CMMI Institute

Data Management Maturity Model Introduction

University of Ottawa

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Presenter

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Program Director,
DM Products & Services
CMMI Institute

- Development lead and primary author, Data Management Maturity (DMM)^{SM} Model
- Led creation of DMM Assessment method
- Leading development of DMM Training and Certification courses
- 30+ years data management / data architecture
- 7 years Enterprise Architecture (FEA)
- Program design and implementation
- EDM Expert (EDME).

Presentation Objectives

- Introduction to the Model
    - Model drivers, themes, concepts and structure
    - How an organization's program is evaluated
    - Complementarity with bodies of knowledge and standards
    - Use cases for the DMM.
- Introduction to the supporting infrastructure
    - Training
    - Certifications
    - DMM Partners / DMM Community.

Agenda

- Introduction to the DMM
  - What is it - why did we develop it
  - Why our industry needs it
  - What is its structure and approach
- DMM in Action
  - DMM Assessments
  - Use Cases
- How the DMM is Supported
  - Adoption / Case Studies
  - Training
  - Certifications
  - Partner Program
  - Industry Alliances

Data Management Maturity Model
History, Description, Structure
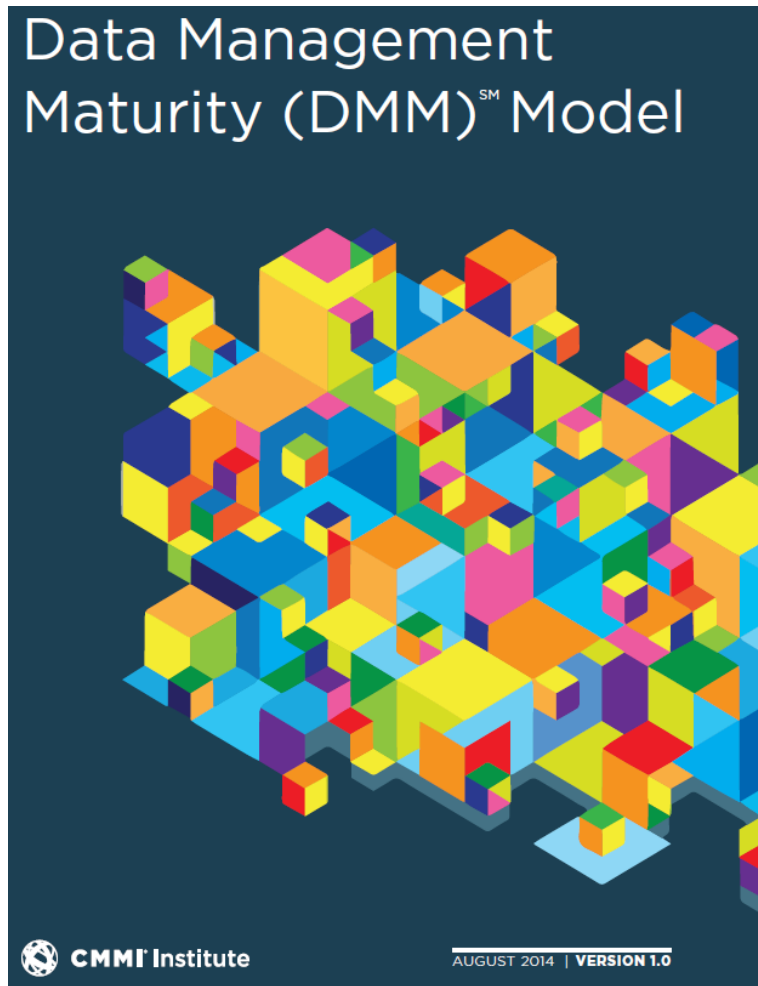
CMMI – Worldwide Process Improvement

CMMI Quick Stats:

- Over 10,000 organizations

- 94 Countries

- 12 National governments

- 10 languages

- 500 Partners

- 1500+ Appraisals in 2013

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Data Management Maturity (DMM)^{SM} Model

The DMM was released on August 7, 2014

- 3.5 years in development
- 4 sponsoring organizations
- 50+ contributing authors
- 70+ peer reviewers
- 80+ organizations involved
- 300+ practice statements
- 300+ work products

DMM - Guided Navigation to Lasting Solutions

- **Reference model framework** of fundamental data management capabilities

- **Measurement instrument** for organizations to evaluate capability maturity, identify gaps, and incorporate guidelines for improvements

- **Developed by CMMI Institute** with our corporate sponsors - Booz Allen Hamilton, Lockheed Martin, Microsoft Corporation, and Kingland Systems

- **Structured, crafted, and refined** to leverage the strengths and proven approach of CMMI, with the contribution of many subject matter experts

- **Pioneering Organizations** – DMM Assessments:

  - Microsoft; Fannie Mae; Federal Reserve System Statistics; Ontario Teachers' Pension Plan; Freddie Mac; Securities and Exchange Commission; Treasury Office of Financial Research

Who Wrote It and Why

- Author team and peer review team represent multiple industries - deep experience in designing and implementing data management programs and solutions
  - Industry skills include: EDW, MDM, DQ, BI, SOA, governance, big data, enterprise architecture, data architecture, business and data strategy, platform implementation, business process engineering, business rules, software engineering, appraisals and benchmarking, DMBoK, DRM, etc.
- Consortium approach – tested and proven approaches
  - Broad practical wisdom - What works
  - Extensive discussions, implementation testing, and rigorous reviews resulting in consensus
- We wrote it for ourselves and for You – all organizations
  - To quickly and accurately measure where we are
  - To accelerate the journey forward with a clear path and milestones

DMM Drivers

- An effective data management program requires a planned strategic effort
  - Integrate multi-discipline efforts
  - Inculcate a shared vision and understanding
  - Data is a 'thing' – vital infrastructure element foundation of the n-tier architecture
  - Not a project, more than a program – a lifestyle.

- Organizations needed a comprehensive reference model to evaluate data management capabilities and measure improvements – benchmark and guidance

- DMM targeted to unify understanding and priorities of lines of business, IT, and data management per se. Aimed at the biggest challenges:
  - Achieving an organization-wide perspective
  - Clearly communicating to the business
  - Aligning of business with IT/DM
  - Sustaining a multi-year effort.

DMM Themes

- **Architecture and technology neutral** – applicable to legacy, DW, SOA, unstructured data environments, mainframe-to-Hadoop, etc.

- **Industry independent** – usable by every organization with data assets, applicable to every industry

- **Emphasis on current state** – organization is assessed on the implemented data layer and existing DM processes

- **Foundation** for collaborative and sustained process improvement – for the life of the DM program [*aka, forever*].

If you manage data, the DMM is for you

Foundation for advanced solutions

You can accomplish Advanced Data Solutions without proficiency in Basic Data Management Practices, but solutions will:

- Take longer
- Cost more
- Non-extensible
- Deliver less
- Present greater risk

Advanced Data Solutions

- MDM
- Analytics
- Big Data
- IOT
- Warehousing
- SOA

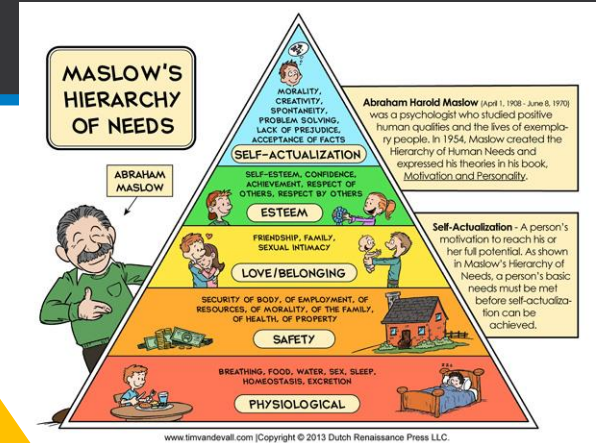**Fundamental Data Management Practices**

Data Management Strategy
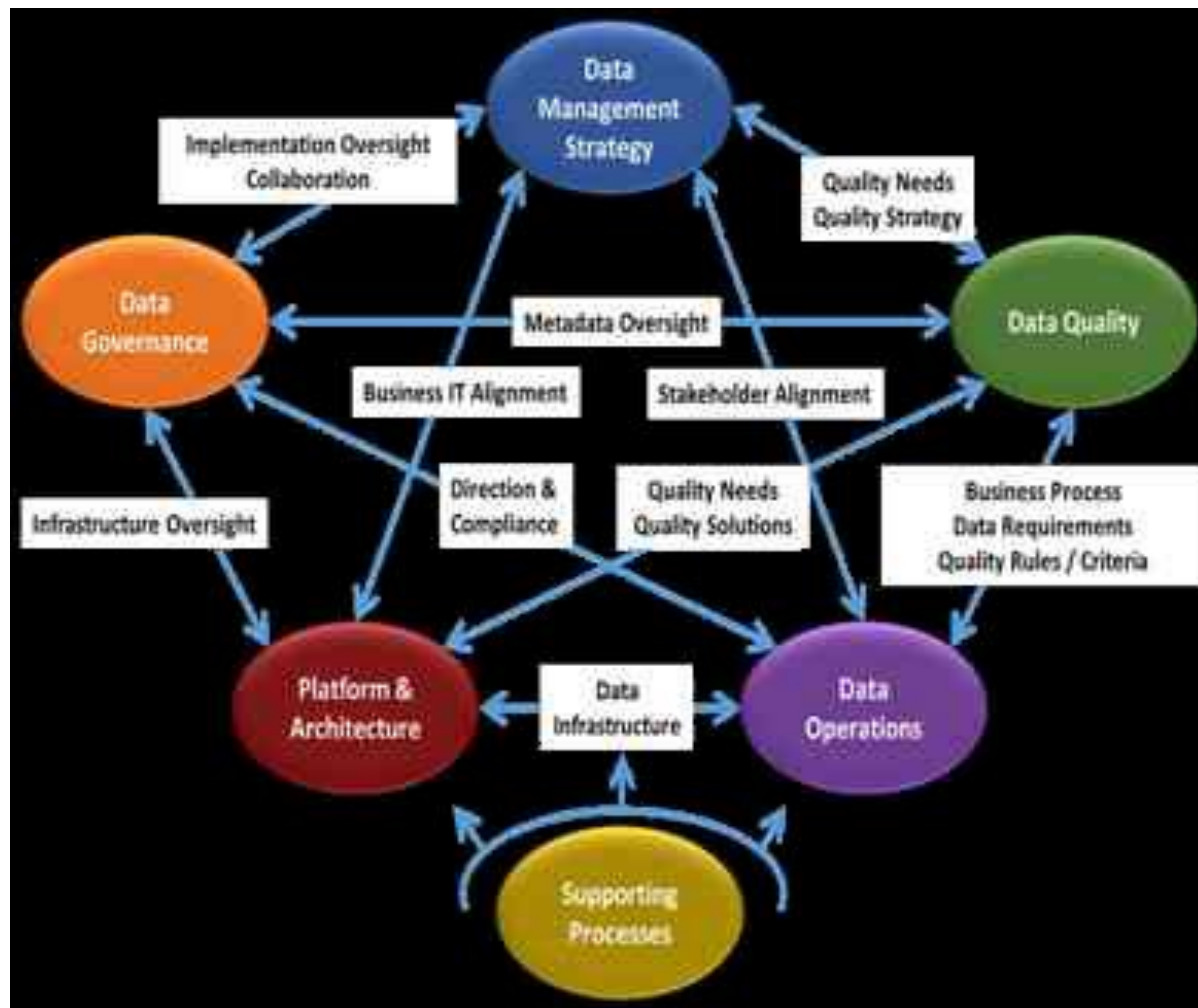
Data Governance

Data Integration

Metadata Management

Data Management Function

Data Quality Program

MASLOW'S HIERARCHY OF NEEDS

ABRAHAM MASLOW

MORALITY, CREATIVITY, SPONTANEITY, PROBLEM SOLVING, LACK OF PREJUDICE, ACCEPTANCE OF FACTS

SELF-ACTUALIZATION

SELF-ESTEEM, CONFIDENCE, ACHIEVEMENT, RESPECT OF OTHERS, RESPECT BY OTHERS

ESTEEM

FRIENDSHIP, FAMILY, SEXUAL INTIMACY

LOVE/BELONGING

SECURITY OF BODY, OF EMPLOYMENT, OF RESOURCES, OF MORALITY, OF THE FAMILY, OF HEALTH, OF PROPERTY

SAFETY

BREATHING, FOOD, WATER, SEX, SLEEP, HOMEOSTASIS, EXCRETION

PHYSIOLOGICAL

Abraham Harold Maslow (April 1, 1908 - June 8, 1970) was a psychologist who studied positive human qualities and the lives of exemplary people. In 1954, Maslow created the Hierarchy of Human Needs and expressed his theories in his book, *Motivation and Personality*.

Self-Actualization - A person's motivation to reach his or her full potential. As shown in Maslow's Hierarchy of Needs, a person's basic needs must be met before self-actualization can be achieved.

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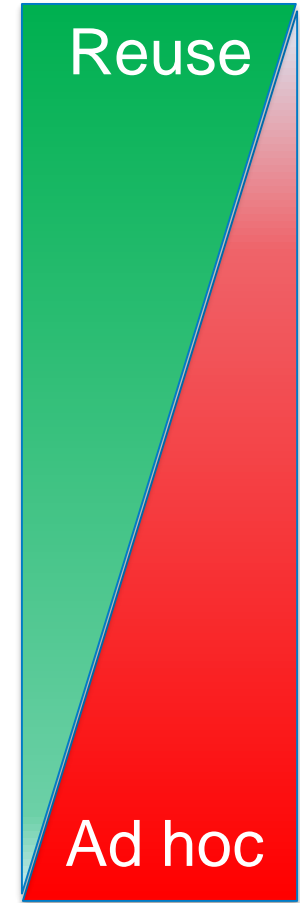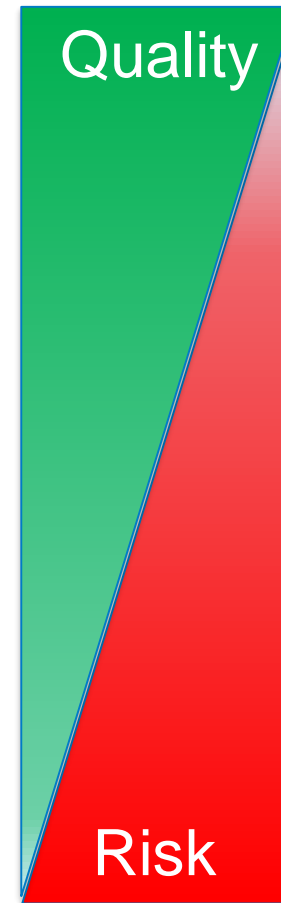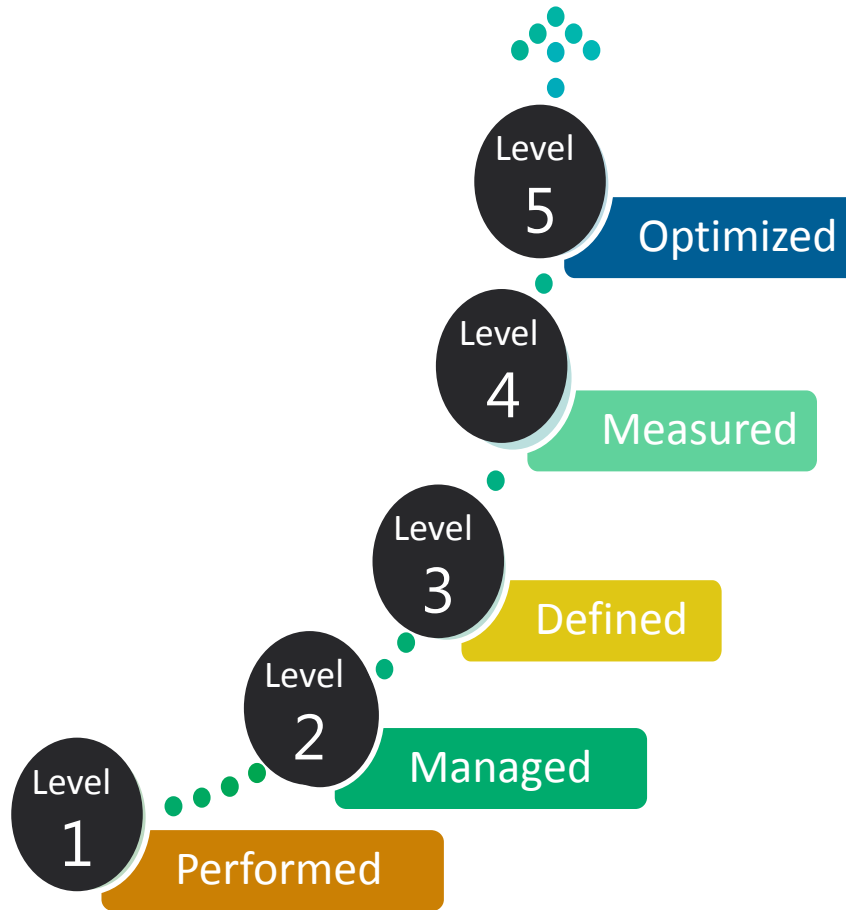
DMM at a Glance

You Are What You DO

- Model emphasizes <u>behavior</u>
  - Creating effective, repeatable processes
  - Leveraging and extending across the organization
- Activities result in <u>work products</u>
  - Processes, standards, guidelines, templates, policies, etc.
  - Reuse and extension = maximum value, lower costs, happier staff
- Process Areas were designed to stand alone for evaluation
  - Reflects real-world organizations
  - Simplifies the data management landscape for all parties
  - Flexible for multiple purposes
  - Because "everything is connected," relationships are indicated

DMM Capability Levels

Capability and Maturity Level Definitions

Level	Description	Perspective
1: Performed	Processes are performed ad hoc, primarily at the project level. There are no processes areas applied across business areas. Process discipline is primarily reactive; for example, for data quality, the emphasis is on data repair. Foundational improvements may exist, but improvements are not yet extended within the organization or maintained.	**Data is managed as a requirement for the implementation of projects**
2: Managed	Processes are planned and executed in accordance with policy; employ skilled people having adequate resources to produce controlled outputs; involve relevant stakeholders; are monitored, controlled, and reviewed; and are evaluated for adherence to its process description.	**There is awareness of the importance of managing data as a critical infrastructure asset.**
3: Defined	Sets of standard processes have been established and improved over time, providing a predictable measure of consistency. Processes to meet specific needs are tailored from the set of standard processes according to the organization's guidelines.	**Data is treated at the organizational level as critical for successful mission performance.**
4: Measured	Managed and measured process metrics have been established. There are formal processes for managing variances. Quality and process performance is understood in statistical terms and is managed across the life of the process.	**Data is treated as a source of competitive advantage.**
5: Optimized	Process performance is continually improved through both incremental and innovative improvements. Feedback is used to drive process enhancements and business growth. Best practices are shared with peers and industry.	**Data is seen as critical for survival in a dynamic and competitive market.**

DMM Benchmark to Date
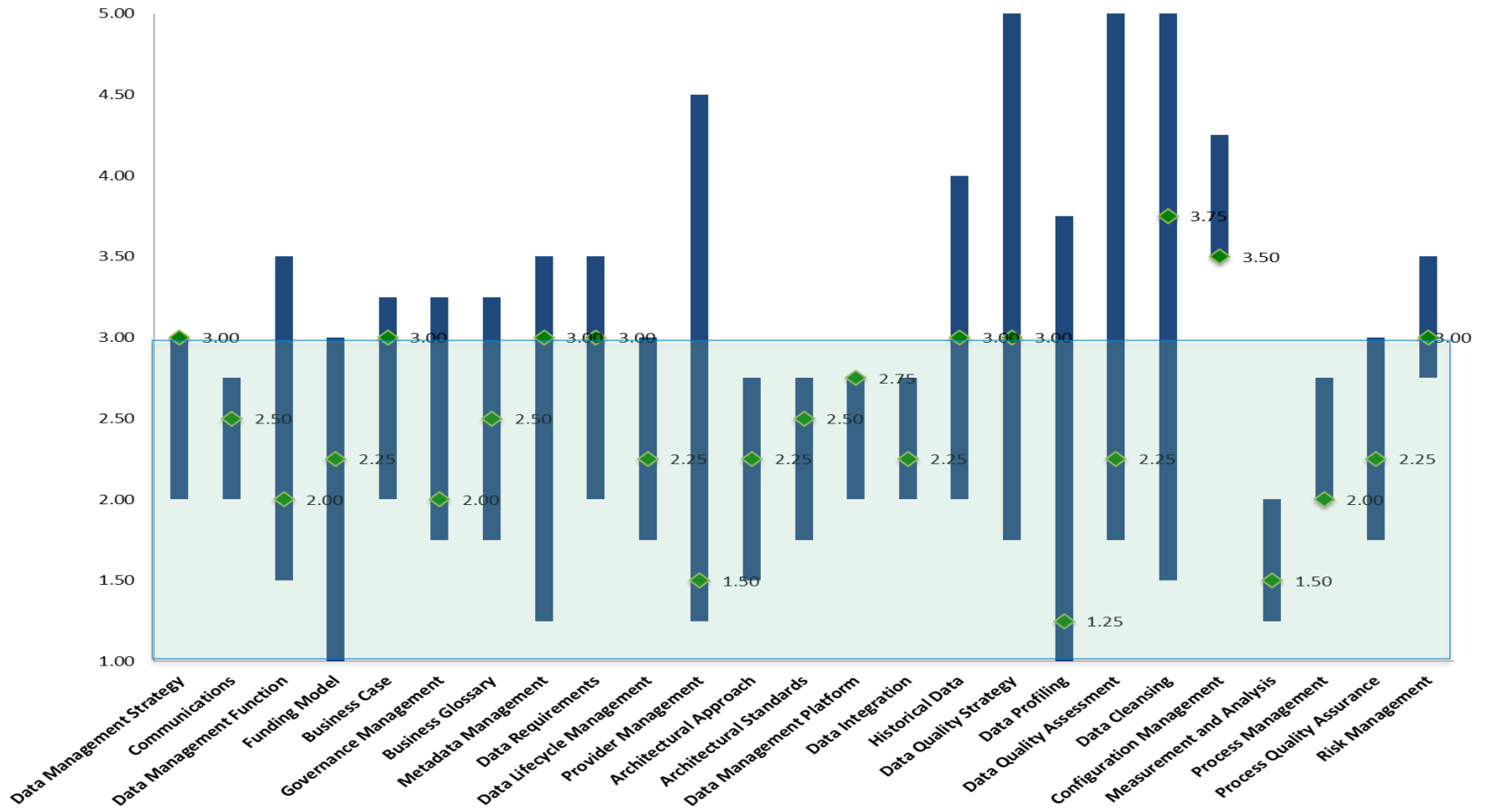
What the DMM is Not

- Not a compendium of all data management knowledge
- Does not address every topic and sub-topic – focus on business decisions
  - 35+ years of evolution
  - Foundational thinkers & Talented vendors
  - Wealth of collective experience
  - Fully mature industry practices.
- Not a cookbook
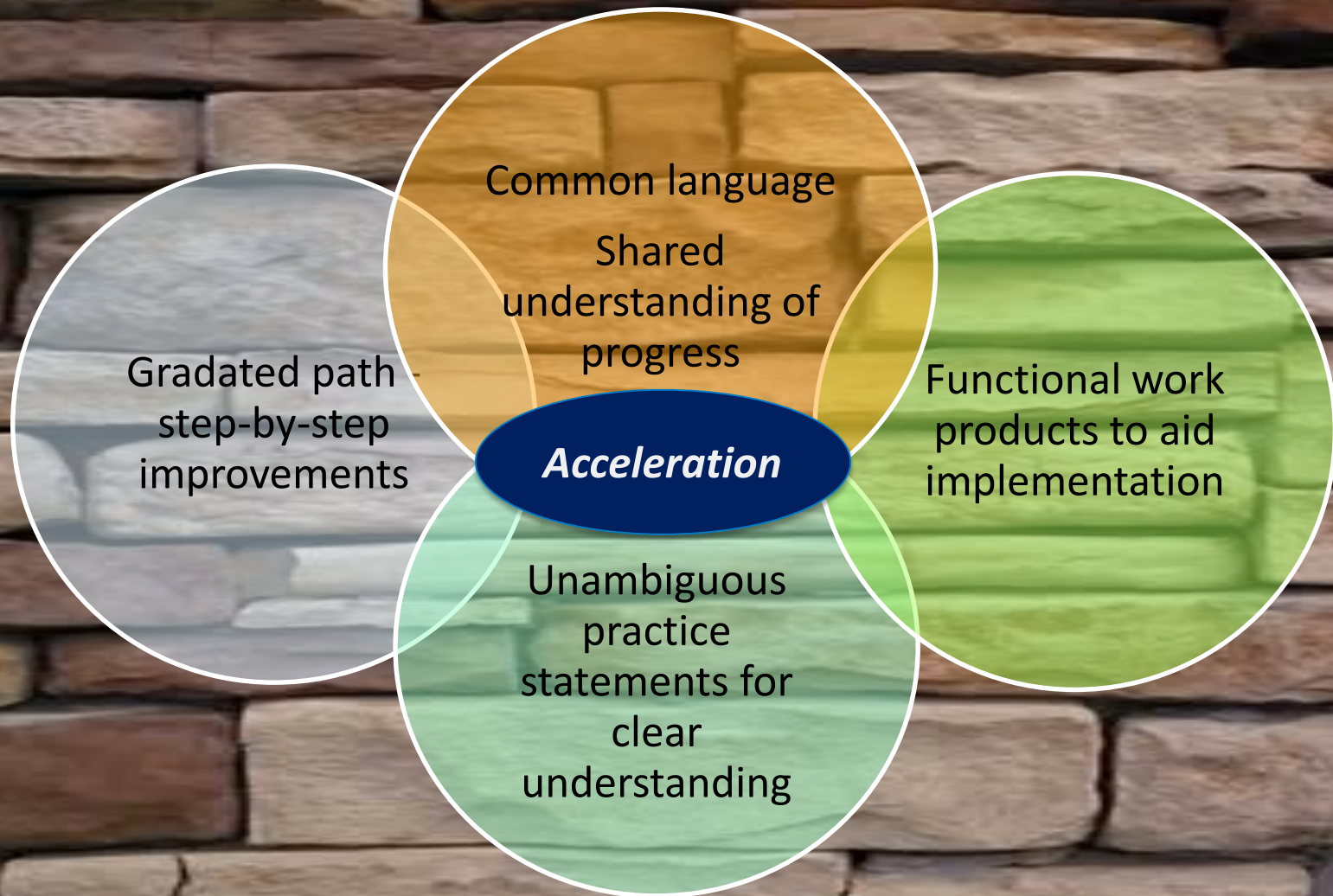- Too much specificity = 1000+ pages
- Doesn't identify the "one best way"

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Data Management Maturity Model
In Action

Why the DMM is useful

- **Educational tool** for all stakeholders
- **Practical wisdom** guides activities and implementation
- **Contextually flexible**
  - **WHAT**, not **HOW** – which is dependent on business priorities, technical choices, and organizational culture
- **Enables a thorough gap analysis in record time**
  - Capabilities that are absent, unintegrated or weak
  - Strengths you can build on and extend
  - Overlooked techniques, toolsets, capabilities
- **Builds support** - strategic, financial, and commitment of effort (coalition of the willing).

Why Executive Needs the DMM

- Engaging the lines of business
  - Alignment with mission, goals, and objectives
  - Forge a shared perspective
  - Collective understanding
    - Current strengths and weaknesses
    - Roles to support the data assets
- Reveals critical needs for the data management program
  - Quick Wins
  - High Value / reasonable timeframe
  - High Value / Strategic
- Wins hearts and minds - motivates collaboration for improvements

Starting the Journey - DMM Assessment Method

- To maximize the DMM's value as a catalyst for forging shared perspective and accelerating the program, our method:
  - Provides interactive collaboration event with broad range of stakeholders
  - Evaluates capabilities collectively by consensus affirmations
  - Naturally facilitates unification of factions - everyone has a voice and role
  - Solicits key business input through supplemental interviews
  - Verifies the evaluation with work product reviews (evidence)
  - Report and executive briefing presents Scoring, Findings, Observations, Strengths, and targeted specific Recommendations.
- Audit-level benchmark method will be introduced in 2015 for formal benchmark of maturity, leveraging the CMMI SCAMPI A method
  - Option for organizations and regulators.

To date, over 200 individuals from business, IT, and data management in early adopter organizations have employed the DMM - practice by practice, work product by work product - to evaluate their capabilities.
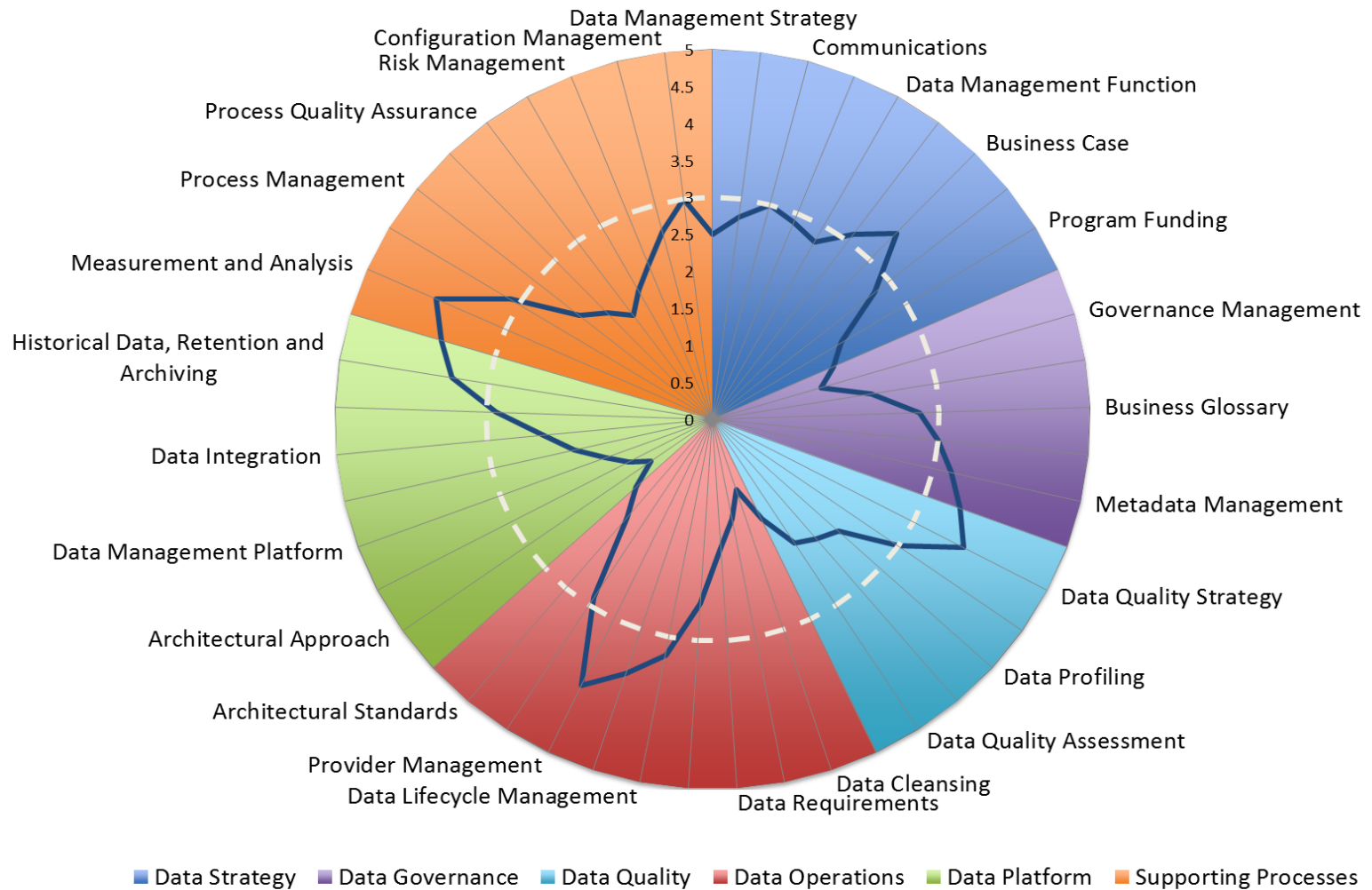
Measurement = Confidence

- Activity-focused, evidence-based evaluation

- Emphasizes metrics – from Day 1 to Forever

- Organizations can gauge their achievements against peers

- Metrics justify support for funding improvement initiatives

- Enhances an organization's reputation – quality and progress is evident to all.

DMM Assessment Summary
Sample Organization

Early Adopters – DMM Assessment Drivers

- **Microsoft** – Integrated Information Management supporting transition to the Real-Time Enterprise, data governance

- **Fannie Mae** – Validation of EDM program and governance, discovery for new business priorities

- **Federal Reserve System Statistics** – Validation of inherent strengths, discovery of gaps, leverage capabilities across function and the Banks

- **Ontario Teachers Pension Plan** – Evaluation of well-rounded program, voice of the customer, next steps

- **Freddie Mac** – Evaluation of current state as preparation for a Single-Family-wide data management program launch

- **Center for Army Analysis** – Enhance data asset strength to support analytics for logistics, targeting, troop deployments for warfighting effort.

Wherever you are, there you are

Comprehensive and Realistic Roadmap for the Journey

Microsoft
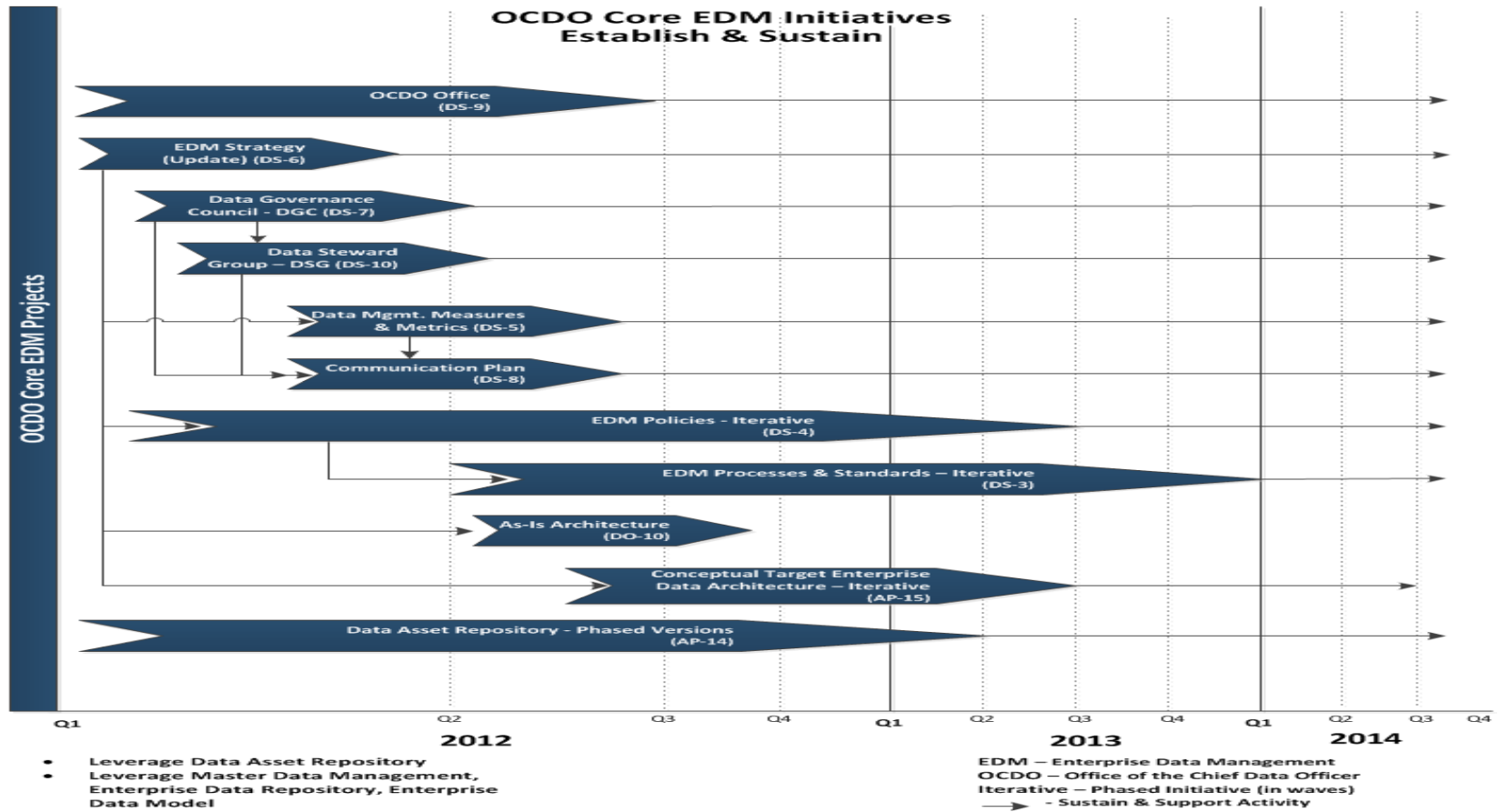
The Real Time Enterprise

Virtually everything in business today is an undifferentiated commodity, except how a company manages its information. How you manage information determines whether you win or lose.
– Bill Gates

Business Processes

People

Information

Technology

Processes achieve business results
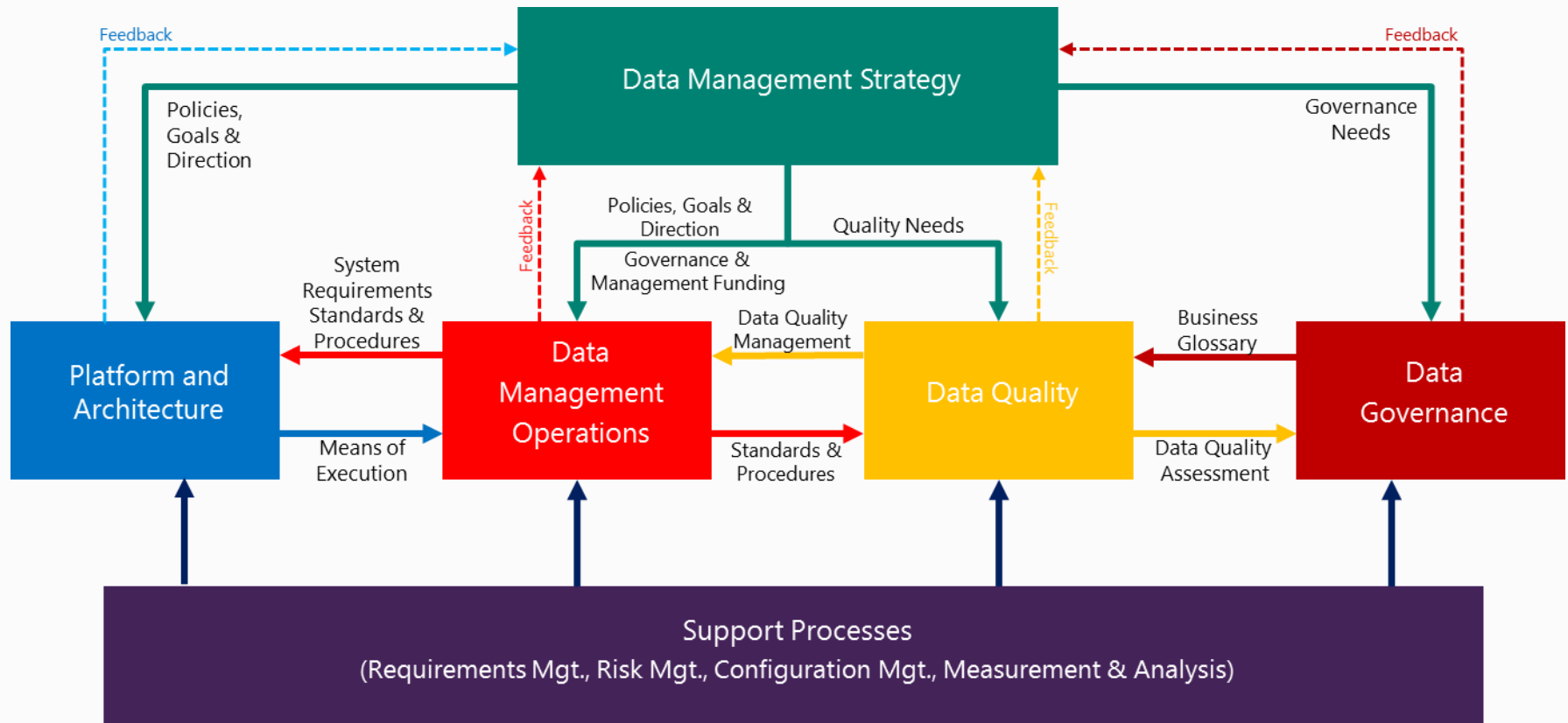
People make decisions

Decisions are driven by Information

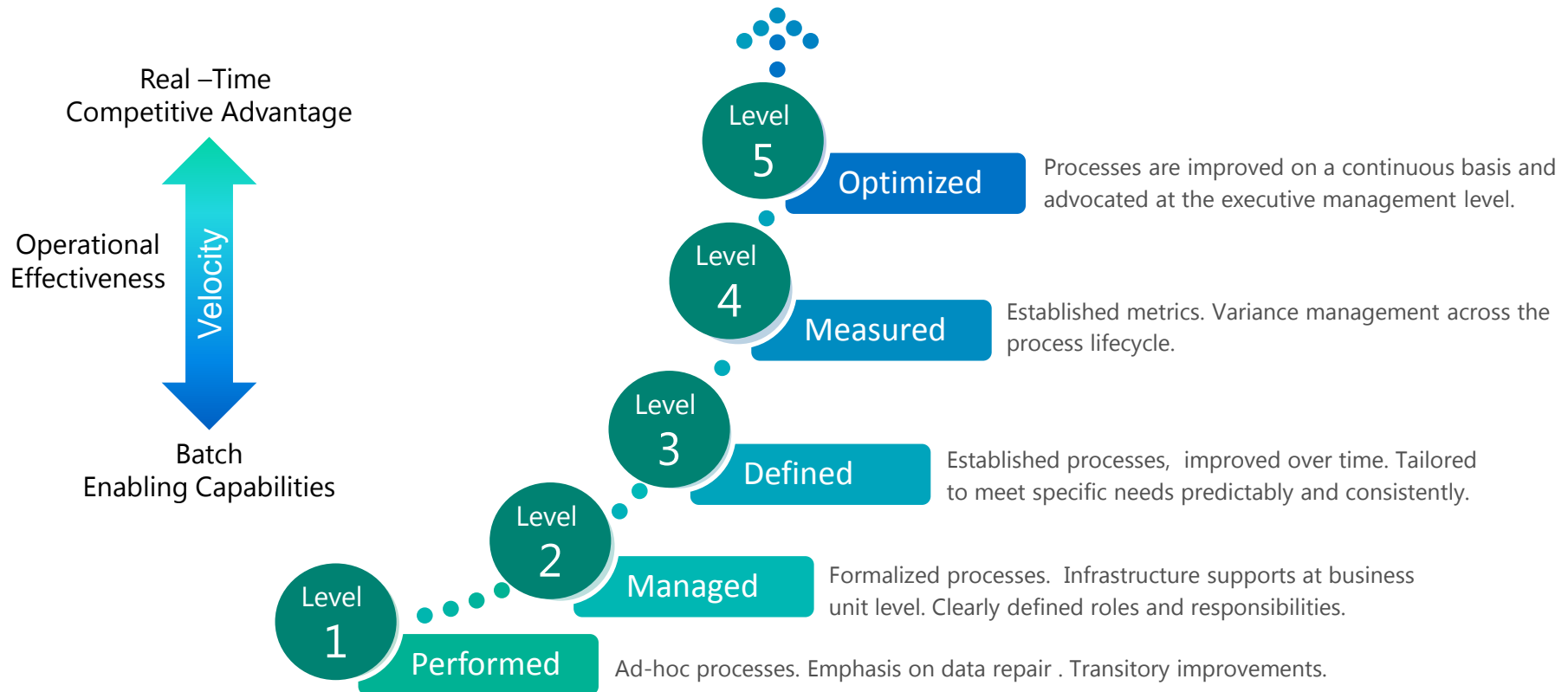Technology speeds the delivery of information

Microsoft

Establishing a Common Data Management Language

Data Management Maturity Model

Microsoft

Maturity Levels Related to Real Time Data

Real –Time
Competitive Advantage

Operational
Effectiveness

Velocity

Batch
Enabling Capabilities

Level 5 — Optimized: Processes are improved on a continuous basis and advocated at the executive management level.

Level 4 — Measured: Established metrics. Variance management across the process lifecycle.

Level 3 — Defined: Established processes, improved over time. Tailored to meet specific needs predictably and consistently.

Level 2 — Managed: Formalized processes. Infrastructure supports at business unit level. Clearly defined roles and responsibilities.

Level 1 — Performed: Ad-hoc processes. Emphasis on data repair . Transitory improvements.

Microsoft® IT

Strategic Enterprise
Architecture

Microsoft

CMMI Assessment Recommendations

- **Unified effort to maximize data sharing and quality**
- **Monitor and measure adherence to data standards**

- **Map key business processes to data**
- **Leverage Meta Data repository**

- **Leverage best practices for data archival and retention**
- **Maximize shared services utilization**

- **Integrate data governance structures**
- **Prioritize policies, processes, standards, to support corporate initiatives**

- **Top-down approach to prioritization**
- **Up-stream error prevention**
- **Common Data Definitions**

Data Management Strategy

Data Management Operations

Platform & Architecture

Data Quality

Data Governance

Microsoft

Key Lessons

- In the world of Devices and Services, Data Management is a pillar of effectiveness

- DMM is a key tool to facilitate the Real-Time Enterprise journey

- Active participation of cross-functional teams from Business and IT is key for success

- Employee education on the importance of data and the impact of data management is a good investment

- Build on Strengths!

Microsoft IT Annual Report may be found at:
http://aka.ms/itannualreport

Strategic Enterprise Architecture

DMM Assessment – Fannie Mae Governance Results

- How the DMM Assessment pointed out enhancements for a strong Governance Program:

  - Identified the need to strengthen Governance to increase tangible business benefits

  - Identified immediate "quick wins" and strategic initiatives

  - Strengthened relationship between data governance and data quality

  - Incorporated the feedback from Assessment recommendations and LOBs into design of the new Data Governance Operating model for the firm

  - Established "fit for purpose" governance – expanded service to LOBs.

When Should I Employ the DMM?

- Assess your current capabilities <u>before</u>:
  - Embarking on a major architecture transformation
  - Developing (or enhancing) your data management strategy
  - Establishing data governance
  - Undertaking a major expansion of analytics
  - Implementing a data quality program
  - Implementing a metadata repository
  - Designing and implementing multi-LOB solutions:
    - Master Data Management
    - Shared Data Services
    - Enterprise Data Warehouse
    - Conversion to an ERP
    - Etc., etc., etc.

Energy audit - Executive physical

DMM Training & Certification

- **Three successive courses** leading to certification as an Enterprise Data Management Expert (EDME). Effective complement to CDMP, CBIP and similar certifications
  - DMM Introduction – 3 days – implementation oriented
  - DMM Advanced – 5 days – mastery of DMM content
  - Enterprise Data Management Expert – 5 days
    - Qualifications
    - Mastery of Method and Deliverables
    - Exam
    - Observation / Certification
    - 3 year license / recertification

Intro → Advanced → EDME

Near-Future Certification

- DMM Lead Appraiser (DMM LA) training and certification
  - Fall 2015
  - Leveraging the SCAMPI A benchmarking method used by over 10,000 organizations for a formal appraisal.
  - Option to publish results
  - Of interest to regulatory organizations - audit
  - For organizations ready to benchmark their progress.

- Individuals are sponsored by a Partner

Intro ⟩ Advanced ⟩ DMM LA

DMM Partner Program

Partner Program – organizations sponsor EDMEs and have a voice in the evolution of the DMM going forward.

Industry Outreach / Alliances

- Articles and White Papers
- Conferences and Webinars – seminars and case studies
- Federal Agencies
- Trade Associations
- Data Management Association International

- And………….we are eager to align with similar standards and standards bodies (so give us a call). ☺

For More Information

Please visit our web site:

Home, FAQs, White Papers, Model Download
http://whatis.cmmiinstitute.com/data-management-maturity

Training Schedule and Registration
http://whatis.cmmiinstitute.com/training

DMM Partner Application
http://partners.clearmodel.com/become-a-partner/become-partner-dmm/

Contact

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240-274-7720 (M)

Please connect with me on Linked In

Appendix:
DMM Governance Principles
Governance Management Process Area

Excerpt from 'Data Governance – the Forest and the Trees'
Winter Data Governance conference

Governance in the DMM

- Big Three
- Key functions for data assets
    - Building
    - Nurturing
    - Sustaining
    - Compliance
- One process area (Vertical)
- Decisions, Activities, Work Products in all process areas (Horizontal)
- Active Engagement
- Executive Support
- Does not dictate a structure.
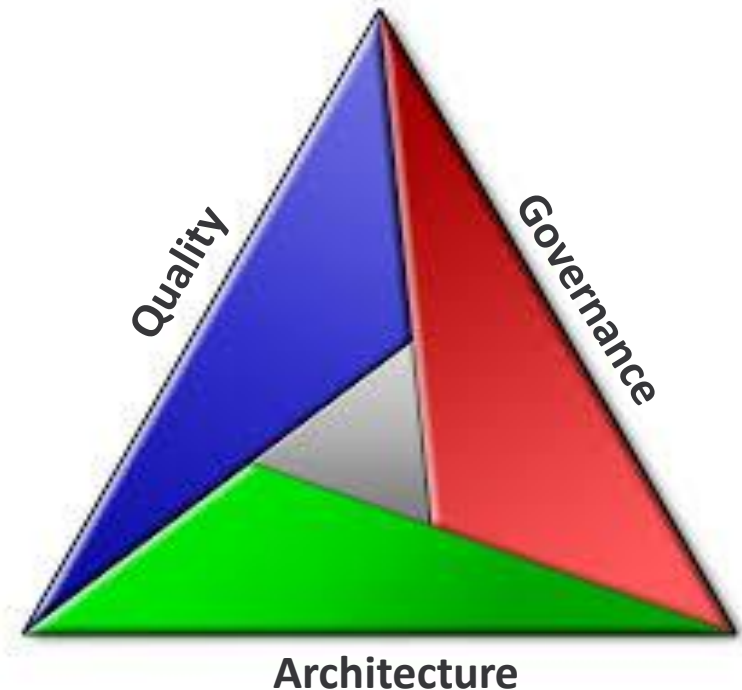
DMM Governance Calls Out

- Oversight

- Policies

- Approvals

- Alignment

- Metrics

- Access Controls

- Compliance / Audit

- Roles and Responsibilities

- Stakeholder representation (all levels)

Governance Management (GM)

Purpose

Develop the ownership, stewardship, and operational structure needed to ensure that corporate data is managed as a critical asset and implemented in an effective and sustainable manner.

Definition

Processes that facilitate collaborative decision making and effectively implement building, sustaining, and compliance functions for the data assets. Governance bodies are fundamental to create a corporate culture of shared responsibility for data.

GM Goals

A process is established and followed for aligning data governance with business priorities, including ongoing evaluation and refinement to address changes in the business, such as the need to encompass new functions and domains.

Data governance ensures that all relevant stakeholders are included, and that roles, responsibilities, and authorities are clearly defined and established.

Compliance and control mechanisms with appropriate policies, processes, and standards are established and followed.

GM Benefits to the DM Program

- "Every shoulder to the wheel" to build, nurture, and improve the data assets
- Makes organization-wide data decisions possible, increases awareness and engagement of executives
- Structured collaboration
    - Clear roles – ends confusion
    - Clear responsibilities – self-tasking
- Implements and enforces compliance with policies, processes, and standards
- Critical foundation for well-executed enterprise data initiatives
    - Data Management and Data Quality Strategies
    - Business Glossary
    - Metadata Management, etc., etc.
- Increases agility through reuse of established processes
- Increases communications, relevance and impact of the data management program and the data management function
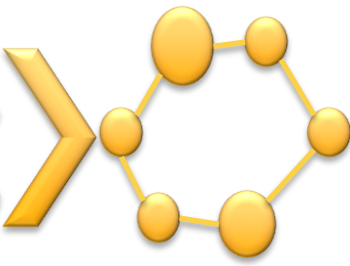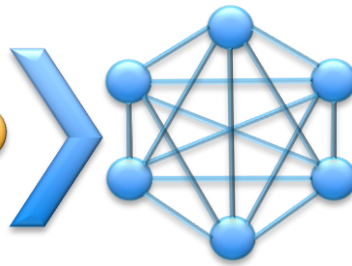
GM Capability Levels
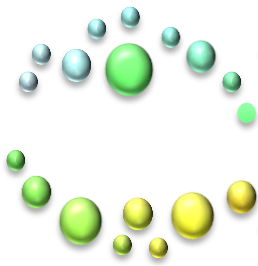
Level 1

Project-based data governance activities are performed; owners, stewards, and accountability are defined at the project level.
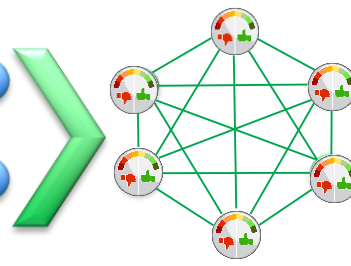
Level 2

Defined governance structure is established; roles, responsibilities, accountability established at subject area level; defined policies, processes, and standards; governance review process.

Level 3

Organization-wide governance structure with executive sponsorship; operational executive data governance; all high-priority subject areas are represented; processes are standardized; metrics employed to evaluate effectiveness; analyzed against objectives.

Level 4

Governance is managed using statistical key performance indicators and results used to refine the program.

Level 5

Governance is continuously improved through research in best practices; strong program is a model of success.

GM Key Activities - Summary

- Approve the data management strategy

- Approve policies, processes, and standards

- Actively participate in "enterprise" initiatives, such as:

  - Define and approve business terms by subject area

  - Determine metadata categories, sub-categories and properties

  - Define and participate in the data quality strategy and program, etc.

- Assign accountability and responsibility

- Develop decision authorities and change mechanisms

- Enforce compliance

- Address external requirements and organization-wide needs, such as role-based access, etc.

Data Governance Capabilities

Process Area	Functional Practice Statement	
Governance Management	1.1	Data governance functions are performed.
	1.2	Ownership, stewardship, and accountability for data sets are primarily project-based assignments.
	2.1	A defined and documented data governance structure is in place.
	2.2	Governance roles, responsibilities, and accountabilities are established for data subject area by priority, as stated in the business or data strategy.
	2.3	Data subject area representatives participate in data governance and associated processes.
	2.4	Data governance follows defined policies, processes, and standards.
	2.5	A review process is established and followed to evaluate and improve data governance.

Data Governance Capabilities

| Process Area	Functional Practice Statement
Governance Management	3.1 An organization-wide data governance structure and rollout plan is established with executive sponsorship.
	3.2 Executive level organization-wide data governance is operational for the organization's high-priority subject areas.
	3.3 Data governance includes representatives from all business units which are suppliers or consumers of high-priority data subject areas.
	3.4 Standard data governance policies and processes are followed.
	3.5 Data governance determines and approves appropriate metrics to evaluate effectiveness of governance activities.
	3.6 An evaluation process is established for refining data governance to align with changing business priorities and to expand as needed to encompass new functions and domains.
	3.7 Classroom, mentoring, e-learning, or on-the-job training in data governance processes is required for new governance members and other stakeholders.

Data Governance Capabilities

Process Area	Functional Practice Statement
Governance Management	3.8 Data governance activities and results are analyzed against objectives periodically and reported to executive management.
	4.1 Statistical and other quantitative techniques are applied to determine if governance efforts are changing organizational behaviors appropriately.
	4.2 Adjustments to data governance activities and structure are made based on analysis results.
	5.1 External governance structures and industry case studies are evaluated for best practices and lessons learned, providing ideas for improvements.
	5.2 The data governance structure is communicated to the peer industry as a model of best practice.
	5.3 Data governance processes are continually refined and improved.

Governance Practices Across the DMM
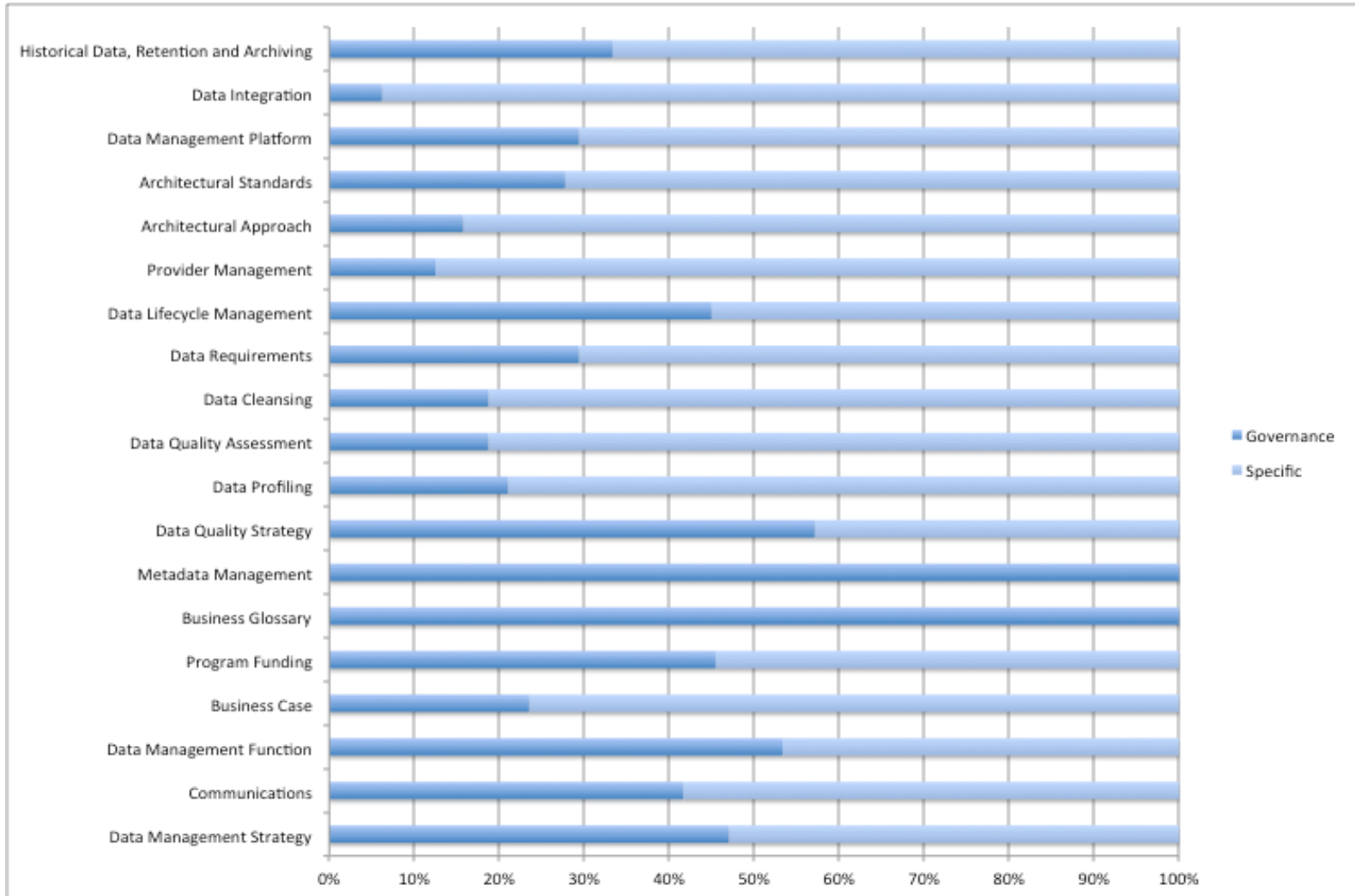
Governance - What Should We Be Doing Now?

- Conduct a DMM Assessment – then leverage that energy!

- If you don't have an organization-wide program
  - Engage an Executive Sponsor
  - Start with one critical line of business or one multiple stakeholder program.
- If you have a limited program – perhaps only based in IT, in one business area, etc.
  - Present business case aimed at solving key issues
  - Persuade key stakeholders based on their business interests
- If you have a complex program
  - Identify areas of lack of clarity in RACI
  - Work with senior body to enhance organizational structure
  - Propose a streamlined interaction model.