. List regions or divisions that may be subject to DG and in scope2. Identify key divisions in regions3. Understand significant strategies and initiatives4. Determine if divisional differences merit different DG
Techniques	None
Tools	Work, PowerPoint or similar
Outputs	<ol style="list-style-type: none">1. Candidates for DG2. High level business strategies driving DG3. Scope drivers for DG4. DG program scope
Outcome	A declaration of scope for the DG program



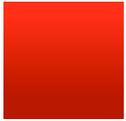
Objective	Define the final areas subject to DG. Based on a standard definition of DG, adjust the scope based on any constraints such as timing, economic conditions, or regulations, then define the DG rollout plan.
Purpose	Refine the proposed scope based on realities of timing and develop a detailed approach to deploying the DG program.
Inputs	<ol style="list-style-type: none">1. Initial scope2. Basic DG deployment template
Tasks	<ol style="list-style-type: none">1. Define DG specific tasks2. Define known constraints within proposed scope3. Define required assessments4. Define standard startup tasks
Techniques	None
Tools	Work, PowerPoint or similar
Outputs	<ol style="list-style-type: none">1. DG tasks2. Known constraints3. Required assessment tasks4. Standard enterprise program startup tasks (if any)
Outcome	DG project plan



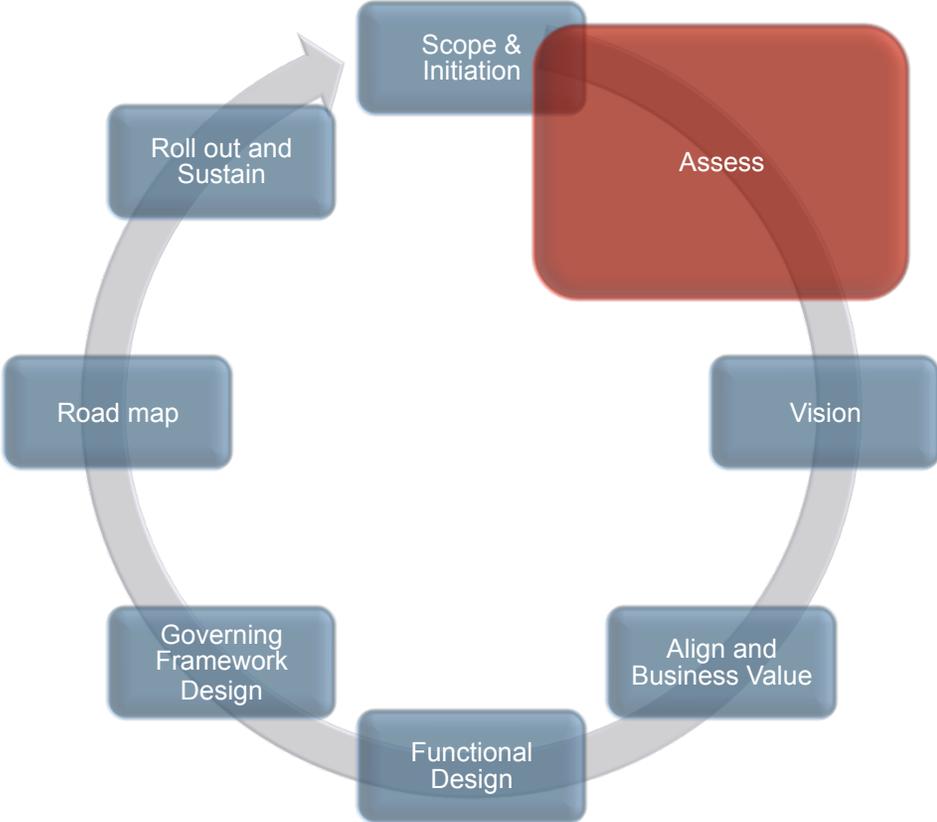
Objective	Identify the on-the-ground team members, the steering committee, and other key stakeholders
Purpose	Determine who will be available to assist in deploying DG, including leaders and “hands-on” individuals
Inputs	<ol style="list-style-type: none">1. Initial scope2. Organization chart
Tasks	<ol style="list-style-type: none">1. Identify DG team and key stakeholders2. Identify DG steering body3. Perform SWOT analysis on participants
Techniques	<ol style="list-style-type: none">1. Facilitation2. SWOT analysis (strength, weakness, opportunity, threat)3. Team building
Tools	Work, PowerPoint or similar
Outputs	<ol style="list-style-type: none">1. DG team and stakeholder list2. DG steering body names3. DG participants SWOT analysis
Outcome	A proposed DG team that will be able to stand up the DG program

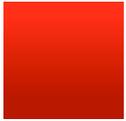


Objective	Obtain approval of the DG team and deployment scope, approach, and schedule
Purpose	Establish that DG has true, realistic support to move forward
Inputs	1. DG plan, team structure, scope
Tasks	1. Review scope with proposed steering body 2. Adjust based on feedback 3. Develop final statement of DG scope
Techniques	1. Presentation 2. Selling 3. Facilitation
Tools	Work, PowerPoint or similar
Outputs	1. Proposed DG scope 2. Feedback adjustments 3. Final DG scope statement
Outcome	Approval to proceed within a well-defined scope



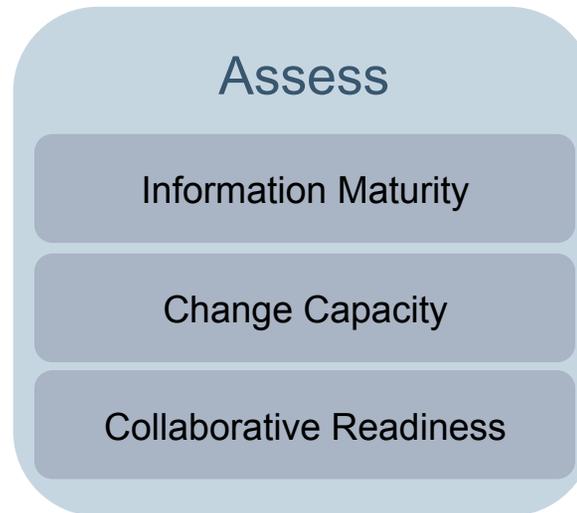
Assess

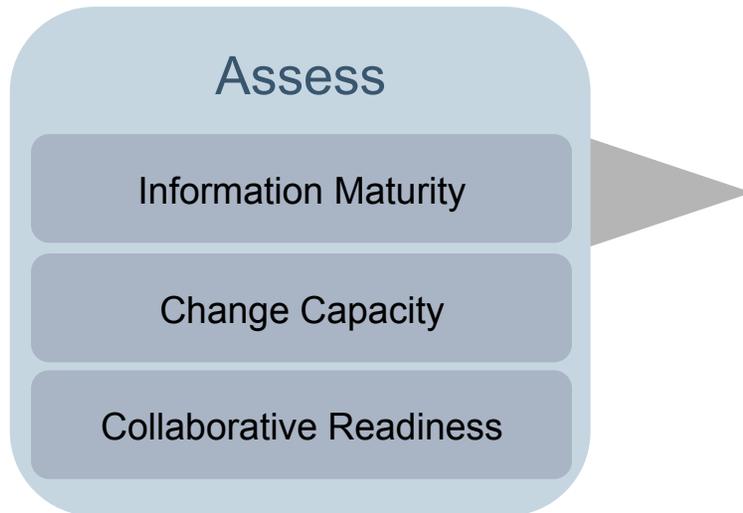




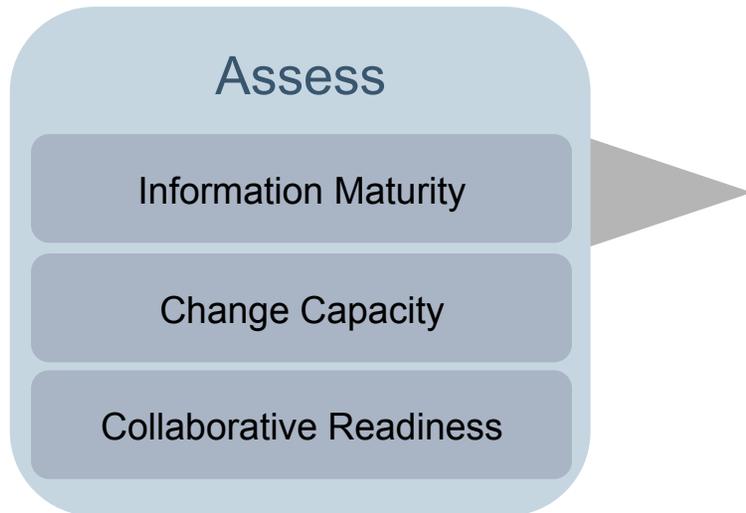
Assess

“Seeing, contrary to popular wisdom, isn't believing. It's where belief stops, because it isn't needed any more.” – Terry Pratchett

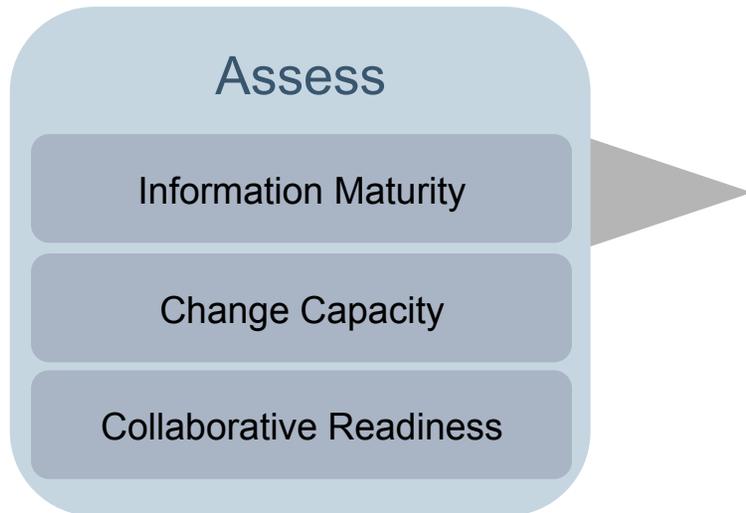




Objective	Understand what UDOT does with the content and information produced. The focus is on the impressions and feelings business personnel have as to how well UDOT manages data.
Purpose	Improving the leverage and quality of data and content is a core driver for data governance. This activity provides the baseline for measuring progress toward future DG effectiveness from an objective, qualitative standpoint.
Inputs	The activity requires the development of survey-style questions. Input would be a template created that measures the maturity of UDOT's data environment.
Tasks	<ol style="list-style-type: none">1. Determine scope of the survey instrument2. Select or develop the maturity scale3. Identify all participants by name and group4. Orient respondents on importance and anonymity if required.5. Agree on survey delivery (online, written, group focus)6. Review and modify maturity template7. Produce final form of delivery



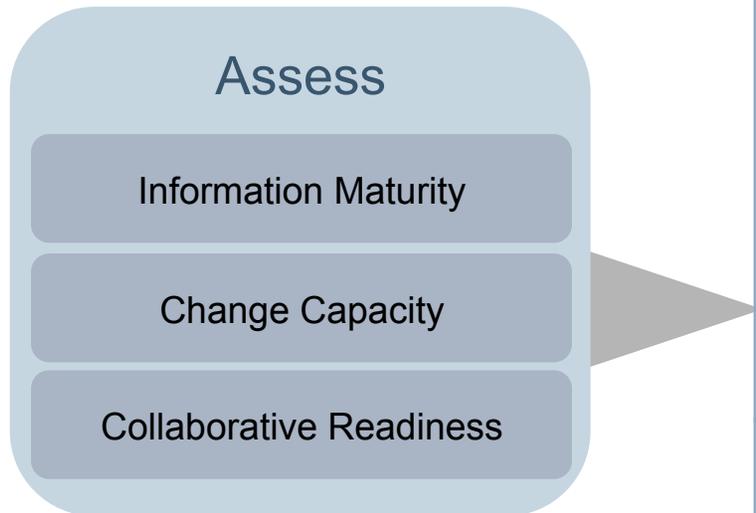
Tasks Cont.	<ol style="list-style-type: none">8. Deploy survey9. Monitor online survey OR10. Distribute and monitor written version OR11. Prepare and deliver focus sessions12. Collect and evaluate data13. Derive maturity score based on selected scale14. Collect existing standards, procedures, and policies for information management, info, resource utilization, prioritization, and controls – and map to IMM scale15. Prepare findings for presentation
Techniques	<ol style="list-style-type: none">1. Online survey using intranet tool2. Focus groups, with groups segmented by management level – do not mix upper and lower management groups3. Written survey to be check boxed – this takes forever and response rates are low <p>Develop the IMM score with the team, and have the sponsor review and concur</p>
Tools	Online survey tools Excel to modify / develop the initial survey template



Outputs	<ol style="list-style-type: none">1. Survey results are evaluated and are usually produced in the form of charts or graphs2. A statement on the existence or lack of data governance can be made3. Specific outlier or extreme results must be evaluated and addresses.
Outcome	<ol style="list-style-type: none">1. IMM score and presentation delivered.2. Results may include recommendations for next steps.3. Sponsor concurs with findings, even if they are controversial.



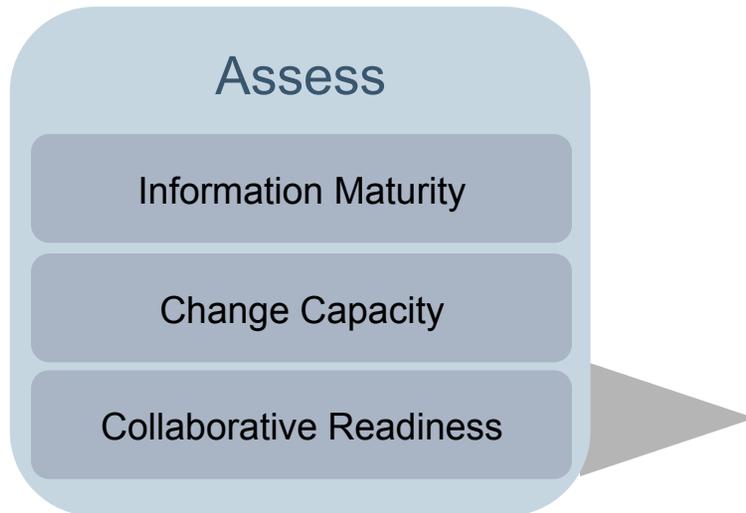
Objective	Measure the capacity for UDOT to change behaviors required for adapting IAM. Secondly, identify potential resistance points.
Purpose	It is vital to assess the risk to DG that will originate from culture change issues. The DG program must be sustainable, and it cannot be made so without vital information that will allow the DG team to accommodate and leverage UDOT's culture. The results are used to adjust the "Sustaining" phase, and will even influence the rollout of information projects and policies.
Inputs	None, unless UDOT has a standard change-management process, which always includes an "assessment" step. The "Sustaining" phase may ask for this assessment to be revisited to measure how UDOT is adapting to required changes.



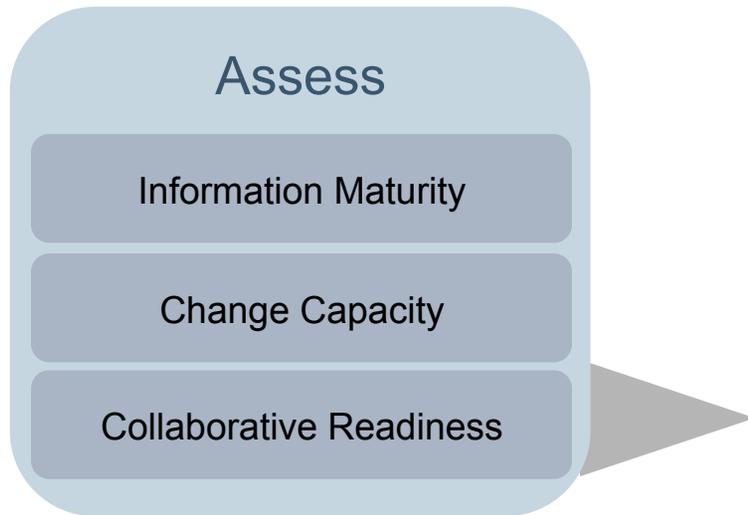
Tasks	<ol style="list-style-type: none">1. Determine the formality of the assessment. That is, an informal structured meeting format or a format survey instrument.2. Determine the target audience.3. Define the survey population or interviewees.4. Define the approach – structured meeting, written, or online.5. Administer the survey OR conduct meetings.6. Analyze and summarize findings.7. Determine if additional investigation is required.<ol style="list-style-type: none">1. Leadership alignment2. Leadership commitment8. Determine what will be reported now versus sent to the EIM team to use during subsequent phases
Techniques	<p>If there is a division in UDOT that has a change management team or organization development practitioners with change management expertise, utilize their skills.</p> <p>If time is short, an informal, anecdotal exercise will be sufficient until the “Sustaining” phase.</p>



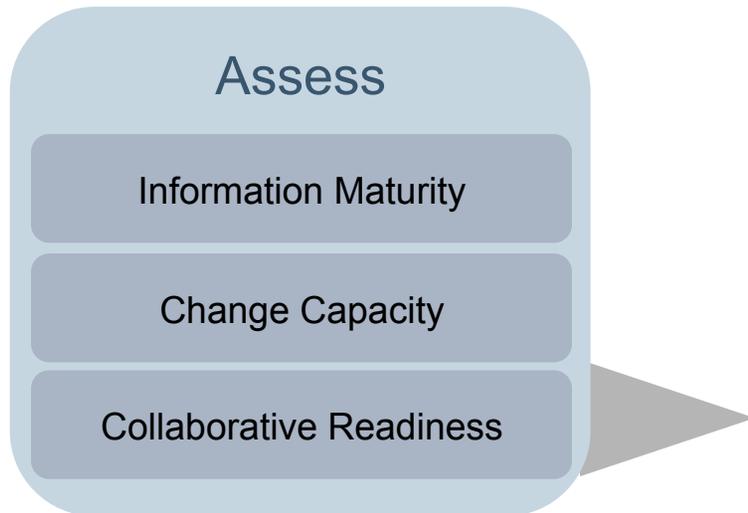
Techniques Cont.	Another informal technique is to maintain the structured meeting questions as a checklist, and review those with various groups as different personnel move in and out of the EIM effort.
Tools	Online survey tools – SharePoint, Survey Monkey
Outputs	The results may take the form of a report or presentation.
Outcome	The culture capacity assessment is complete when results are acknowledged and accepted by the executive team or sponsor.



Objective	Determine the capability and/or the need for UDOT to institute collaborative elements into the use of data and content.
Purpose	If there are elements such as workflow, document sharing, document management, and social networking-type facilities, then there are significant resources being used. These can present as much “information asset management” opportunity as any database.
Inputs	Most of the time, the IMM or “Change Capacity” surveys will trigger the need for this. When planning the entire assessment phase, however, consider this activity beforehand. This will help with shaping the “Readiness” approach. Typical inputs are the questions related to cooperation, from the IMM or change capacity assessments, or determinations that the business needs to consider workflow from the readiness assessment.



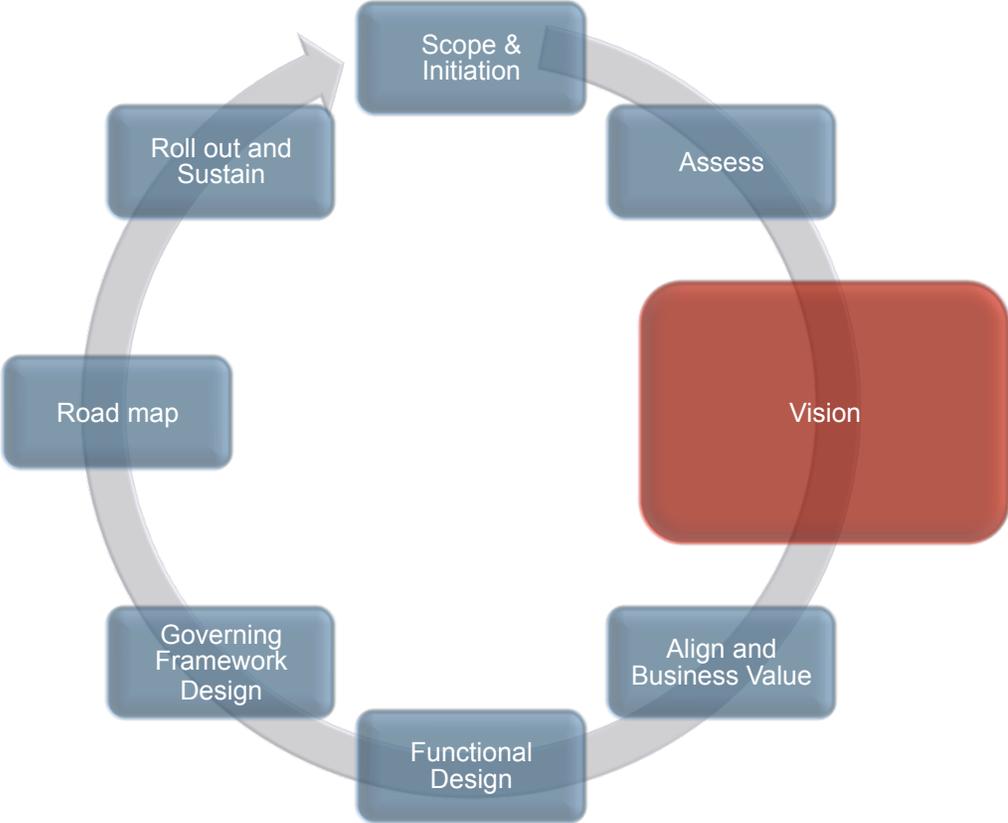
Task	
	<ol style="list-style-type: none">1. Determine the assessments scope. Does it include:<ol style="list-style-type: none">1. Websites and content2. Documents and sharing3. Seeking and Identifying existing communities of practice or interest4. Workflow5. Collaborative products6. Contemporary facilities like instant messaging, texting, Twitter, or Facebook2. Determine assessment approach – interviews, document reviews, surveys, or a combination.3. Collect existing standards, procedures, and policies for document sharing, workflow, internal wikis, blogs, etc. for review.4. Collect inventory of SharePoint or other work-share facilities.5. Determine scope of survey instrument.6. Select or develop a survey scale.7. Identify all participants by name and group, if necessary.8. Orient respondents on importance.9. Identify interviews of focused group participants, if necessary.



Task	<ol style="list-style-type: none">10. Agree on survey delivery (online, written, focus group.)11. Produce final form of delivery.12. Deploy survey instrument.13. Monitor online survey OR14. Distribute and monitor written version OR15. Prepare and deliver focus sessions.16. Collect and evaluate data from surveys, documents, and meetings.17. Develop collaborative readiness statement based on predetermined scale.18. Prepare findings for presentation.
Techniques	Interviews, surveys, and facilitated sessions are techniques of choice.
Tools	SharePoint lists, Word, Excel
Outputs	The readiness information from this assessment is used to share the DG vision, in that collaboration may be a new topic for UDOT. DG can be an impetus to cross functional accomplishments.
Outcome	Assessment reviewed and accepted by DG leadership.



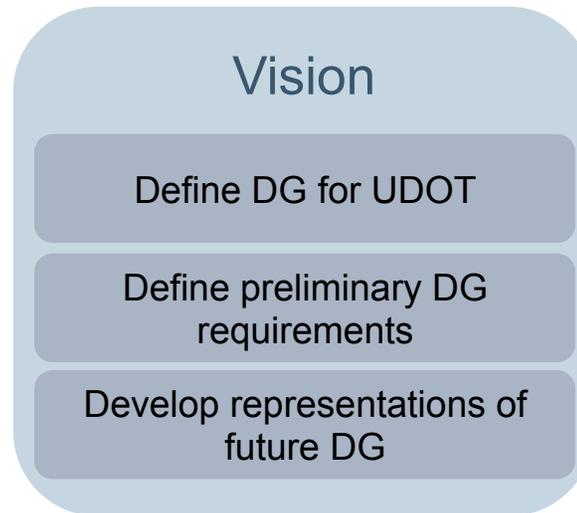
Vision

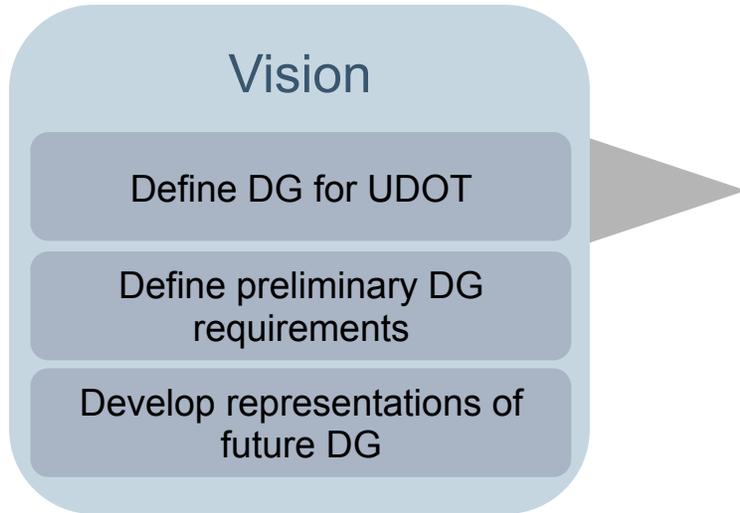




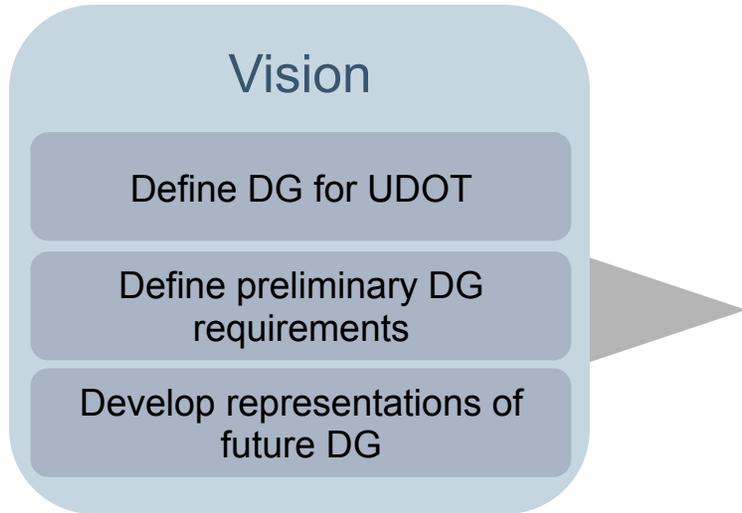
Vision

“Few things are harder to put up with than the annoyance of a good example.” – Mark Twain

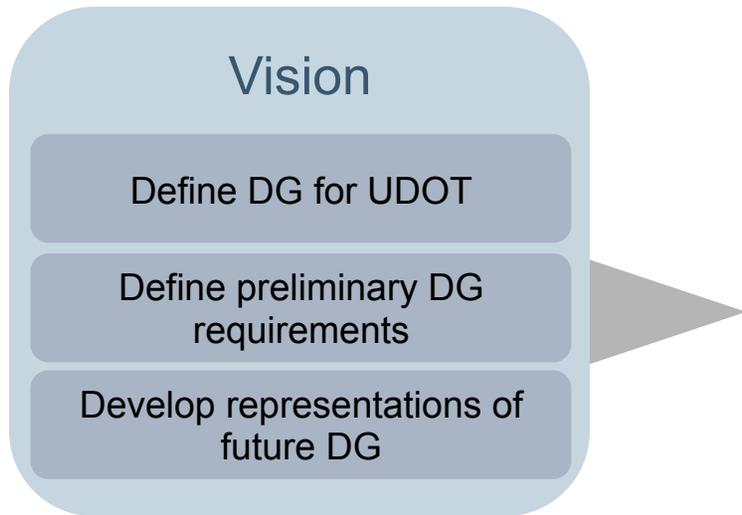




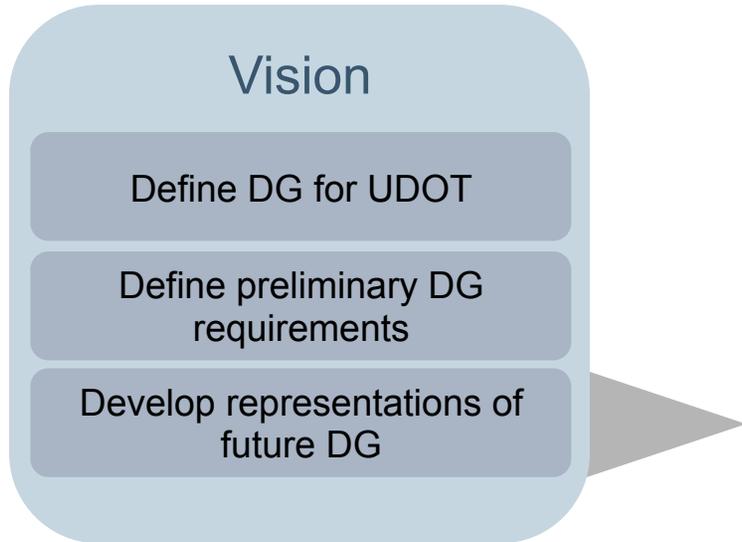
Objective	Draft a clear vision and definition that are relevant to UDOT.
Purpose	Ensure UDOT has a clear definition of data governance.
Inputs	Assessment results, sample definitions of DG
Tasks	<ol style="list-style-type: none">1. Define IAM for UDOT.2. List possible DG measures.3. Develop DG mission and value statements.4. Develop straw-man DG definition.5. Build DG elevator speech.
Techniques	Mission and vision statements facilitation
Tools	Work, PowerPoint or similar
Outputs	<ol style="list-style-type: none">1. Definition of DG/IAM philosophy. Draft brief impact and considerations document.2. Initial list of DG metrics3. DG mission and value4. Notional definition of DG5. DG elevator speech



Objective	Develop an initial view of DG requirements that shows how DG will support UDOT's business needs.
Purpose	This activity will provide focus for the DG team, help identify stakeholders and stewards, and provide more insight into metrics and additional tasks to help sustain DG.
Inputs	<ol style="list-style-type: none">1. Business drivers, goals and objectives2. Data artifacts affected by DG3. Outstanding application issues4. Knowledge of organization risks
Tasks	<ol style="list-style-type: none">1. Gather levers or stated goals and strategies and examine required content to enable them.2. Gather existing artifacts such as data or process models for Data Quality surveys.3. Examine backlogs of report requests, website updates, and requisitions for external data, data issues, and anecdotal requests for DG.4. Identify obvious targets for improved quality or those that would benefit from external scrutiny.5. Examine significant business events and activities for content affecting risk. (Safety)

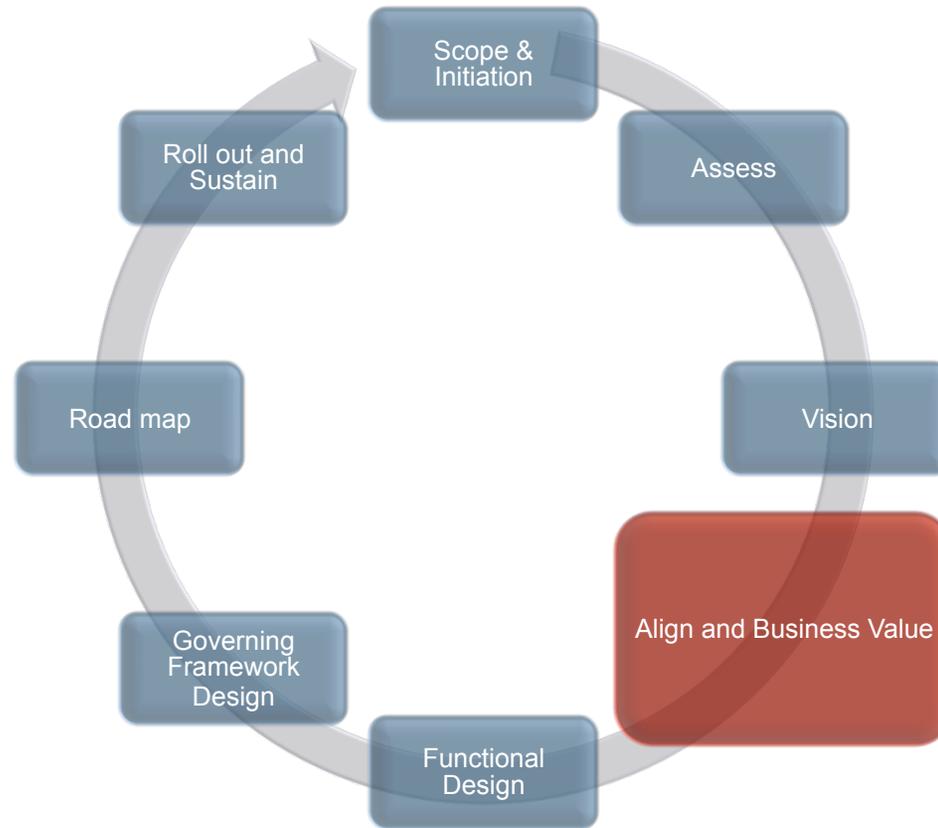


Techniques	
Tools	Word, PowerPoint, and similar; requires management tools, and strategic planning or enterprise architecture tools
Outputs	<ol style="list-style-type: none">1. Business goals affected by DG2. Data artifacts affecting DG3. Direct and indirect requests for DG4. Data quality opportunities for DG5. Risk areas benefiting from DG



Objective	Produce a visual representation of the DG vision.
Purpose	Develop the deliverable that will serve to convey the value and purpose of the DG program.
Inputs	1. DG requirements, mission and vision statements, and elevator speech.
Tasks	1. Identify single-page abstract of DG vision. 2. Identify notional DG touch points. 3. Develop “day-in-the-life” picture.
Techniques	
Tools	Word, PowerPoint
Outputs	1. Visual DG vision 2. Refined DG business value proposition 3. “Day-in-the-life” slide

Align and Business Value





Align and Business Value

“Efficiency is doing things right; effectiveness is doing the right things.” – Peter Drucker

Align and Business Value

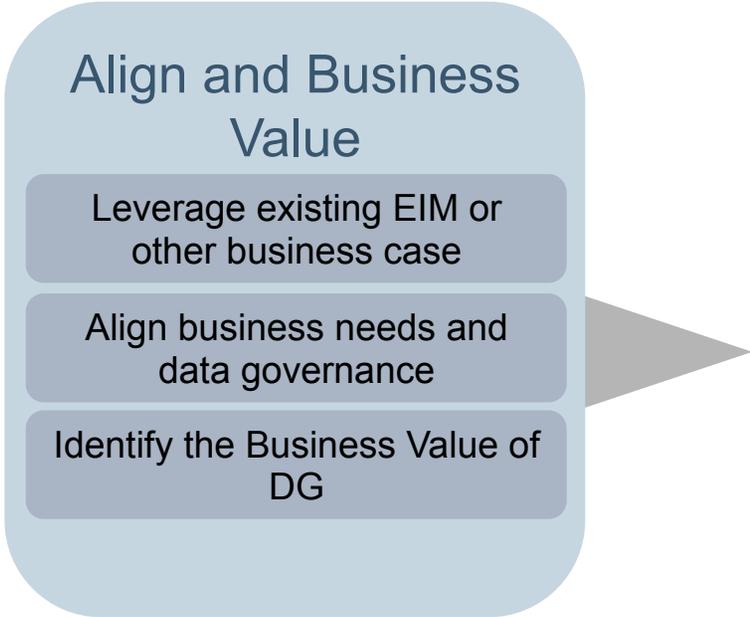
Leverage existing EIM or other business case

Align business needs and data governance

Identify the Business Value of DG



Objective	Start to tie DG into meeting business needs.
Purpose	Familiarize the dg team with business needs and deepen the position of DG as a business program.
Inputs	UDOT goals and objectives, business cases. And ROI documents.
Tasks	<ol style="list-style-type: none">1. Review business documents, earlier findings.2. Confirm future relevance of goals and objectives to DG.3. Confirm measure of goals and objectives.4. Clarify possible DG role in achieving business goals.5. Ensure each goal or objective is measurable.
Techniques	Interpreting UDOT business goals and objectives into metrics.
Tools	Excel, Word
Outputs	<ol style="list-style-type: none">1. Business goals and objectives, findings from earlier activity.2. Confirmed business goals relevant to DG3. Metrics for confirming business goals4. DG roles in achieving business goals5. Confirmed metrics



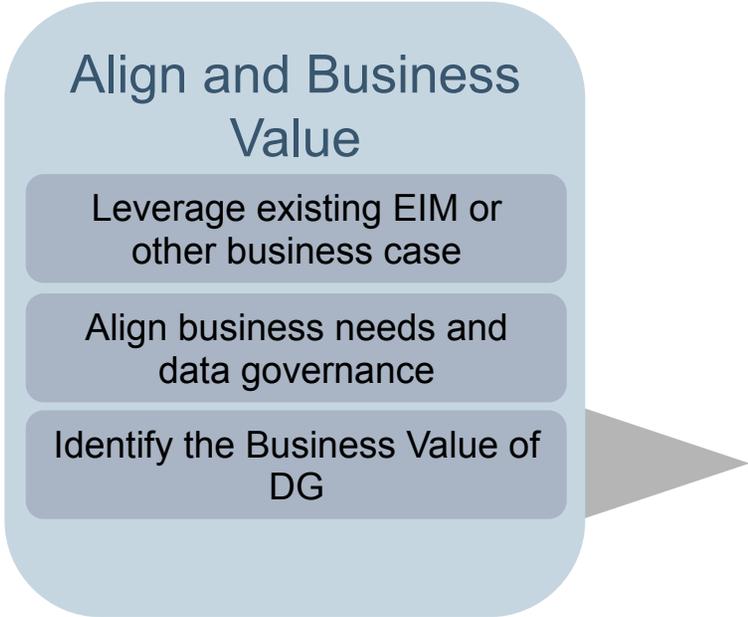
Objective	Derive UDOT's goals and objectives and look for DG opportunities to support business objectives.
Purpose	Develop sufficient business information to provide input for the DG team to determine some financial impacts of DG.
Inputs	UDOT business plans, external research, internal project ROI, budget, and management by objective (MBO) type documents.
Tasks	<ol style="list-style-type: none">1. Gather/verify collective business goals and objectives.2. Develop a list of known business challenges, problems and potential opportunities.3. Turn challenges and opportunities into business directions.4. Ensure each goal or objective is measurable.5. Convert goals and strategies into data requirements.<ol style="list-style-type: none">1. Gather metrics and indicators from other BIRs.2. Identify standard Transportation Industry metrics.3. Map DG opportunities to BIRs and metrics to verify model relevance



Tasks	<ol style="list-style-type: none">6. Connect BIRs to data issues.7. Build data usage/value worksheets, if required (these show specific business activities that will use information to accomplish business goals, so it is a collection of use cases.)8. Determine the business context to present benefits of DG.9. Schedule facilitated sessions with business leaders or subject matter experts.10. Capture business benefit results in the session, or refine results after presenting them.11. Confirm the future relevance of goals and objectives to DG.12. Confirm measures of goals and objectives.13. Clarify possible DG role in achieving business goals.
Techniques	Business alignment, strategy mapping, use cases.
Tools	Enterprise Architecture Tools, Excel, Planning Tools



Outputs	
	<ol style="list-style-type: none">1. UDOT goals and objectives2. Categorized business goals into opportunities, challenges, problems3. Business opportunities4. Confirmed objectives and business metrics5. Enterprise data requirements6. Consolidated metrics and BIR list7. Standard Transportation industry metrics8. BIR/metrics to data model cross reference9. Metrics/BIRs to data quality issues cross reference10. Enterprise DG touch points11. Usage value/info lever worksheets or information usage cases12. Enterprise value context13. Business discovery session schedule14. Discovery session results15. Confirmed business goals relevant to DG16. Metrics for confirming business goals17. DG roles in achieving business goals



Objective	Assign financial value to DG program
Purpose	Create baseline for determining DG success and set goals for DG to achieve.
Inputs	Business goals, objectives, levers, initial BIRs
Tasks	<ol style="list-style-type: none">1. Connect data issues with business needs2. Identify potential cash flow from business goals3. Extract levers and other opportunities for using content to data.<ol style="list-style-type: none">1. Identify touch points where new managed content or data will touch or be leveraged by levers or other processes.2. Isolate the processes that created value or achieved the goals related to the originating action.3. Apply the various financial benefits and the costs to whatever benefit model is in use at UDOT.4. Create value statements of the interaction of data and business goals.5. Publish results to the DG team and/or steering committee.6. Align business data needs with DG benefits (show a connection)





Align and Business Value

Leverage existing EIM or other business case

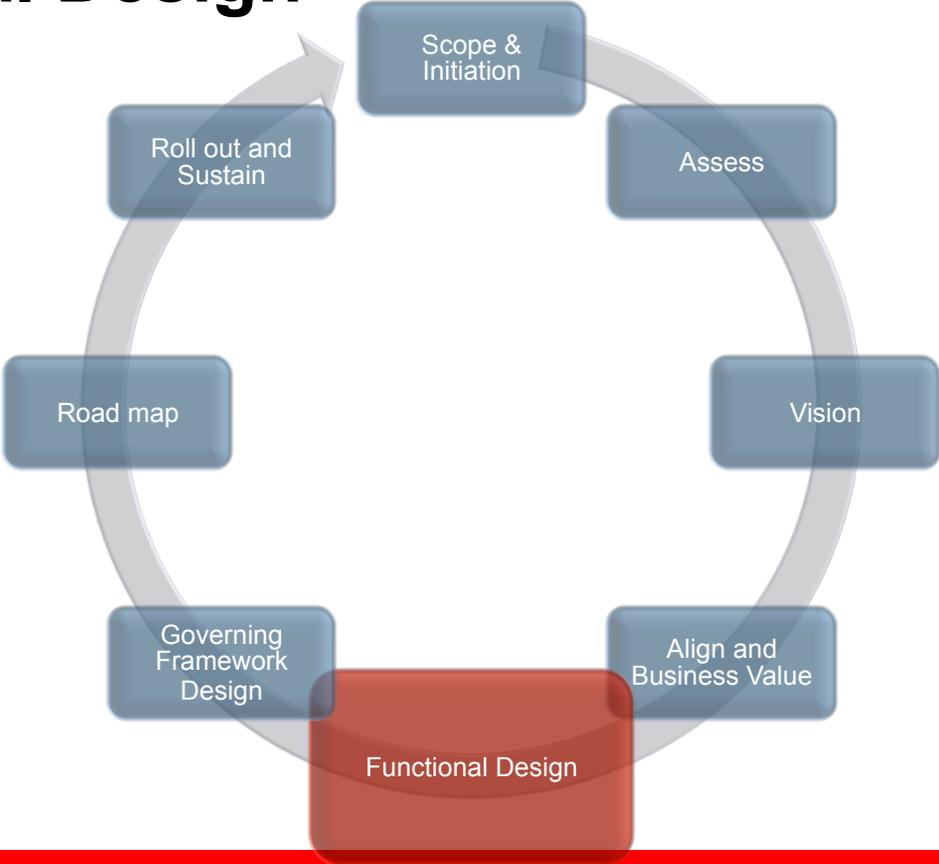
Align business needs and data governance

Identify the Business Value of DG

Techniques	Strategy mapping, business case development
Tool	Excel, strategic planning tools
Outputs	<ul style="list-style-type: none">• List of known data issues cross-referenced with related business needs• Business cash flow from affected business issues• Possible value points for new processes• Detailed actions in business processes achieving results through managed information• Financial benefit model for DG• DG value statement• DG value presentation• DG business value



Functional Design





Functional Design

“Our principles are the springs of our actions. Our actions, the springs of our happiness or misery. Too much care, therefore, cannot be taken in forming our principles.” – Red Skelton

Functional Design

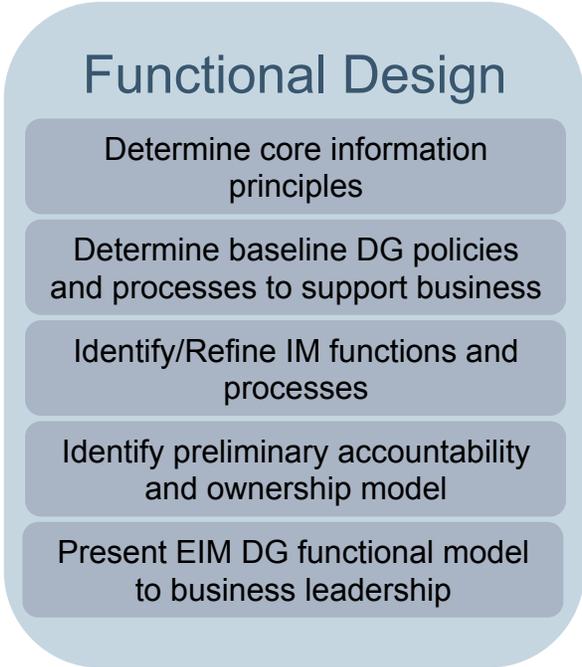
Determine core information principles

Determine baseline DG policies and processes to support business

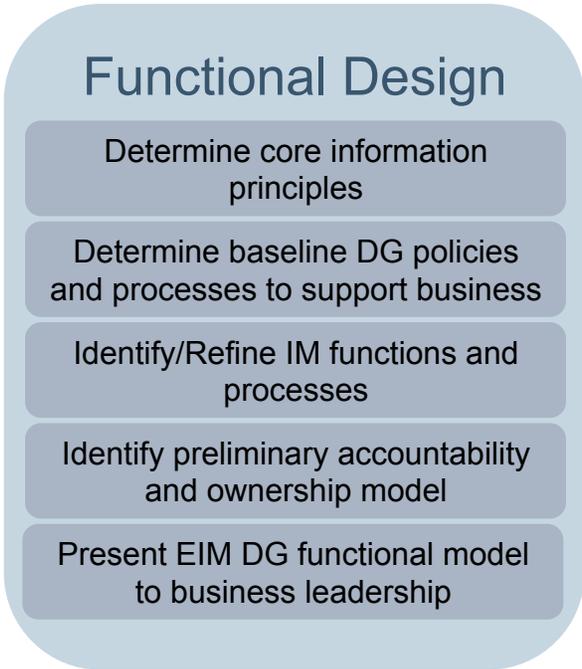
Identify/Refine IM functions and processes

Identify preliminary accountability and ownership model

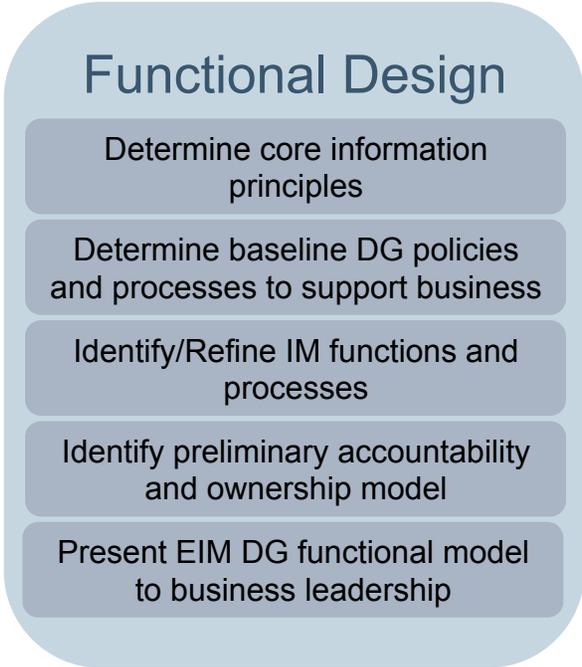
Present EIM DG functional model to business leadership



Objective	Determine core information principles.
Purpose	Establish statements of enterprise-level beliefs regarding data governance.
Inputs	GAIP external examples, current organization belief statements
Tasks	<ol style="list-style-type: none">1. Use seed principle.2. Apply GAIP.3. Align with existing enterprise principles and policies.4. Add rationale and implications for each principle.5. Submit and approve principles to DG steering body.
Techniques	<ol style="list-style-type: none">1. GAIP application
Tools	Microsoft Word
Outputs	<ol style="list-style-type: none">1. Initial list of information principles2. Verification of principles to GAIP3. Adjusted and rationalized principles to reflect other principles or policies4. Draft enterprise information principles5. Approved information principles

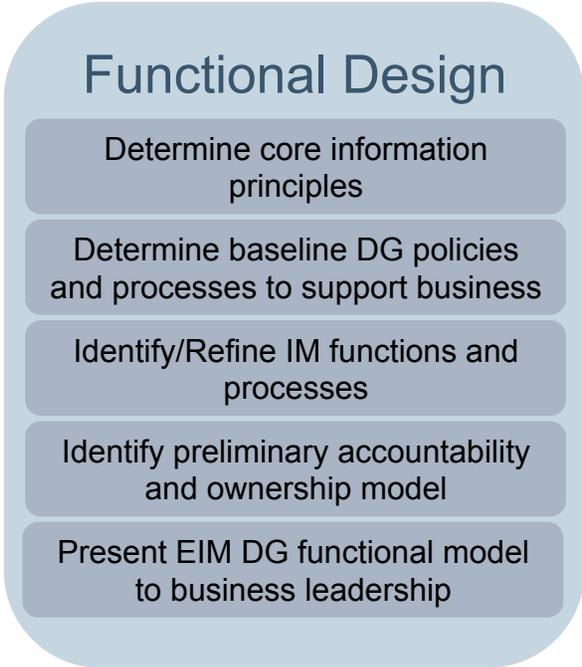


Objective	Define the required processes for information management and data governance.
Purpose	Develop the details to make the data governance program operational.
Inputs	Information principles, DG mission and vision, DG requirements
Tasks	<ol style="list-style-type: none">1. Draft initial policies from principles rationale.2. Identify DG processes.<ol style="list-style-type: none">1. Gather any existing information and governance policies.2. Identify processes to sustain key business measures or metrics models.3. Identify processes to support standards, controls, and policy.4. Identify processes to support master data and ERP projects.5. Define/support regulatory drivers.6. Identify requirements and processes for enterprise data model standards and procedures.7. Identify requirements and processes for reference and code polices/procedures.

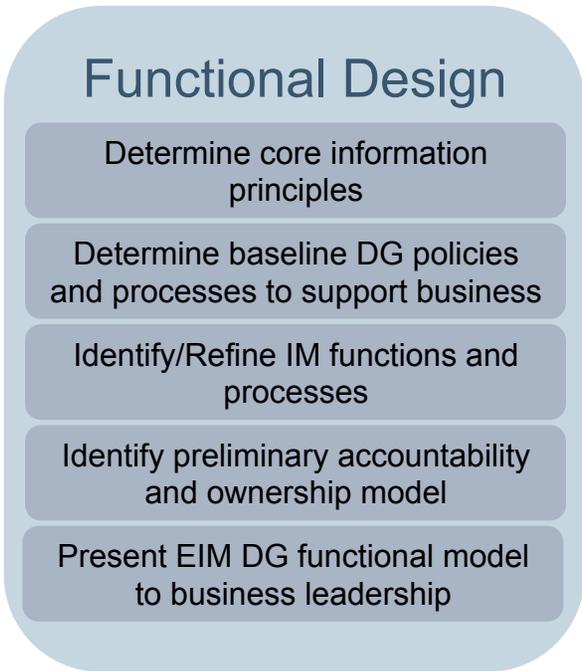


Task	
	<ul style="list-style-type: none">8. Identify any planning or management functions.9. Identify processes to administer policies and standards. <ul style="list-style-type: none">3. Ensure processes and polices are not in conflict.4. Optional: Work with finance and compliance to perform a pro forma "Information Risk Forecast."5. Identify gaps in the current state of data management.6. Specify adequate controls.7. Specify privacy and security concerns.8. Specify compliance and regulatory concerns.9. Specify key DG process flows.<ul style="list-style-type: none">1. Define issue resolution processes.2. Define process for DG policy and standards changes.3. Define DG project interactions.4. Develop new organization performance objectives.10. Identify other DG detail processes<ul style="list-style-type: none">1. Identify changes to SDLC processes.2. Design DG process details, deliverables, and documentation for SDLC integration touch points.3. Develop revised process/policy alignment plan.

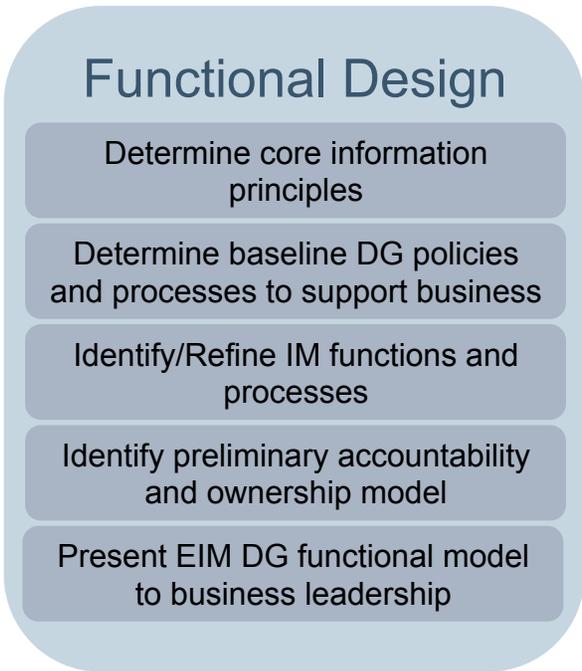




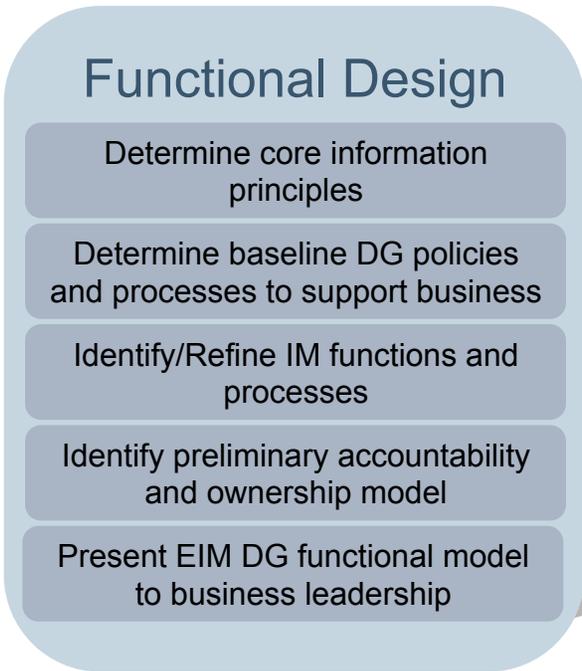
Techniques	Process modeling, process design
Tools	Process modeling tools
Outputs	<ol style="list-style-type: none">1. Draft DG policies2. Metrics and business information requirements and management processes3. Standards and controls management processes4. MDM and ERP DG processes5. Regulatory DG processes6. Data standards DG processes<ol style="list-style-type: none">1. DG planning and management processes2. DG administration processes3. Policy/process cross reference4. Reference and code DG processes7. Information risk forecast8. Processes to close current DG deficiencies9. Data controls10. Privacy/security controls11. Compliance and regulatory DG processes12. Policy and standards maintenance flow13. DG issue resolution flow14. Policy and standards maintenance flow15. DG performance objectives for business area16. SDLC change requirements17. SDLC changes18. Revised polices affected by governance



Objective	Define the functionality that the information management area will need to perform
Purpose	Provide visibility to the difference between IM and DG processes.
Inputs	DG functions
Tasks	<ol style="list-style-type: none">1. Identify IM processes2. Separate IM functionality from DG
Techniques	Process modeling, process design
Tools	Process modeling tools
Outputs	<ol style="list-style-type: none">1. Revised IM processes (not DG)2. Separate lists of IM and DG functionality

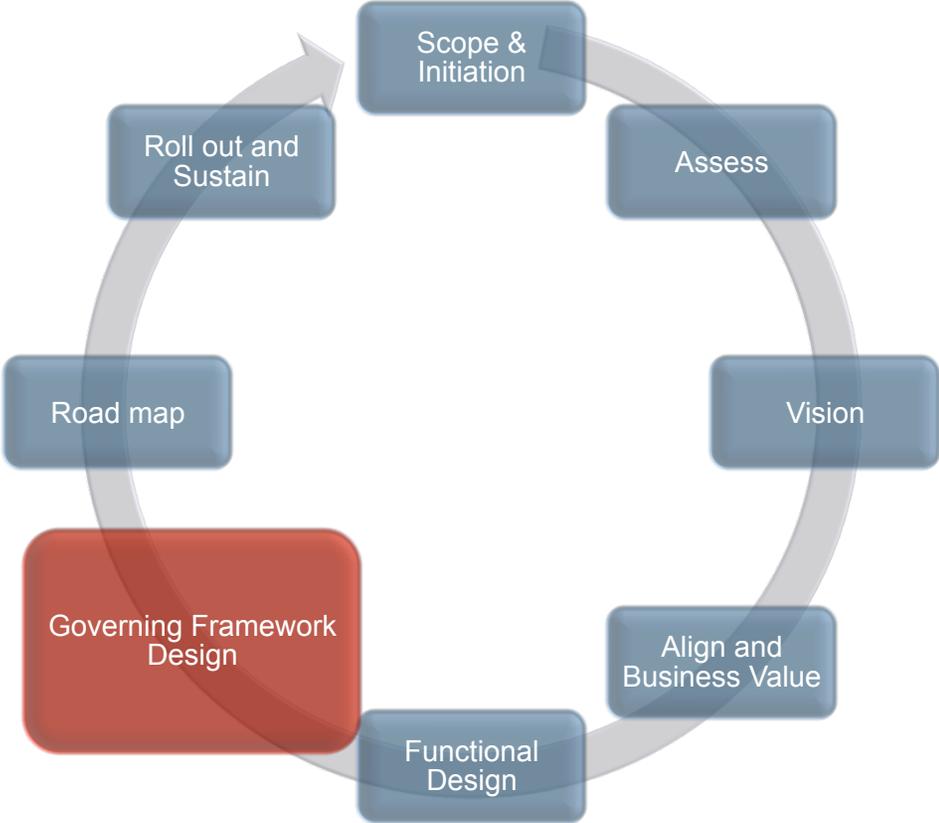


Objective	Develop the initial view of who will perform the various roles in the organization after DG is deployed.
Purpose	Provide leadership with a preliminary view of new roles and accountabilities.
Inputs	The IM and IG functions and processes
Tasks	<ol style="list-style-type: none">1. Examine processes requiring DG accountability.2. Identify business area touch points with DG functions.3. Define preliminary operating DG layers.
Techniques	Facilitation, organization design
Tools	Excel, Word, or similar
Outputs	<ol style="list-style-type: none">1. Processes with accountability list2. Touch points between DG and rest of UDOT3. Preliminary view of DG operating layers



Objective	Gain approval of the functional approach to data governance.
Purpose	Ensure that there is support and understanding of the DG program before assignment are made.
Inputs	The functional models for IM and DG
Tasks	<ol style="list-style-type: none">1. Prepare a DG functional presentation2. Gain acceptance of data governance processes in principle
Techniques	Facilitation
Tools	PowerPoint or similar
Outputs	<ol style="list-style-type: none">1. DG functional presentation2. Approved function list

Governing Framework Design

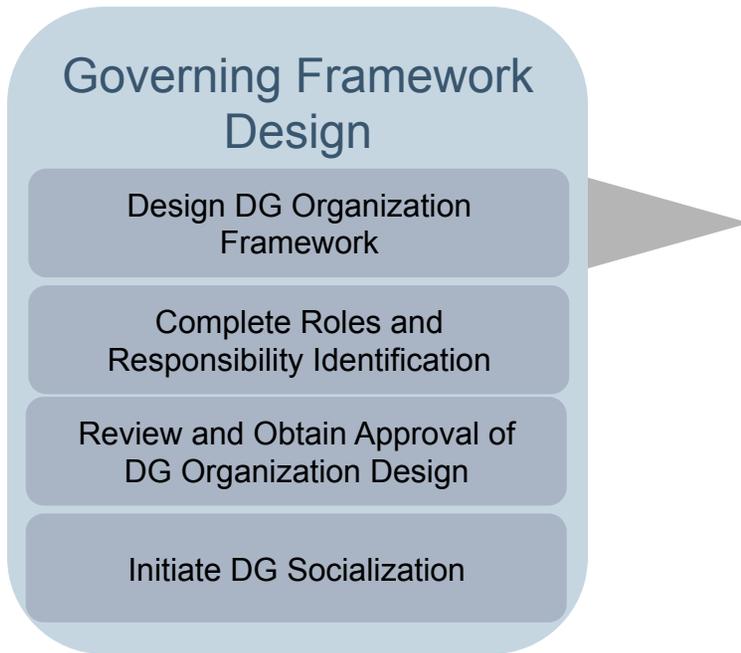




Governing Framework Design

“The ability to convert ideas to things is the secret to outward success.” – Henry Ward Beecher





Objective	Develop the operating structure for data governance.
Purpose	Apply a reasoned process to show UDOT the most desirable framework for DG.
Inputs	Functional model for DG
Tasks	<ol style="list-style-type: none">1. Develop DG RACI from functional design2. Determine levels of federation3. Identify layers of oversight based on RACI4. Determine organization model5. Propose federated DG structure6. Determine potential staffing7. Identify leadership at all levels8. Develop charters for main levels of DG organization.
Techniques	RACI analysis
Tools	Excel



Outputs	
	<ol style="list-style-type: none">1. DG RACI2. DG federation layers3. Organization layers for DG4. DG organization chart5. DG federation model6. DG organization staffing7. DG leadership8. DG charters



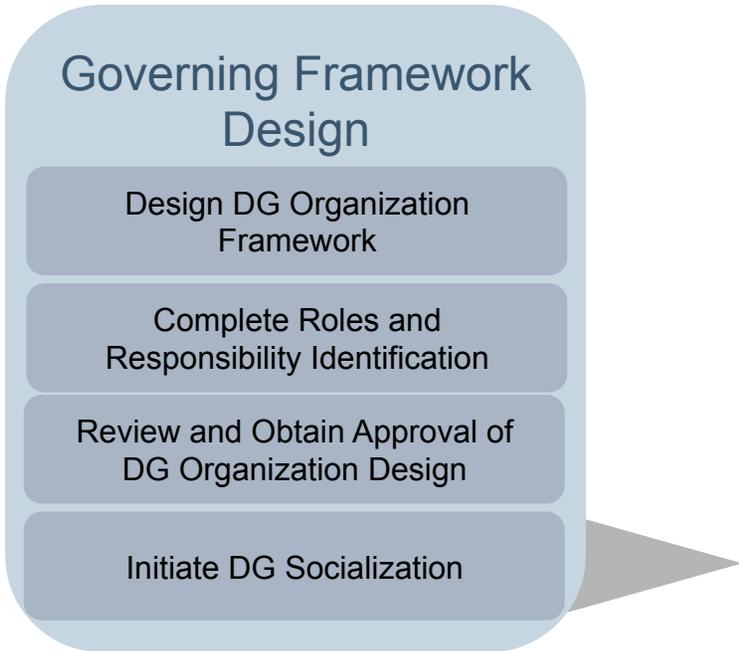
Objective	Develop an approved list of accountable and responsible DG participants
Purpose	Identify the core participants in the IAM process
Inputs	The DG framework and initial list of participants
Tasks	<ol style="list-style-type: none">1. Define data stewards' roles and responsibilities.2. Develop data steward/accountability identification approach.3. Coordinate with HR and identified data steward(s) to revise data steward(s) performance goals and objectives.4. Identify data governance oversight body(s)<ol style="list-style-type: none">1. Identify council, forum, and committee members.2. Identify specific contact points and protocol.
Techniques	Organizational development, political skills
Tools	Word, Excel



Outputs	<ol style="list-style-type: none">1. Stewards/owner roles and responsibilities2. Accountability definition for DG3. Revised performance objectives for stewards4. Data governance oversight framework
----------------	--



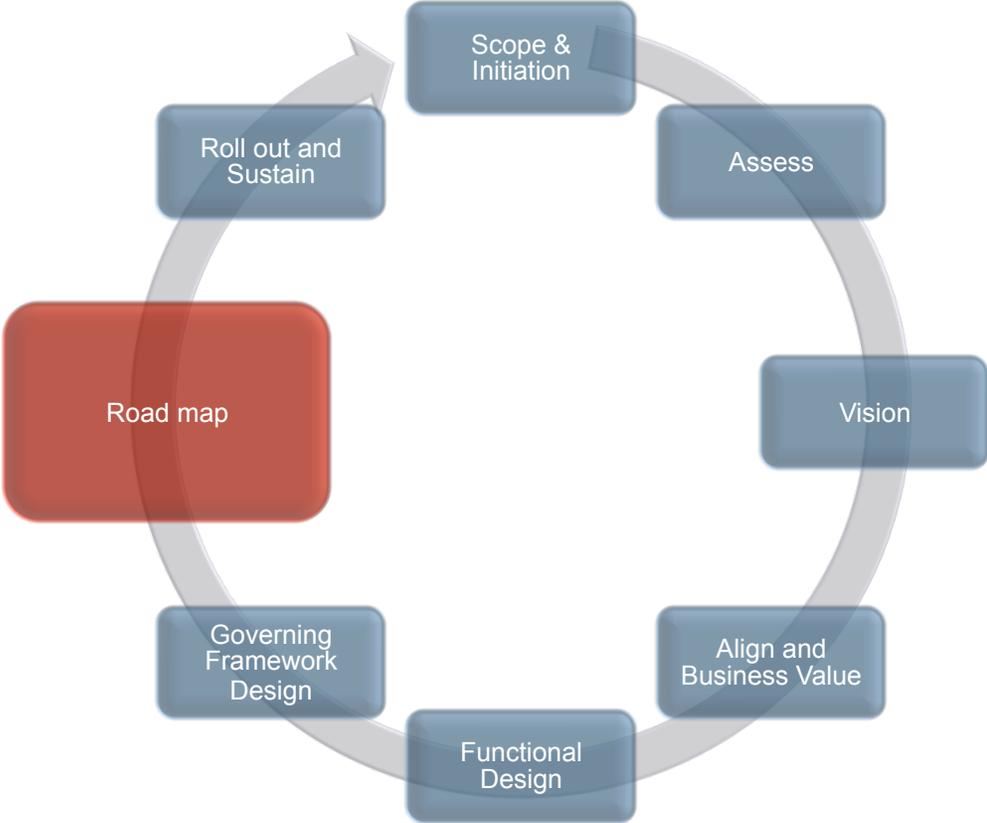
Objective	Obtain approval of the DG framework and initial topics.
Purpose	Gain understanding and acceptance of how DG will actually work
Inputs	Lists of candidates and DG framework
Tasks	<ol style="list-style-type: none">1. Review and obtain approval of data stewards2. Develop data steward identification template3. Identify data steward identification subject areas and prioritize them4. Identify stewards and owners5. Obtain approval of stewards and owners
Techniques	Facilitation, politics
Tools	PowerPoint
Outputs	<ol style="list-style-type: none">1. Approval to acquire stewards2. Steward template3. Steward content oversight areas4. List of stewards and owners5. Approval of stewards and owners



Objective	Raise awareness of the new DG framework and operating model.
Purpose	Establish expectations and initial orientation with the new DG at UDOT
Inputs	The DG framework and appointees
Tasks	<ol style="list-style-type: none">1. Conduct data steward orientation2. Review IM/DG principles with councils and stewards.
Techniques	Facilitation
Tools	PowerPoint
Outputs	<ol style="list-style-type: none">1. Completed orientation2. Principle review session



Road Map

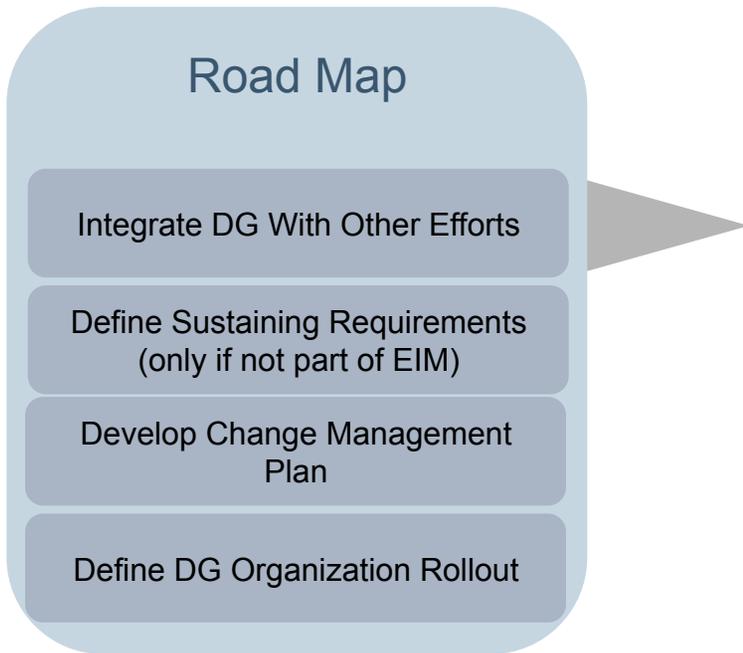




Road Map

“Revolutions always come around again. That’s why they’re called revolutions.” – Terry Pratchett

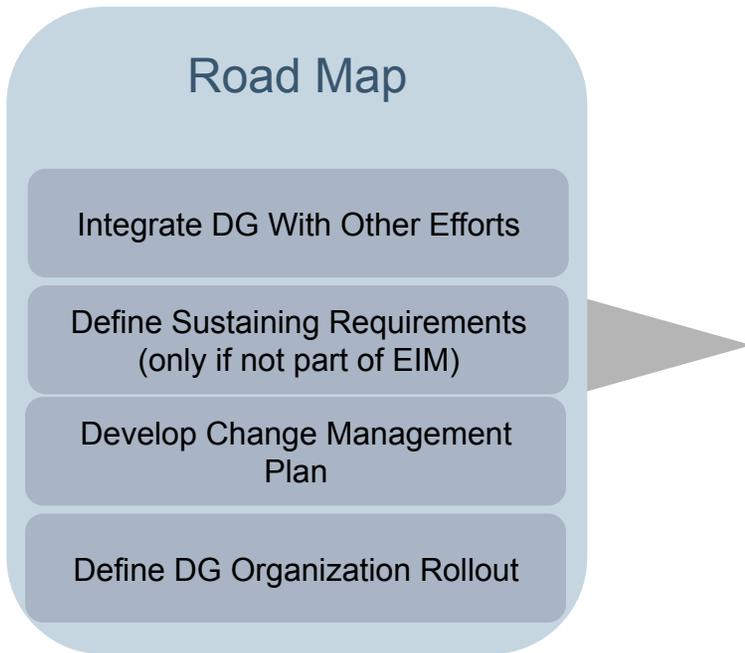




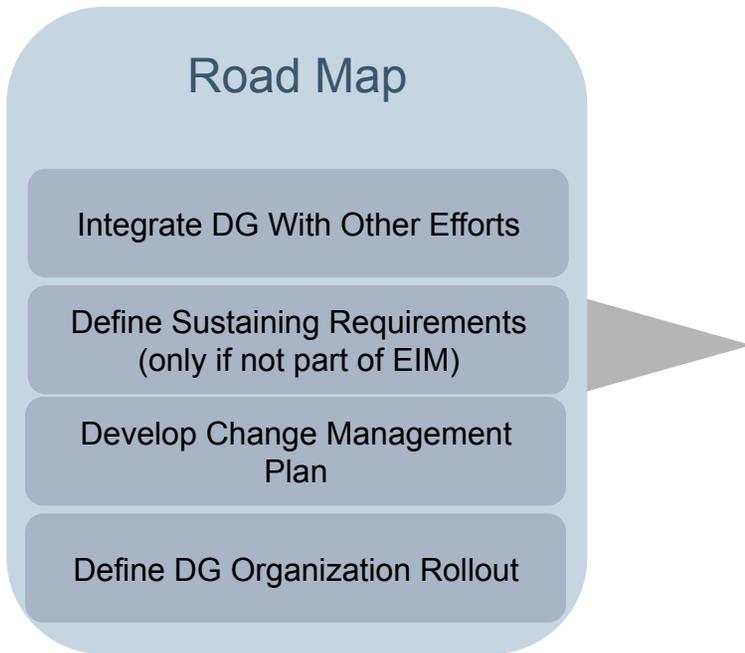
Objective	Identify initial projects or programs to be governed.
Purpose	Ensure the project or programs are visibly governed and show the value of DG.
Inputs	DG function, RACI, projects planned or in process
Tasks	<ol style="list-style-type: none">1. Identify projects and stakeholders subject to standards and governance.2. Refine governance bodies and committees (if part of EIM).3. Refine DG charters (if part of EIM)4. Confirm stewardship and ownership model, if necessary5. Define the rollout of DG to support the EIM road map or other identified projects.
Techniques	Project planning
Tools	Project management tools at UDOT



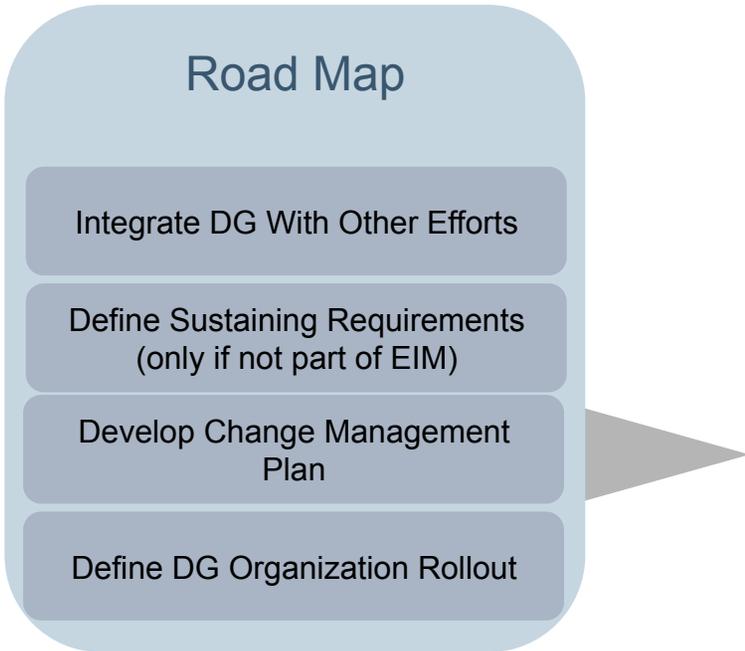
Outputs	
	<ol style="list-style-type: none">1. List of projects and stakeholders subject to DG2. Enhanced EIM oversight3. Adjusted EIM/DG charters4. Reviewed DG rollout with stewards and owners.5. EIM/DG rollout road map6. DG rollout schedule



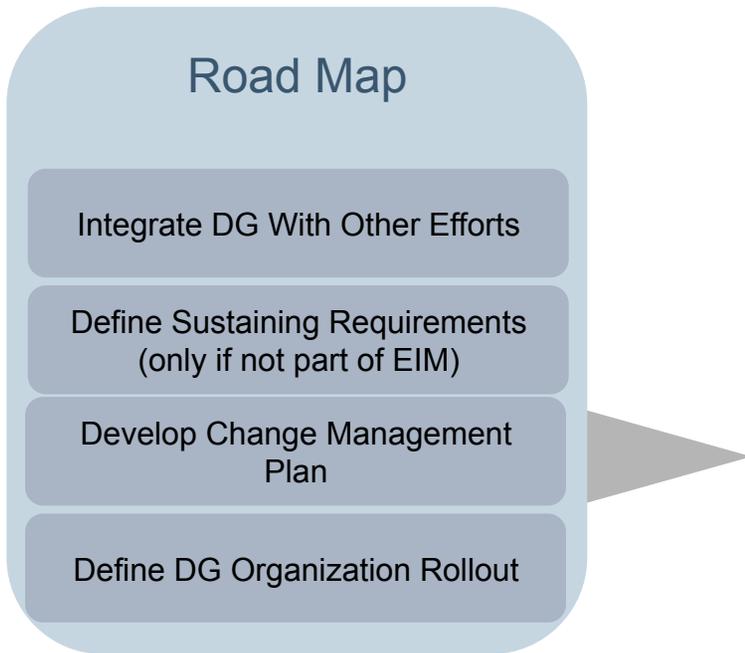
Objective	Identify the elements that must be addressed in the OCM plan if data governance is to be sustainable at UDOT for the long term.
Purpose	Ensure all aspects of sustaining DG have been considered and will be addressed as part of and OCM plan.
Inputs	Change capacity assessment, stakeholder analysis, IMM assessment
Tasks	<ol style="list-style-type: none">1. Review/perform stakeholder analysis2. Review other IM assessments3. Execute change capacity assessment4. Identify change management resources required5. Cross reference touch points, change capacity, and stakeholder analysis.6. Incorporate IMM results into the change capacity analysis.7. Perform stakeholder analysis8. Conduct an initial leadership alignment assessment.9. Define nature, scope and size of change.10. Identify metrics and reporting requirements for sustaining DG.



Tasks	<ol style="list-style-type: none">1. Identify executive DG sponsor2. Develop plan to engage sponsros3. Define training requirimetnes4. Define communications requiriemetns5. Prepare statemetn of change readiness6. Complete reuquirements to sustain DG
Techniques	Assessment via interviews for leadership alignment assessment via survey, if required OCM assistance form HR
Tools	Change capacity assessment survey Stakeholder analysis guide
Outputs	<ol style="list-style-type: none">1. DG sustaining requirements<ol style="list-style-type: none">1. Stakeholder analysis2. Leadership assessment3. Metrics and reporting requirements2. Ongoing DG program sponsor (not deployment sponsor)3. Approved OCM strategy



Objective	Identify the tasks and timelines required to implement and sustain a data governance process/function for UDOT.
Purpose	Ensure there is a structure process, measures, and monitoring for integrating data governance into the culture of UDOT.
Inputs	Sustaining requirements, stakeholder analysis, the DG roadmap, change capacity assessment.
Tasks	<ol style="list-style-type: none">1. Define conditions for sustainability success.2. Define and design capture of sustaining metrics.3. Identify OCM team members.4. Identify specific types of resistance (overt, passive, etc.)<ol style="list-style-type: none">1. Develop responses to resistance2. Develop resistance-management plan3. Review and approve resistance-management plan5. Define and align staff performance goals and reward structures to new accountabilities.6. Develop the sustainability checklist for data governance.7. Develop the organizational alignment action plans.



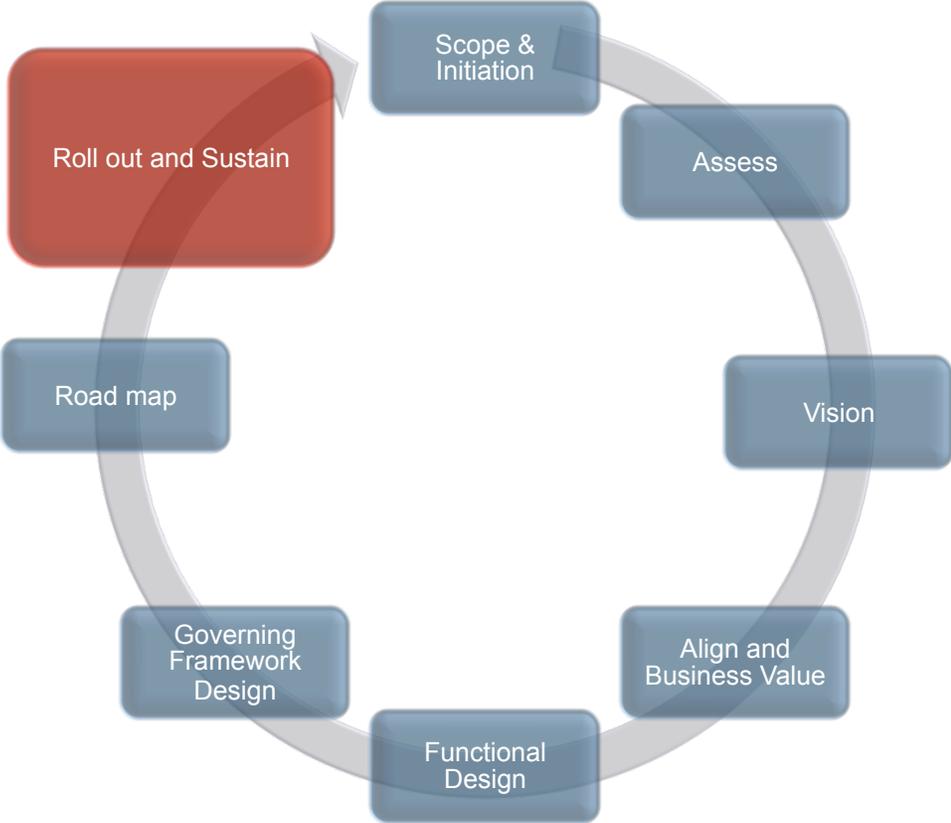
Tasks	<ul style="list-style-type: none">8. Identify and design change measures.9. Define feedback and monitoring approach10. Develop staff transition approach11. Develop communication and training plans<ul style="list-style-type: none">8. Develop DG Communication Plan9. Develop DG Training Plan
Techniques	Assessment via interviews for organizational alignment action plans
Tools	<ul style="list-style-type: none">OCM planning templateCommunication planning templateTraining Plan TemplateOrganizational alignment action-planning templateDG sustainability checklist template
Outputs	<ul style="list-style-type: none">1. Detailed OCM task plan and timeline2. OCM Team3. Communication plan4. Training Plan



Objective	Define an incremental process to deploy DG at UDOT.
Purpose	Ensure DG is absorbed into UDOT and is in digestible components.
Inputs	DG operating framework
Tasks	<ol style="list-style-type: none">1. Develop DG management requirements2. Revise DG charter/mission, if necessary3. Develop/refine DG organization positions4. Identify immediate governing tasks5. Define DG rollout schedule road map
Techniques	Project planning and coordination
Tools	Excel, Project Management, SharePoint
Outputs	<ol style="list-style-type: none">1. Day-to-day DG management2. Revised DG Charters3. Revised DG Organization4. DG Rollout Plan5. Road Map



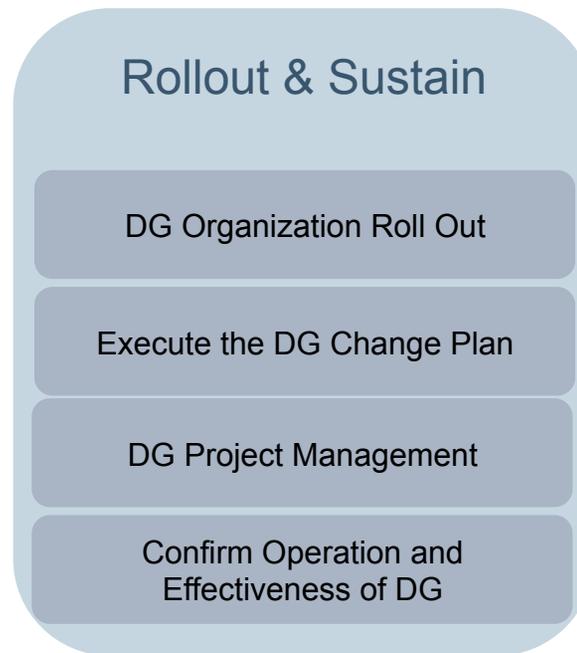
Rollout and Sustain

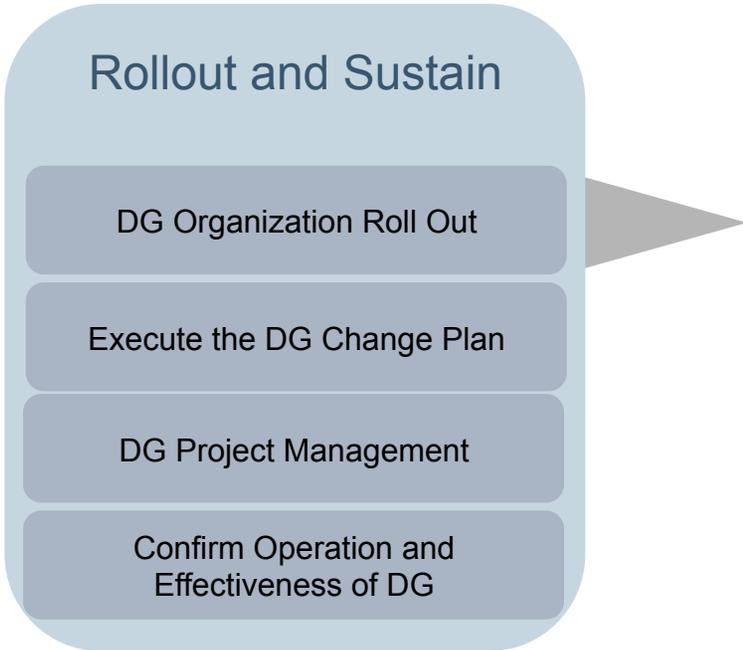




Rollout and Sustain

“Too many people were working on the mind without paying sufficient attention to the heart.” – Kotter and Cohen

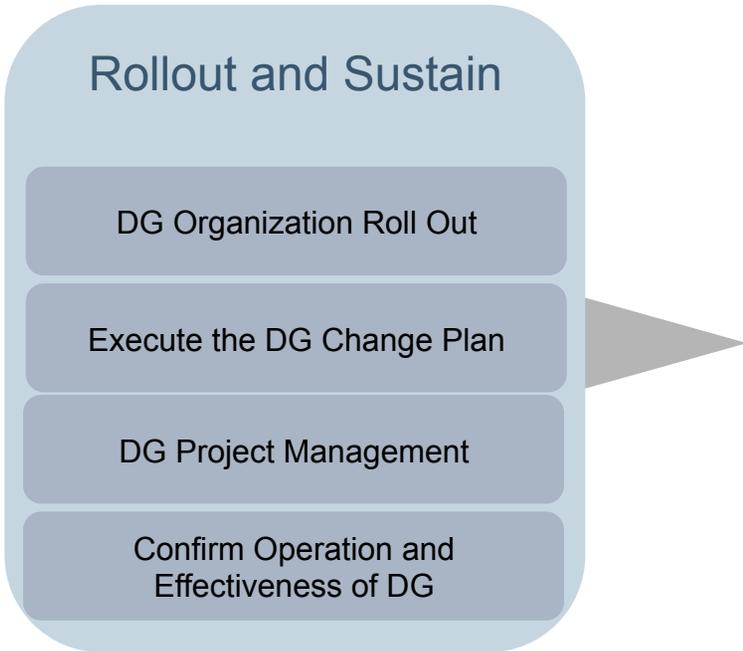




Objective	Operate the DG program in a sustainable manner.
Purpose	Move from DG design to DG operation
Inputs	All prior materials related to DG
Tasks	<ol style="list-style-type: none">1. Complete new DG team identification/ socialization2. Socialize DG program and area to IT and compliance3. Present sustaining activities and stakeholder analysis to DG staff4. Orient executive team to DG organization5. Schedule DG team, committees, and executives for orientation, training etc.6. Align DG team functions with road-map projects7. Ensure estimates are understood and project management practices are in place8. Roll out Initial DG function9. Implement DG program metrics10. Implement tools and technology11. Implement DG operations



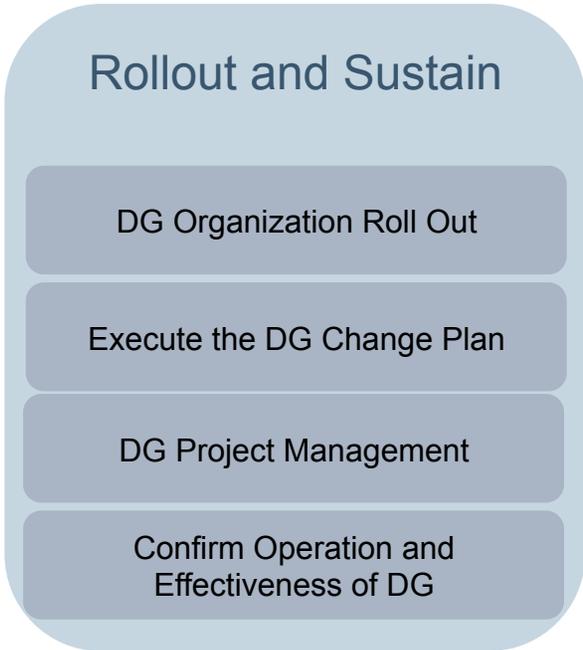
Outputs	
	<ol style="list-style-type: none">1. Verified DG team socialized2. Understanding of the DG team role to constituents3. An operational and effective DG organization.4. DG charter5. Oriented staff6. Oriented executive team <p>List continued in Figure 13-3 page 157 in Landley book.</p>



Objective	To successfully accomplish the tasks previously defined in the change management plan.
Purpose	Ensure UDOT understands and is prepared to accept the changes required for successful data governance.
Inputs	Change management plans
Tasks	<ol style="list-style-type: none">1. Communication plan2. Training development and delivery3. Staff transition to new roles4. Feedback collection and analysis of results5. Perform final leadership alignment assessment6. Monitor and manage resistance7. Manage implementation of DG sustainability checklist8. Develop additional advocates9. Execute organizational alignment action plans10. Measure adoption11. Implement new accountabilities and performance goals



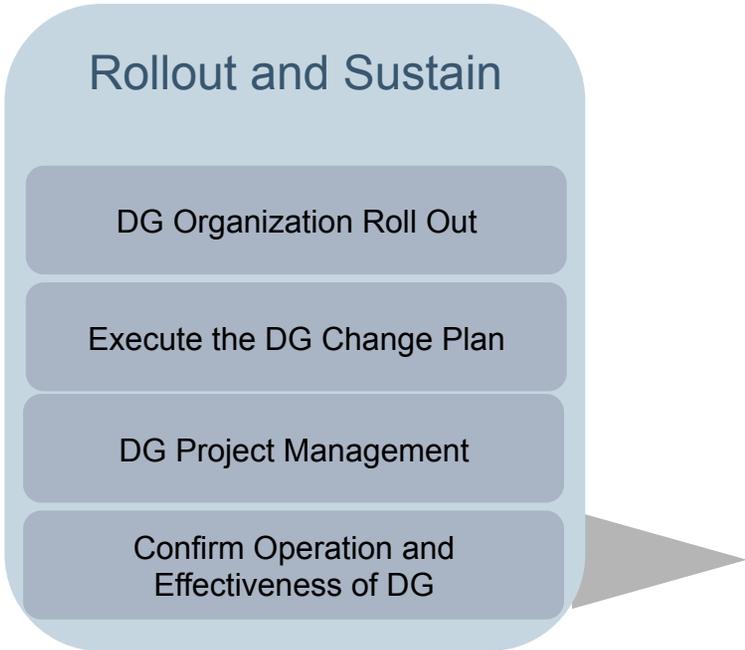
Techniques	Interviews, Surveys, training and delivery and various communication media
Tools	Leadership alignment assessment template, feedback collection surveys
Outputs	Data Governance program successfully adopted.



Objective	Start to govern selected projects or programs.
Purpose	Begin UDOT's movement to information asset management.
Inputs	Projects and programs identified for DG, all prior deliverables as needed.
Tasks	<ol style="list-style-type: none">1. Orient major project steering bodies.2. Align DG project management activities with existing IT practices.3. Identify project templates.4. Identify DG project estimating tools.5. Identify DG tacking and accounting procedures for IT.6. Forecast DG project resources.7. Utilize modified SDLC.8. Interact with enterprise PMO.



Outputs	
	<ol style="list-style-type: none">1. Awareness of ongoing operation of DG2. DG/IT practice aligned3. DG project templates4. DG estimating5. DG tracking6. DG resources7. DG enhanced work products8. PMO DG interaction



Objective	Confirm DG is working.
Purpose	Identify any course corrections, if needed.
Tasks	<ol style="list-style-type: none">1. Evaluate UDOT structure.2. Confirm effectiveness of jobs/people3. Confirm effectiveness of DG framework and processes.4. Verify policies/procedures.5. Review incentives.6. Confirm effectiveness of DG.
Outputs	<ol style="list-style-type: none">1. Verified DG organization2. Verified role transitions3. Verified operating framework4. Verified policies5. Verified incentives6. Revised incentives for DG7. Effectiveness reports



Outputs	
	<ol style="list-style-type: none">1. Awareness of ongoing operation of DG2. DG/IT practice aligned3. DG project templates4. DG estimating5. DG tracking6. DG resources7. DG enhanced work products8. PMO DG interaction



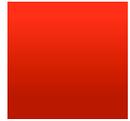
Agenda

- Definition & Concepts
- Overview of Data Governance Program
- Business Case
- Process Overview for Deploying Data Governance
- Artifacts & Tools



What should be tracked?

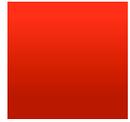
- Business Alignment
 - Strategy, Goal, Objective, Plan, Information Levers
- Business Process
 - Events, Meetings, Methodology, Function, Communication
- Policy
 - Principles, Policies, Standards, Controls etc.
- Organization
 - RACI, Team, Steward, Custodian etc.
- Data
- Technology
- Artifacts



Tools?

There are many!

- There is no one tool that can manage data governance
- Utilize the standard organization collaboration environment to manage the DG program
 - E.g.: Oracle WebCenter Portal & Sites (There are others ;))



Questions?





Links

- <http://imcue.com/>
- http://www.amazon.com/Data-Governance-Effective-Kaufmann-Intelligence/dp/0124158293/ref=sr_1_1?ie=UTF8&qid=1412175991&sr=8-1&keywords=john+ladley
- <http://www.datagovernance.com/>
- <http://www.dama.org/i4a/pages/Index.cfm?pageid=3364>

Hardware and Software

ORACLE®

Engineered to Work Together

ORACLE®

TMIP Updates

For future webinar announcement, please sign up for GovDelivery at <http://www.fhwa.dot.gov/planning/tmip/> if you have not done so.

TMIP Contacts

If you have any questions or comments about today's presentation or TMIP, or if you are interested in sharing your experience, please contact me at:

sarah.sun@dot.gov or
feedback@tmip.org.