

# Extending and Automating Maturity Models for More Value

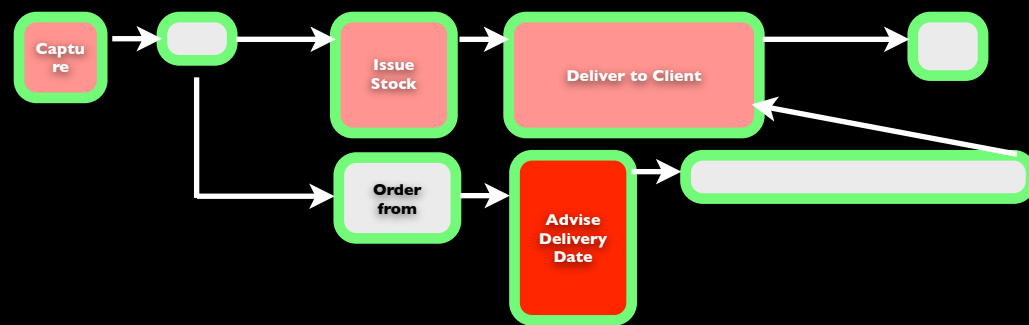
Domain Model Driven Generic Support for Maturity Models

Graham McLeod

Contribution to Models at Work  
Hendon, UK  
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Duisburg-Essen University

[inspired.org](http://inspired.org)



# Outline

Maturity Models

Examples

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# Maturity Assessments

	Level	Capability	Result
	<b>5</b> Optimizing	Continuous Process Improvement	<b>Productivity &amp; Quality</b>
	<b>4</b> Quantitatively Managed	Quantitative Management	
<b>3</b> Defined	Process Standardization	Requirements Development Technical Solution Product Integration Verification Validation Organizational Process Focus Organizational Process Definition Organizational Training Integrated Product Management Risk Management Integrated Teaming Integrated Supplier Management Decision Analysis & Resolution Organizational Environment for Integration	
<b>2</b> Managed	Basic Project Management	Requirements Management Project Planning Project Monitoring & Control Supplier Agreement Management Measurement & Analysis Product & Process Quality Assurance Configuration Management	
<b>1</b> Initial	Heroic Efforts	Design Develop Integrate Test	
			<b>Risk &amp; Waste</b>

First popularised by the Carnegie Mellon Software Development Capability Maturity Model

Maturity Assessments embody considerable compactly encoded knowledge and IP

They provide a quick, low effort and low barrier to entry engagement which offers considerable client value

They highlight areas where maturity is low and effort should be applied to improve performance

Consultants performing MAs are in a great position to provide follow on training, consulting and tools

Inspired has been leveraging them for some years, but stepped this up in 2020

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# DOD Architecture Maturity Model (Inspired Summary)

	None	Initial	Under Development	Defined	Managed	Measured
Architecture Process	Nothing to Speak of	Ad Hoc Localised	Process Documented	Process Followed	Process = Culture	Optimised & Improving
Architecture Development	Nothing to Speak of	Ad Hoc Localised	IT Planning wo Architect.	Gap Analysis and Migr Plan	Established & Evolving	Stds & Waivers Improvement
Business Linkage	Nothing to Speak of	Minimal or Implicit	Explicit	Integrated to Capital Plan	Integrated & Lessons Used	Continuous Improvement
Senior Mgmt Involvement	Nothing to Speak of	Limited	Management Aware	Sen Mgmt Supportive	Sen Mgmt Direct Involved	Sen Mgmt Involved Improv.
Operating Unit Participation	Nothing to Speak of	Limited	Responsibility Assigned	Most Accpt & Participate	All Accpt & Participate	Feedback from all Units Used
Architecture Communication	Nothing to Speak of	Little	Documents & Info Shared	Web Shared and Current	Standards Compl Shared	Support All Decisions
IT Security	Nothing to Speak of	Ad Hoc Localised	Clear Roles and Responsib	Stds Profile Developed	Security w. Perf. Metrics	Feedback improves
Architecture Governance	Nothing to Speak of	No Explicit	Some Standards	Explicit	Explicit & Feedback	Explicit & Improvement
IT Investment & Acquisition Strat.	Nothing to Speak of	Little or no Arch. Involve.	Little or Informal	Strategy & Arch Compliance	All Guided by Architecture	No Unplanned Investment

# Generic Structure

*Table 1: Generic Structure of Maturity Models*

<b>Concern</b>	<b>Maturity Level</b>		
	Ad Hoc	Initial	Developing
Concern 1	Statement A	Statement B	Statement C
Concern 2	Statement D	Statement E	Statement F

# Client Context

Inspired is a small but highly skilled consultancy providing Enterprise Architecture, Methods Engineering and Modelling Consulting and Training to Corporate Clients

It also develops and supports the Enterprise Value Architect Repository and Enterprise Modelling Platform which is sold on a SaaS basis

The organisation has used maturity models in consulting and training for many years. It had developed unique in-house data management and application landscape models. These were not automated other than ad hoc spreadsheets

The author and colleagues had also developed extensions to add value to maturity models. These included algorithms for scoring, guidance in moving up, prioritisation algorithms and assistance with derivation of plans

During the Covid Pandemic, the organisation decided to develop a Pandemic Readiness model to share with clients and the community. There was a desire to put this online to make it broadly available

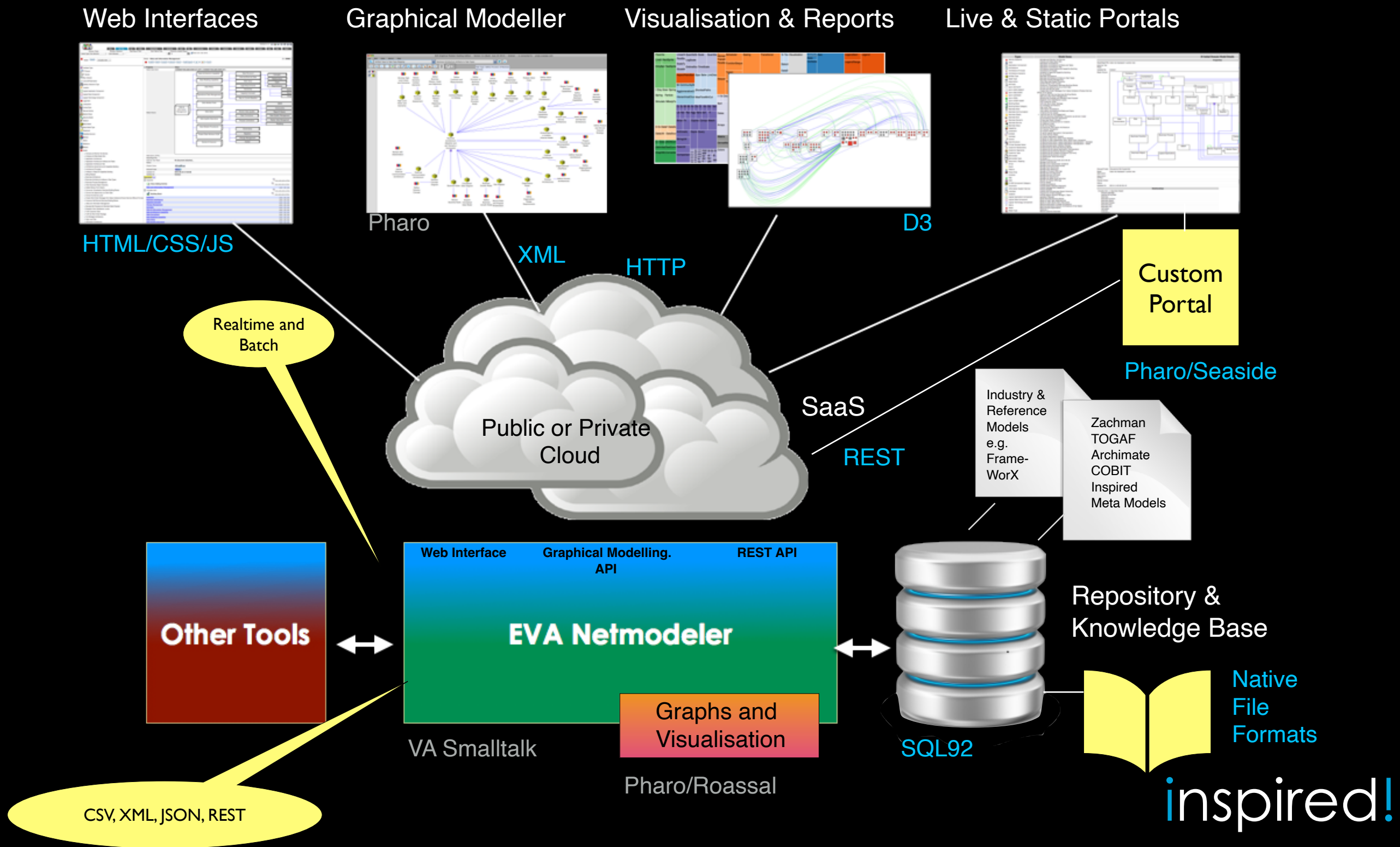
The EVA toolset was seen as a vehicle to rapidly enable this

# Requirements

- R1: The system must be able to handle a wide variety of maturity models without code change - i.e. Model properties such as concerns, maturity levels, questions, recommendations etc. should be held as user editable data in the repository
- R2: It should provide support for assessment, scoring, graphing results, storing assessments
- R3: Client security and privacy should be respected
- R4: Scoring should allow inclusion of a radar/Kiviati graph
- R5: Models may include recommendations, which may have relative effort and dependencies
- R6: Ability to invoke the assessment for a given model using a URL which identifies the model without requiring a login (to provide "service" models anonymously - e.g. the Pandemic Readiness Model)
- R7: Ability to invoke a given model providing a unique but anonymous client identity. This identity to be used to store the assessment. An API to be provided to allow retrieval of the list of models for the client id or a given model using the id and date/time. This was necessary to meet privacy legislation and to separate management of client information (by the partner) and model execution (by our solution)
- R8: Provision of summary results vs full results (to allow model providers to encourage client interaction with them before providing full results)
- R9: Provide assessment scores and results data via an API to allow model providers to retrieve details for their clients and use the data to format their own custom reports (e.g. in Excel, PowerPoint or .pdf)

The above requirements were identified early on and formed a baseline. Other requirements were added as we gained experience and as we leveraged the early work to start providing the platform to commercial partners to support their own models. Further requirements included :

# Enterprise Value Architect





# Tool Capabilities

1. Meta Model - This can be easily defined or extended by users via provided interfaces or graphical modelling facilities. Extensions are immediately active and customise provided user interfaces so that relevant data and relationships can be maintained and reports generated. [McLeod 2001]

2. User Interface - The tool allows the development of custom views which are developed in a combination of HTML, CSS and embedded Smalltalk [Goldberg and Robson 1983] code that allows accessing full facilities within the tool. Custom views can be defined at runtime and immediately deployed. They can be attached to user menus for ease of use. Views can initiate subsequent views

3. Calculated Properties - The tool supports calculated properties as part of type definitions within meta models. Any kind of calculation can be supported and these can reference properties of the item on which they are contained, properties of related items, or items elsewhere in the repository via type/item/property ids

4. APIs - It is very easy to create custom APIs. These are held as code in the repository. Again, API definition can occur at runtime. APIs can then be invoked in the typical fashion by a client application performing a log on to the application (thereby obtaining security credentials) and then using a REST style URL. Data can be returned in any required format, typically JSON, CSV, XML or HTML

# Tool Capabilities (2)

Other features of the tool which provided useful facilities include:

1. HTMLtextfields-These store formatted text of any length which allows holding descriptions, questions and recommendations.They can also hold generated output, such as a results report

2. Picture fields - These allow storing web or print friendly pictures (e.g. .jpeg, .png, .gif).These may be used to store images for explanation or branding purposes

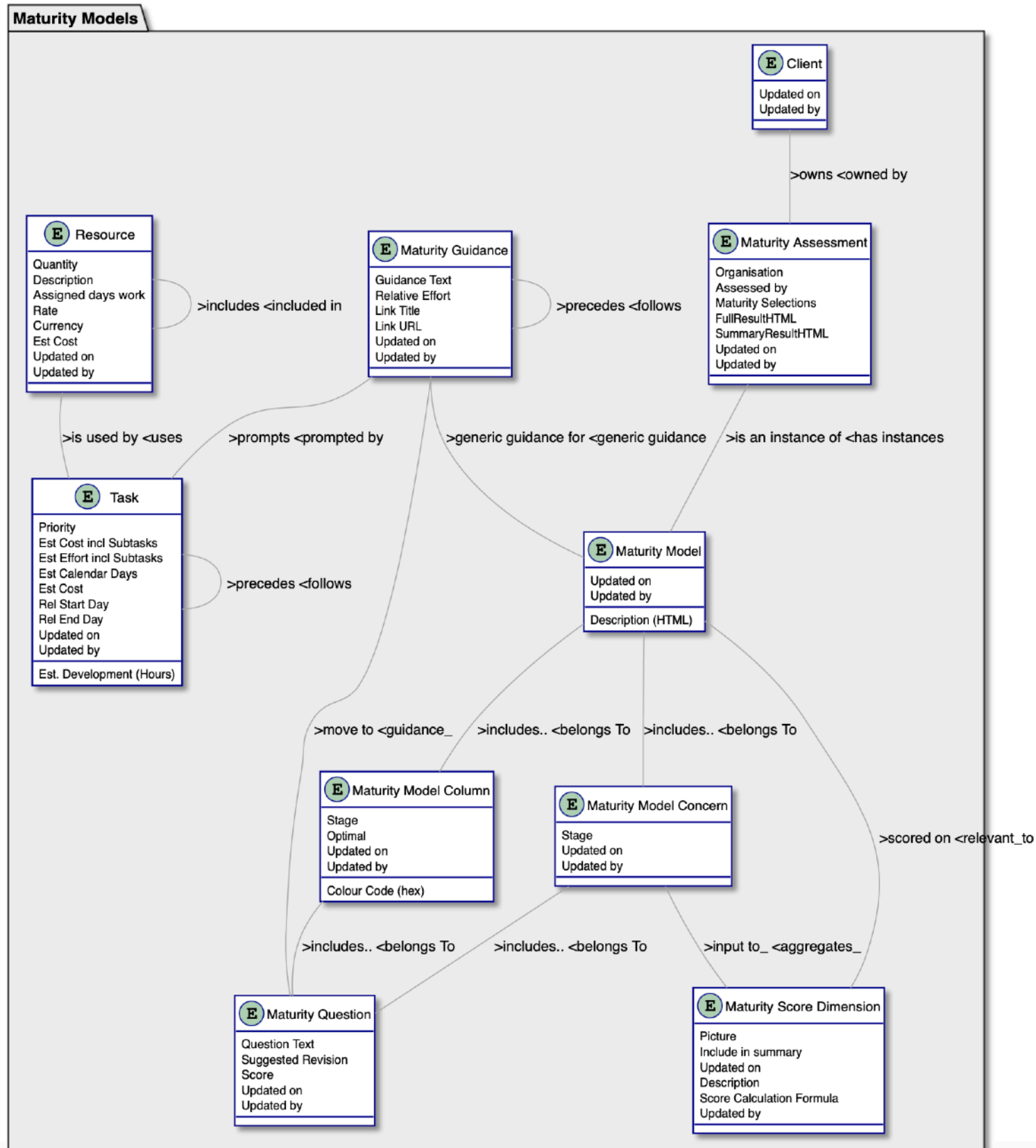
3. Hyperlink fields - These allow storing references to other pages, such as help text or sources of assistance (such as a consulting service or training offering)

4. Graph and visualisation plotting facilities (provided by an embedded Pharo [Open\_Source 2022b] Roassal [Bergel 2022] server).This allows definition of a variety of graphs and visualisations which can be returned as images included in web output or stored in Picture fields (2)

5.A comprehensive security model allowing fine grained control over users, groups, roles, access and update permissions

6. Dynamic language and live programming environment.The tool is written in VA Smalltalk [Instantiations 2022] and exploits the dynamic typing and live programming capabilities unique to Smalltalk to good advantage. It allows code for calculated properties, custom user interfaces and APIs to be edited through the web interface and held in the repository.This code can then be executed without the need for a compile / link / deploy / launch cycle.This vastly speeds up development

7. Output Formats - The tool already supports the generation of output in various languages including: HTML/CSS; XML, CSV and JSON



# Meta Model

Client groups Assessments done for an Organisation

Maturity Model relates the Columns (levels) and Rows and Guidance. Concerns can be grouped into Dimensions

Questions fall within a Concern (row) and Column

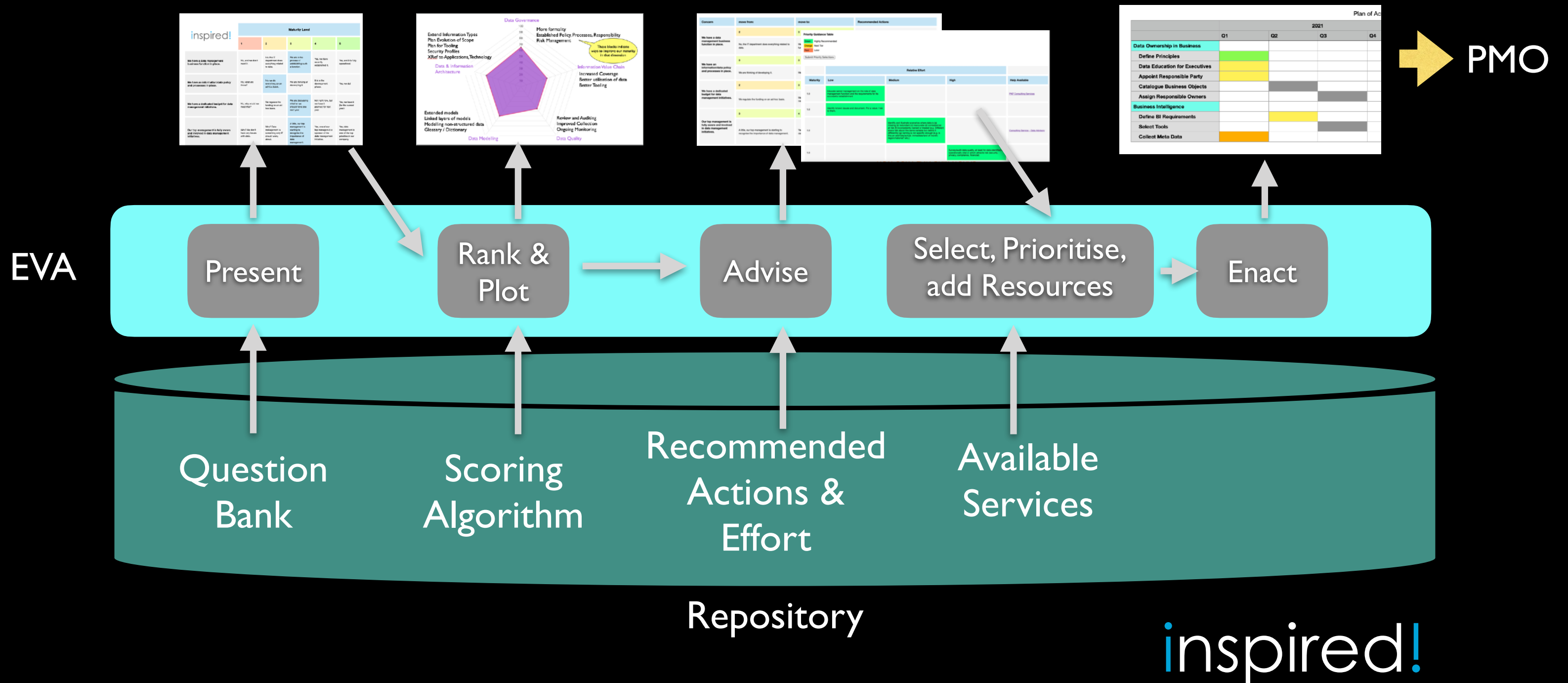
An Assessment records the user responses and results generated

Tasks can result from selecting Guidance items for action

Resources can be allocated to Tasks

Scoring is achieved through user maintained declarative formulas held on the Score Dimension

# How our Maturity Assessment Works



# Maturity Questionnaire

## Maturity Assessment

### Inspired Pandemic Maturity Model

Maturity levels increase from left to right. Work down through the rows, left to right, reading each description carefully. Consider whether your organisation is at that level, or has moved past it. Keep moving right until you find a cell you agree with. Mark the cell, and continue to the next row. If you are unsure, you may select two adjacent cells. Once you have selected a level for each concern area, click Submit at the bottom of the page to generate your results and recommended actions.

[More on using Maturity Models](#)

inspired!	Maturity Level			
	Initial	Emerging	Managed	Optimised
<b>General</b>	Low	High		
<b>Workplace Hygiene Control</b>	Currently not geared up for on site operations. Unable to operate effectively virtually.	Some operations taking place virtually, but business is not at full strength.	Virtual – most operations can function as normal. Onsite – strict procedures are followed. Clear separation of workplace and rotas followed.	Both virtual and onsite are operating at peak.
<b>Customer Interaction Hygiene Control</b>	Currently unable to serve customers due to virus risks and compliance with lockdown regulations.	GAP plan for all changes needed to serve customers effectively. Plans are currently being implemented.	New (if any) customer interaction procedures are in place (example new virtual offerings) and currently in operation. Feedback is being obtained, and processes improved.	Able to serve customers effectively and grow business sales while operating under new Covid19 regulations. Continuous optimisations in place.

# Maturity Ranking

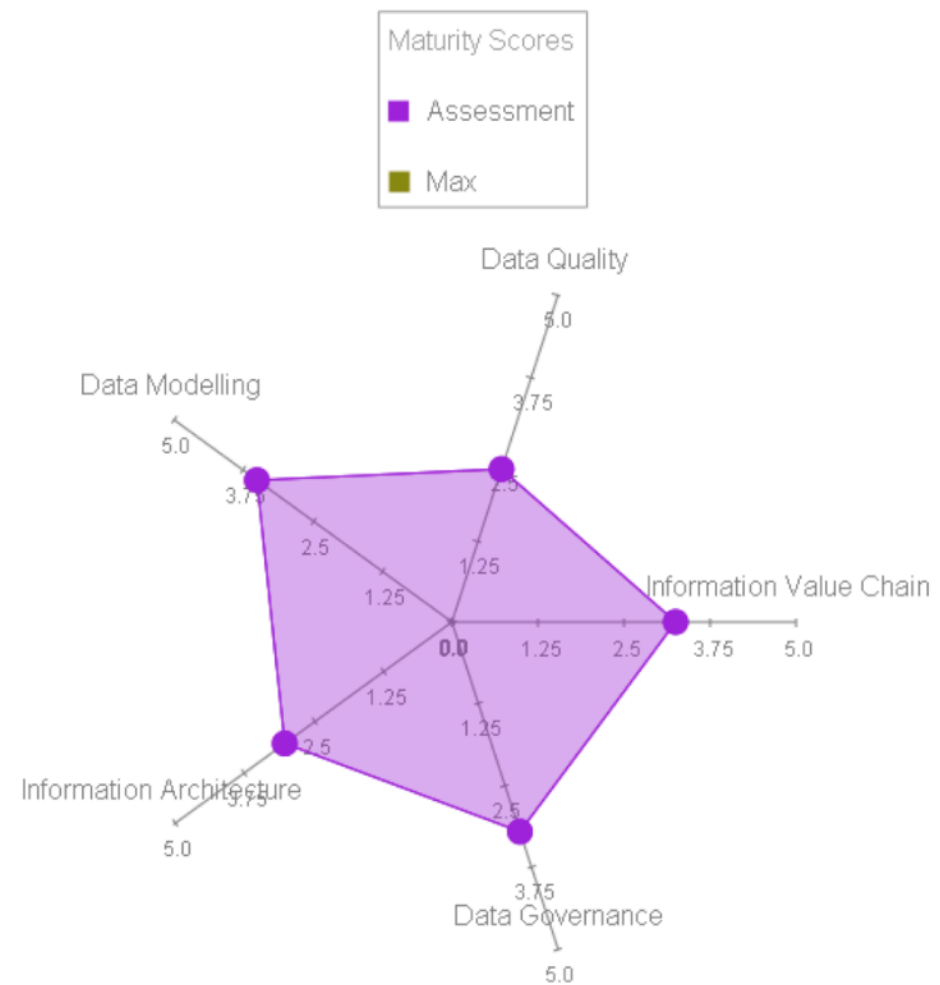
## Maturity Assessment

### Data Management Maturity Model

Generated on 5/12/2021 at 12:52:35 AM

[Save Assessment Results](#)

### Maturity Score



# Maturity Improvement Guidance

Concern	move from:	move to:	Recommended Actions
<b>We have a data management business function in place.</b>	2	3	<ul style="list-style-type: none"> <li>• Find a home for data management responsibility in the organisation</li> <li>• Establish a governance body for data in the business</li> </ul>
	No, the IT department does everything related to data.	We are in the process of establishing such a function.	
<b>We have an information/data policy and processes in place.</b>	3	3	<ul style="list-style-type: none"> <li>• Establish data and information principles</li> <li>• Create a data and information policy</li> <li>• Define data management process</li> </ul>
	We are thinking of developing it.	We are thinking of developing it.	
<b>We have a dedicated budget for data management initiatives.</b>	2	3	<ul style="list-style-type: none"> <li>• Assess the criticality and value of data to the organisation</li> <li>• Establish a suitable budget for data management outside of IT</li> </ul>
	We regulate the funding on an ad-hoc basis.	We are discussing whether we should have one next year.	
<b>Our top management is fully aware and involved in data management initiatives.</b>	3	4	<ul style="list-style-type: none"> <li>• Educate senior management about the value of data, information and knowledge</li> <li>• Educate the organisation about data criticality, quality, security and risk</li> <li>• Appoint a senior management sponsor/champion for data management</li> </ul>
	A little, our top management is starting to recognise the importance of data management.	Yes, one of our top managers is a sponsor of the data management initiative.	

# Maturity Improvement

## Selecting, Ranking, Dependencies, Help

Priority Guidance Table

- Green Highly Recommended
- Orange Next Tier
- Red Later

Submit Priority Selections

	Relative Effort			
Maturity	Low	Medium	High	Help Available
1.0	Educate senior management on the role of data management function and the requirements for its successful establishment			<a href="#">PKF Consulting Services</a>
1.0	Identify known issues and document. Put a value / risk to them.			
1.0		Identify and illustrate scenarios where data is (a) missing (b) redundant (c) inaccurate (d) contested (e) at risk (f) inconsistently named or treated (e.g. Different execs talk about the same variable but define it differently) (g) naming is not specific enough (e.g. is this an estimate/actual; immediate/end of month; region/national? etc.)		<a href="#">Consulting Service - Data Advisory</a>
1.0			Survey/audit data quality, at least for data identified as operationally vital or which attracts risk (security, privacy, compliance, financial)	



# Maturity Improvement Programme of Action

Plan of Action

	2021					
	Q1	Q2	Q3	Q4	Q1	
<b>Data Ownership in Business</b>						
Define Principles						
Data Education for Executives						
Appoint Responsible Party						
Catalogue Business Objects						
Assign Responsible Owners						
<b>Business Intelligence</b>						
Define BI Requirements						
Select Tools						
Collect Meta Data						

# Demonstration

Running a Maturity Model on the SaaS  
platform

# Analysis

*Table 2: Feature Code Size*

Feature	Language			
	CSS	HTML	JavaScript	Smalltalk
Present Questionnaire	110	Gen by ST	44	43
Generate Score Graph	0	0	0	60
Present Results	160	Gen by ST	50	230
Create Plan	24	Gen by ST	33	31
Import Model	0	0	0	347
Return Data API	0	0	0	207

Approx Code Statements

CSS 294

JavaScript 127

Smalltalk 918

HTML Generated

# Reflection

Initial Implementation was rapid

Meta model was done and captured within a day.  
This allowed capture of model content

Custom views for questionnaire, scores and recommendations were completed within a week

Implementation of the graphing and return to browser as a graphic took approximately two days, including a learning curve

The initial implementation was up and live within two weeks

Subsequent work added capabilities to retrieve models via an API, to import models from spreadsheet and to return partial results and data sets in XML or CSV

The platform has been used to support approximately eight different maturity models to date without modification

Platform has been adopted by two international partners for running their own maturity models to large customer and prospect bases

Return on modelling effort has been remarkable

# Researcher: Graham McLeod

✉ [graham@inspired.org](mailto:graham@inspired.org)

🌐 [www.inspired.org](http://www.inspired.org) (Blog there too)

■ LinkedIn: Graham McLeod

■ Skype: grahammcleod

Academia: Undergraduate BSc Comp Sc at Unisa, B Comm Hons (IS) at Univ. Cape Town, PhD (in progress) Univ Duisburg-Essen.

Faculty of Information Systems at UCT for 12 years (1991 - 2003)

Active in industry from 1975 - present. Roles of developer, designer, analyst, project manager, product manager, instructor/lecturer, consultant, architect, entrepreneur, general manager, director, chairman, business owner. Currently Chief Architect / Owner of [inspired.org](http://www.inspired.org)

Major interests: Modelling, Meta Modelling, Methods Engineering, Enterprise and Software Architecture, Business Modelling, Strategy, Tools, Dynamic Languages (Smalltalk)



<http://www.travelstart.co.za/blog/wp-content/uploads/2013/11/Greg-Lumley.jpg>

Based in Cape Town, South Africa

