Introduction to Context-based Measurement

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Content is King

...but Context is the Kingdom.

(Anon.)

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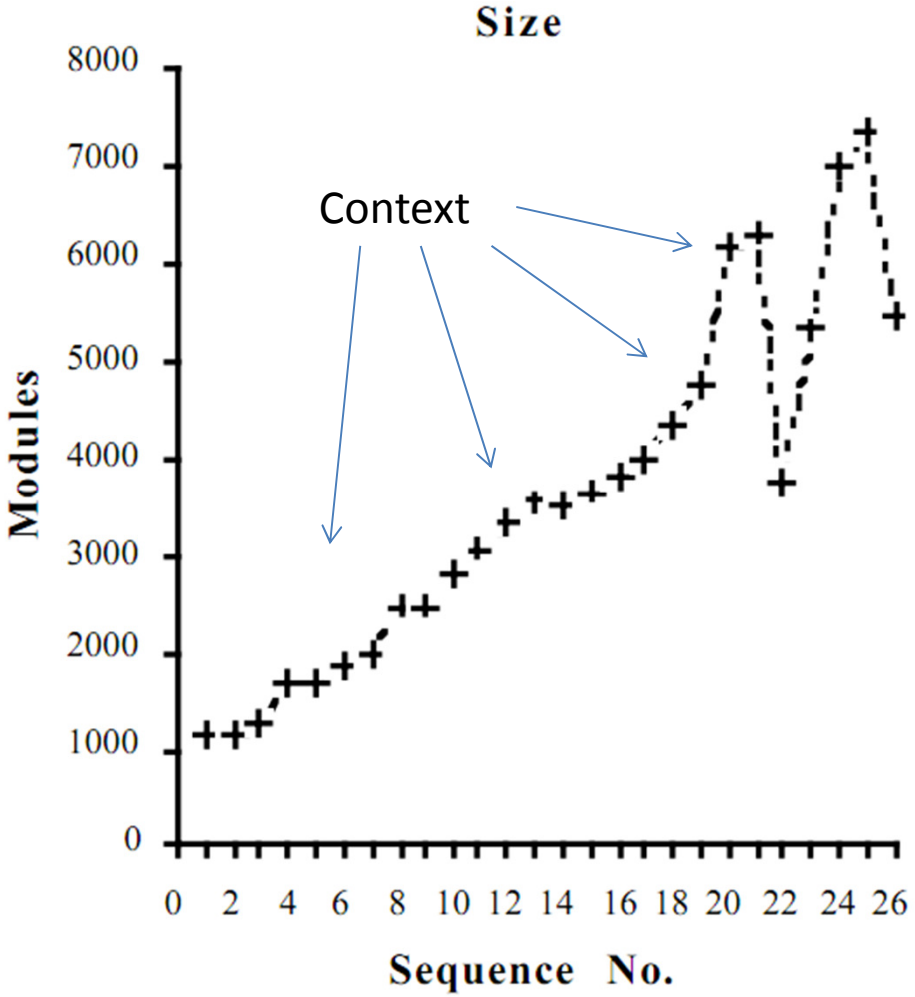
The Value of Context

Prof. Manny Lehman's 8th Law:
*"E-type evolution processes constitute **multi-level, multi-loop, multi-agent feedback systems** and must be treated as such to achieve significant improvement over any reasonable base"*



Source: M M Lehman, ***Laws of Software Evolution Revisited,*** LNCS 1149, Springer Verlag, 1997, pp. 108-124

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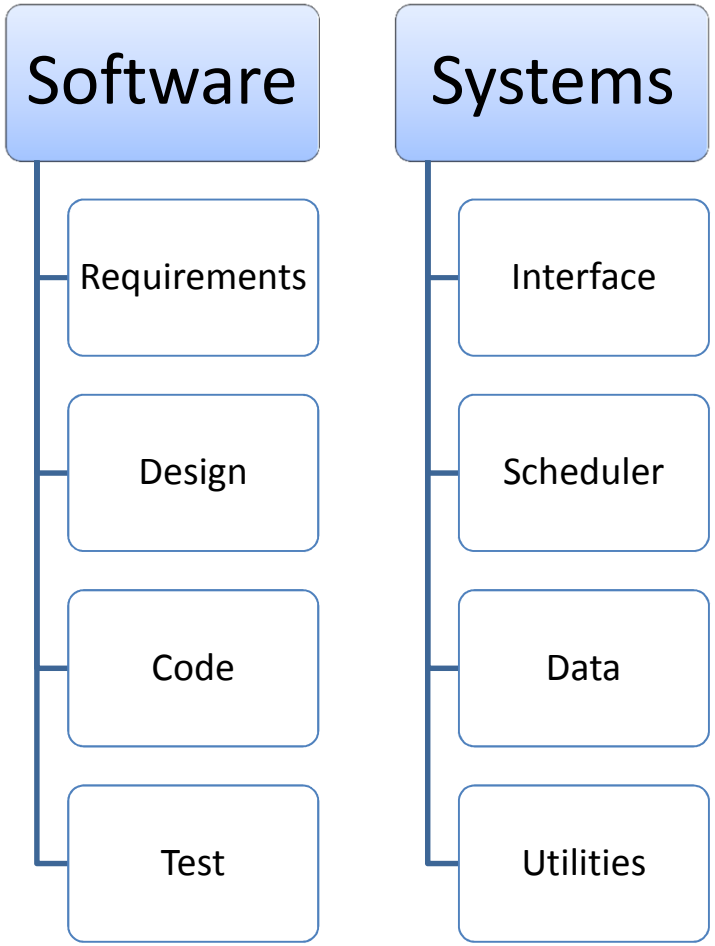
Work Breakdown Structures



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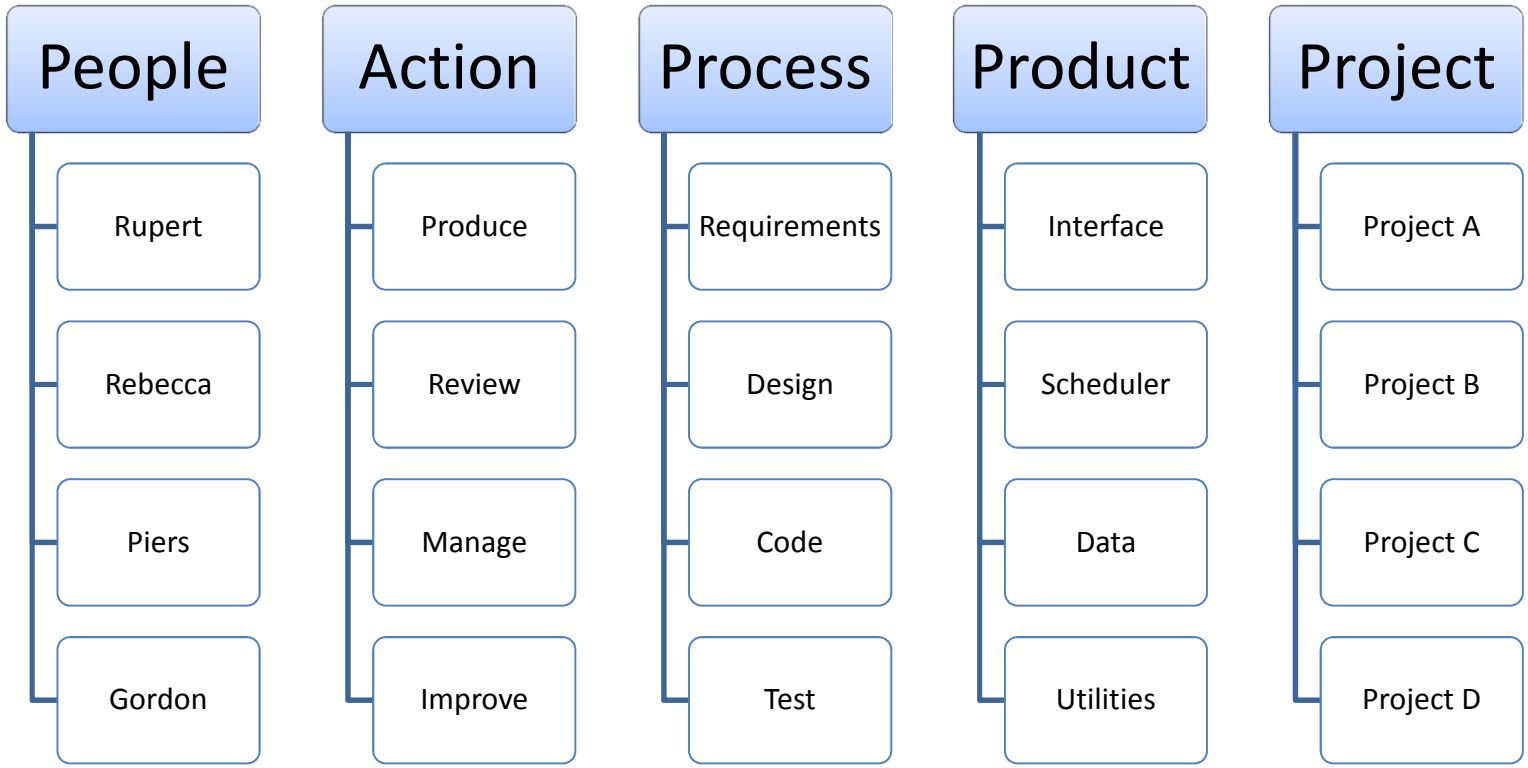
Generic Work Breakdown Structures



4^5 combinations = 1024 elements on your WBS!

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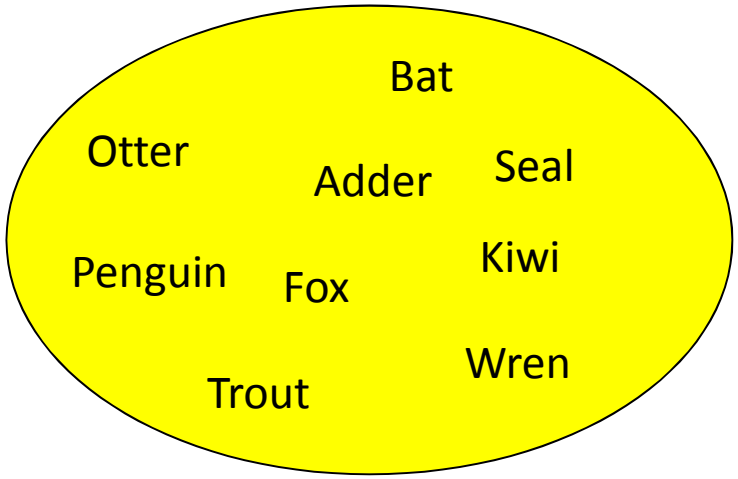
Some Problems of Hierarchies

- Most things can be classified in more than one way.
- Most organizational systems do not handle this well.
- Simple example: Animal Classification



Skin Covering	Locomotion	Diet
Fur	Fly	Fish
Scales	Run	Rodents
Feather	Swim	Insects

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Main Ideas

- Principles
  - Connections between things are articulated in language
  - We use language to reveal, express, and design, structure

- For example
  - An engineer might describe their work as a phrase
    - *"I spent 10 hours to produce the design for the user interface on project A"*
  - And a manager might ask:
    - *"How much effort do we spend producing, reviewing and reworking the user interface?"*

- Likewise they may describe the context of any measure
    - size, defects, reliability, competence, capability, methods, etc.

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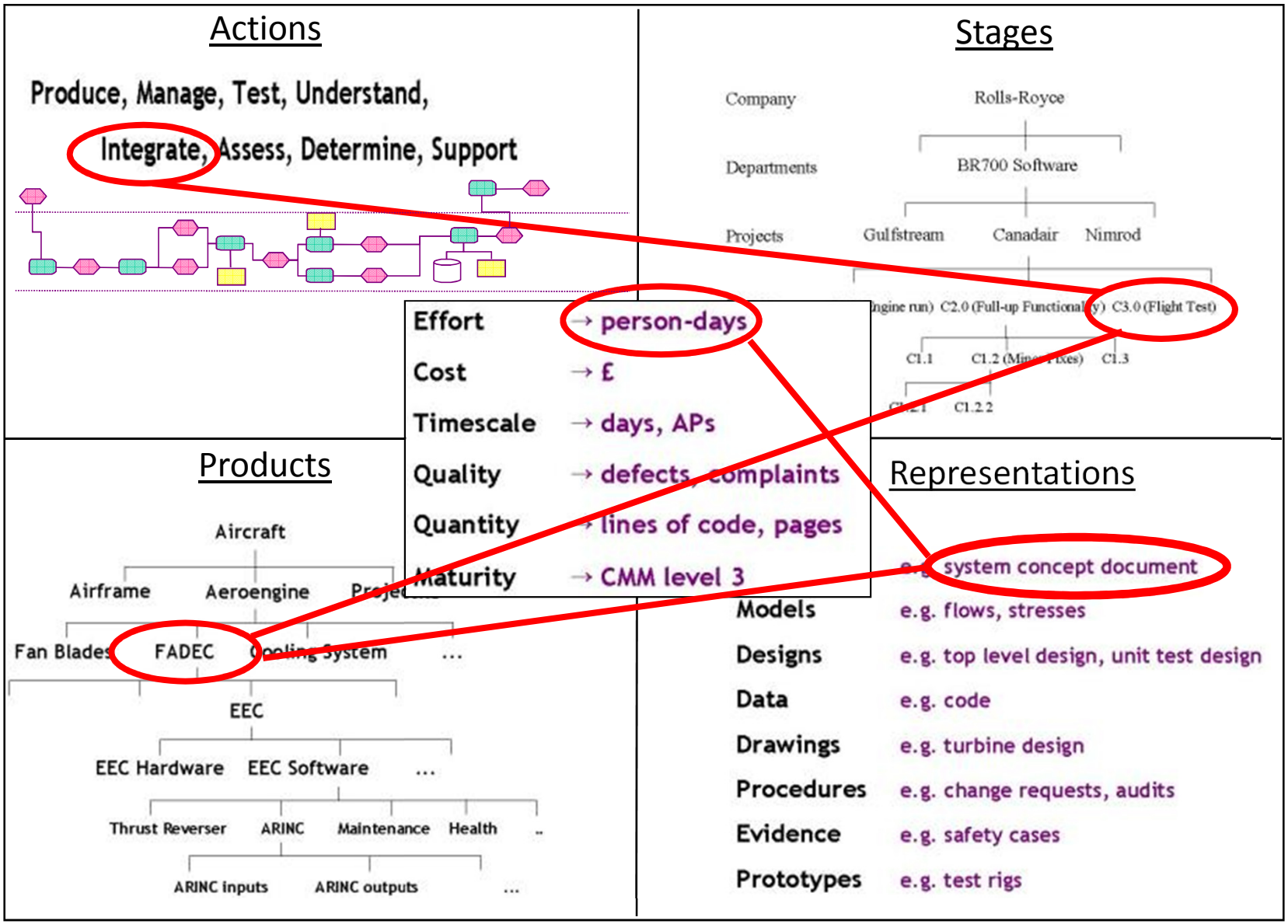

Engineer records: "I took ***4 hours*** to ***Integrate Delivery C3.0 FADEC System Concept Doc***
Manager asks: "What was the total ***effort*** used to ***Produce*** the ***FADEC***? "

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If…

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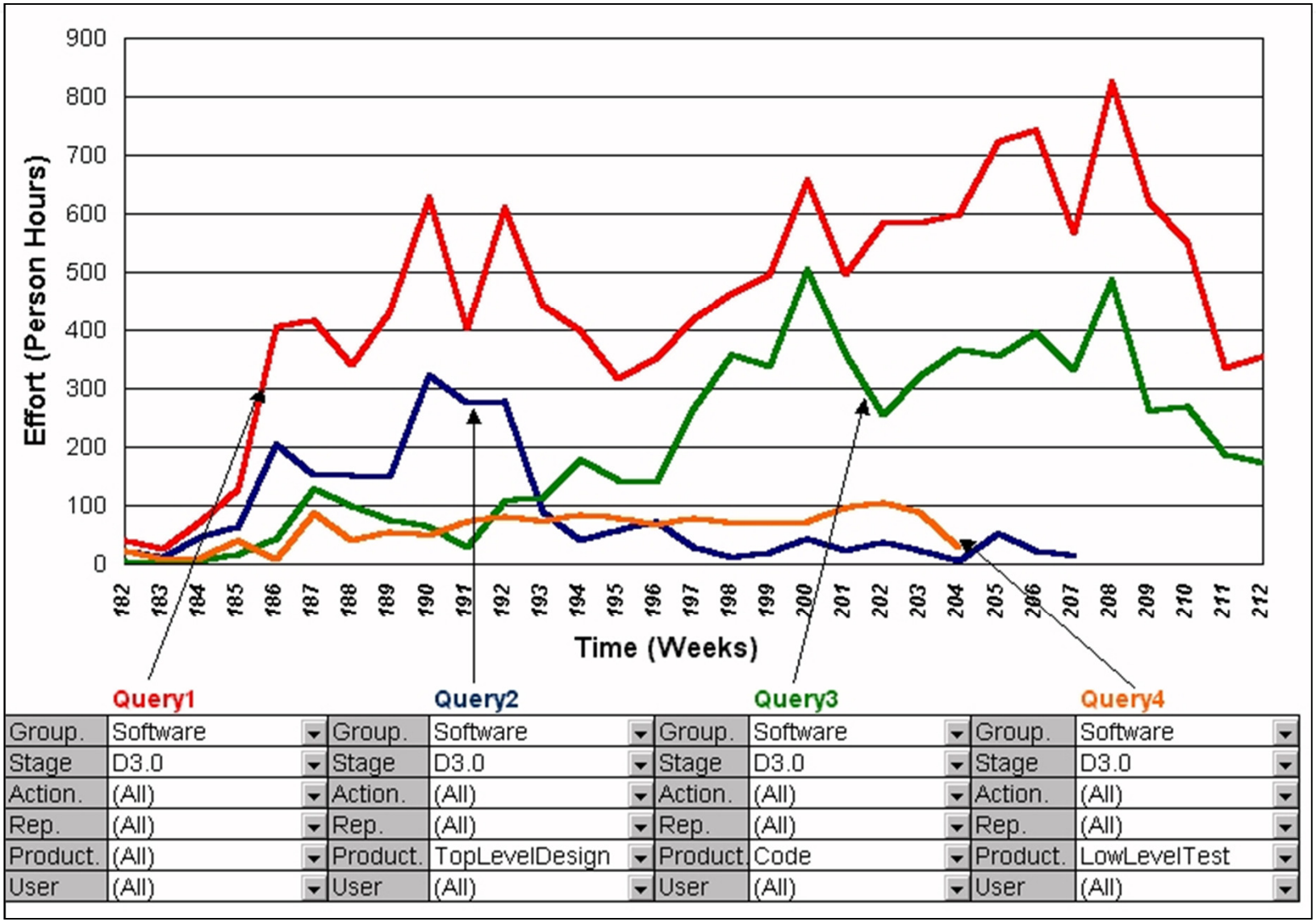
Simple Example – Effort Analysis



Group.	Software	Group.	Software	Group.	Software	Group.	Software
Stage	D3.0	Stage	D3.0	Stage	D3.0	Stage	D3.0
Action.	(All)	Action.	(All)	Action.	(All)	Action.	(All)
Rep.	(All)	Rep.	(All)	Rep.	(All)	Rep.	(All)
Product.	(All)	Product.	TopLevelDesign	Product.	Code	Product.	LowLevelTest
User	(All)	User	(All)	User	(All)	User	(All)

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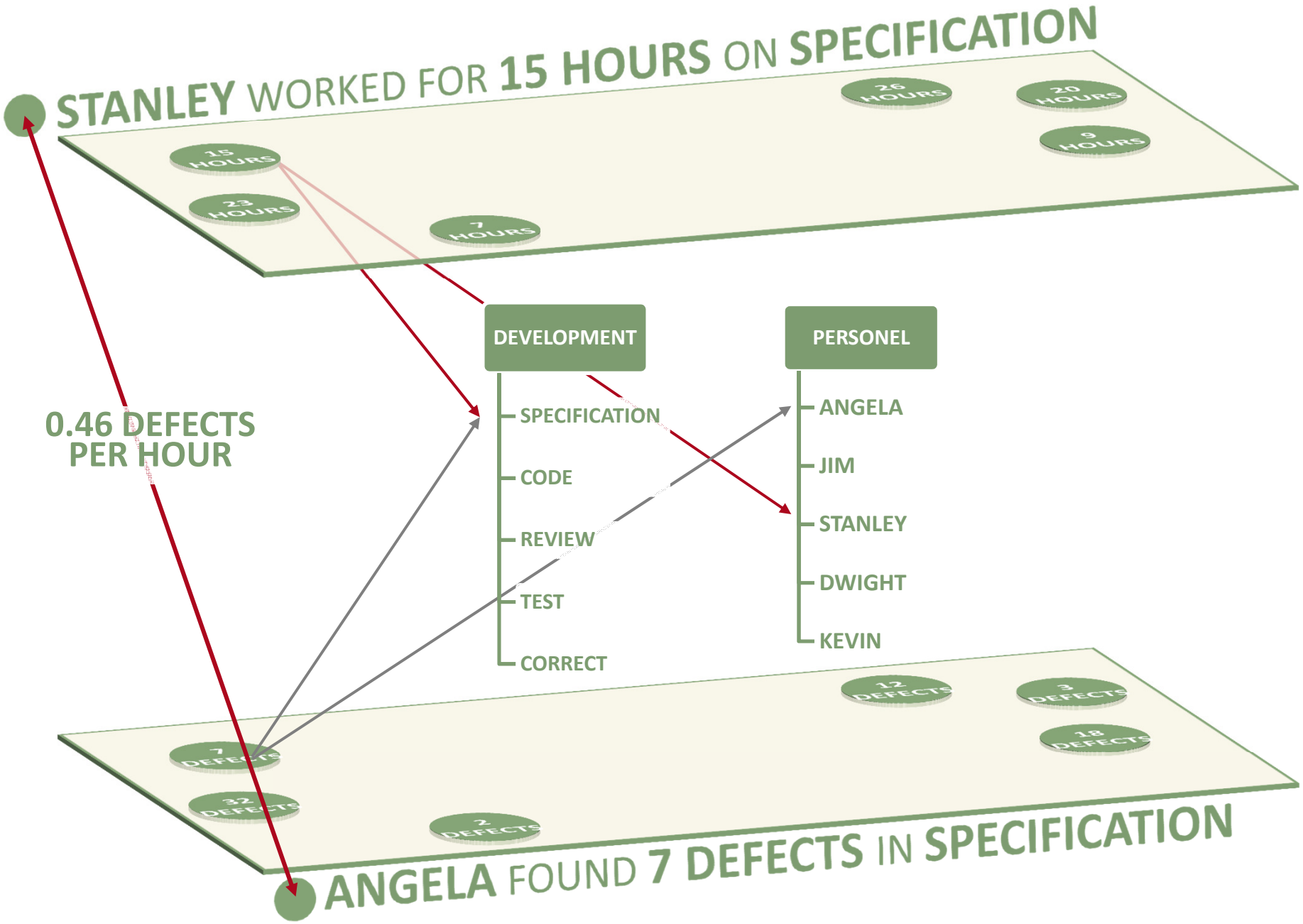

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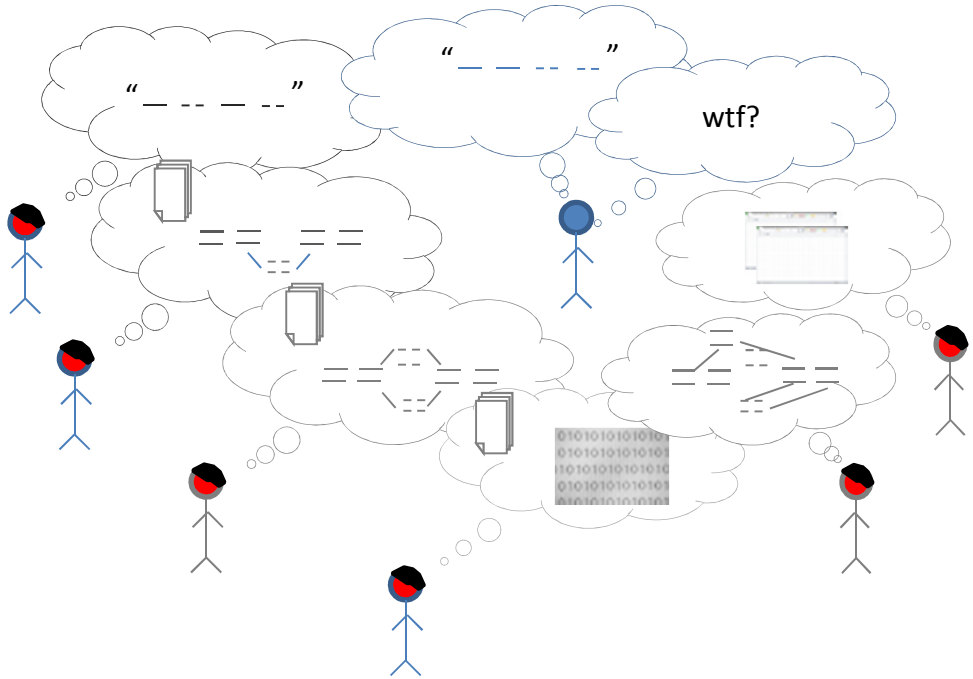
Conventional Approach




```
SELECT
  'today - ' || to_char(trunc(sysdate),'Mon FMDDFM'),
  trunc(sysdate) as deadline
FROM dual
UNION
SELECT
  'tomorrow - '|| to_char(trunc(sysdate+1),'Mon FMDDFM'),
  trunc(sysdate+1) as deadline
FROM dual
UNION
SELECT
  'next week - '|| to_char(trunc(sysdate+7),'Mon FMDDFM'),
  trunc(sysdate+7) as deadline
from dual
UNION
select
  'next month - '|| to_char(trunc(ADD_MONTHS(sysdate,1)),'Mon FMDDFM'),
  trunc(ADD_MONTHS(sysdate,1)) as deadline
from dual
UNION
select
  name || ' - ' || to_char(deadline, 'Mon FMDDFM'),
  deadline
from ticket_deadlines
where project_id = :project_id
and deadline >= trunc(sysdate)
order by deadline
```

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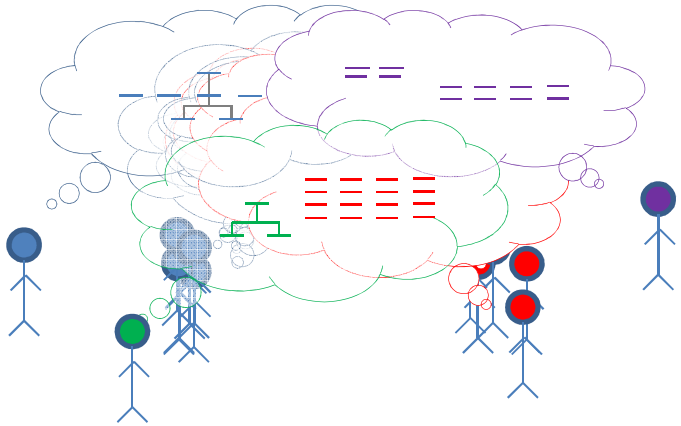
Our Approach



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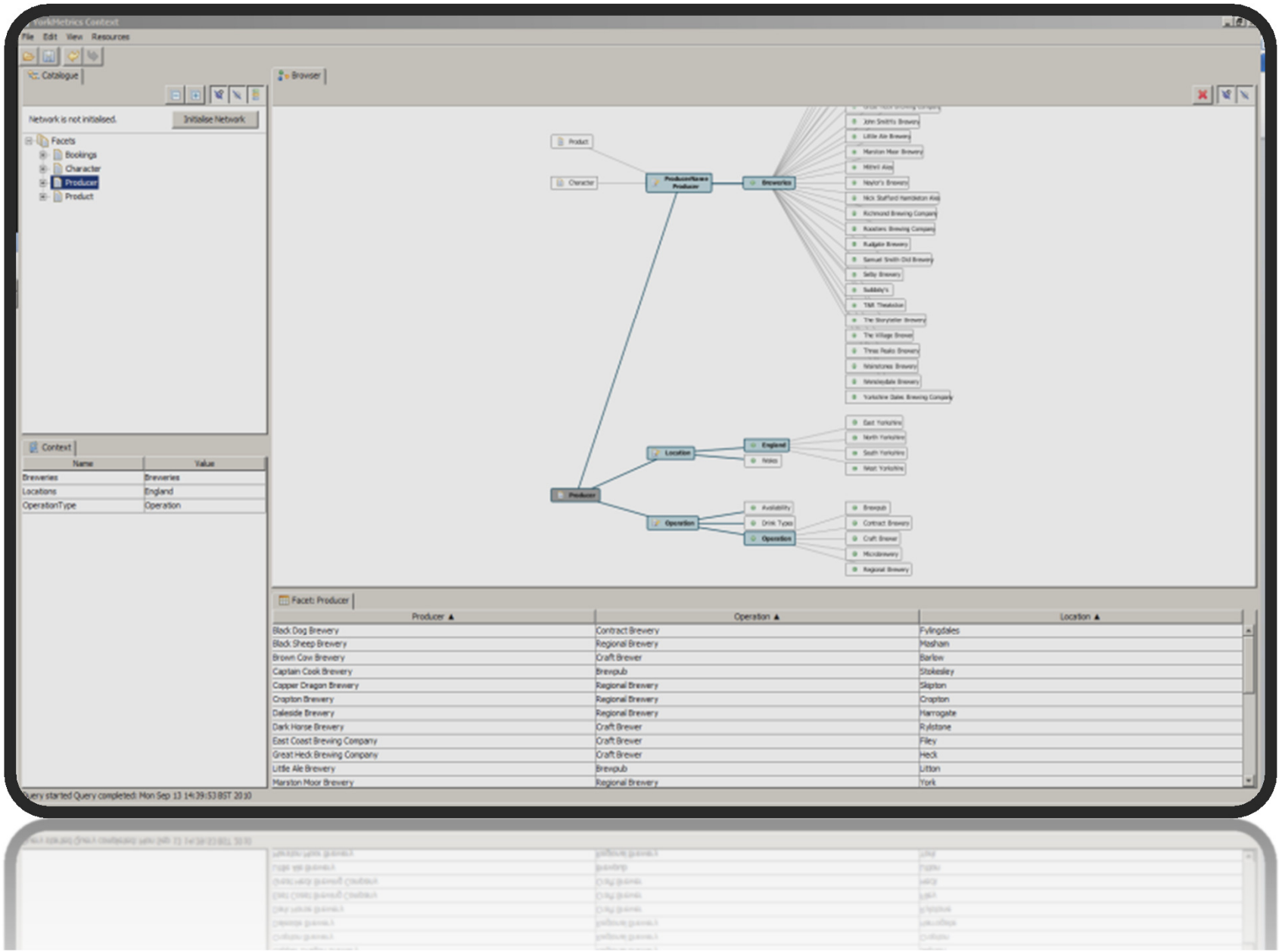
Context (CTX) Alpha



Beer Example

Simple non-software example to illustrate the approach…

Producer Grammar

- The <Producer> is a <Operation> located in <Location>
- "The *Black Sheep Brewery* is a *Contract Brewery* Located in *Masham*"

Product Grammar

- <Producer> produces <Drink> called <Label> is a <Style> rated at <ABV> …
- "*Black Sheep Brewery* produces *Beer* called Black Sheep Ale is a *Ale* rated at *4.4 ABV*"

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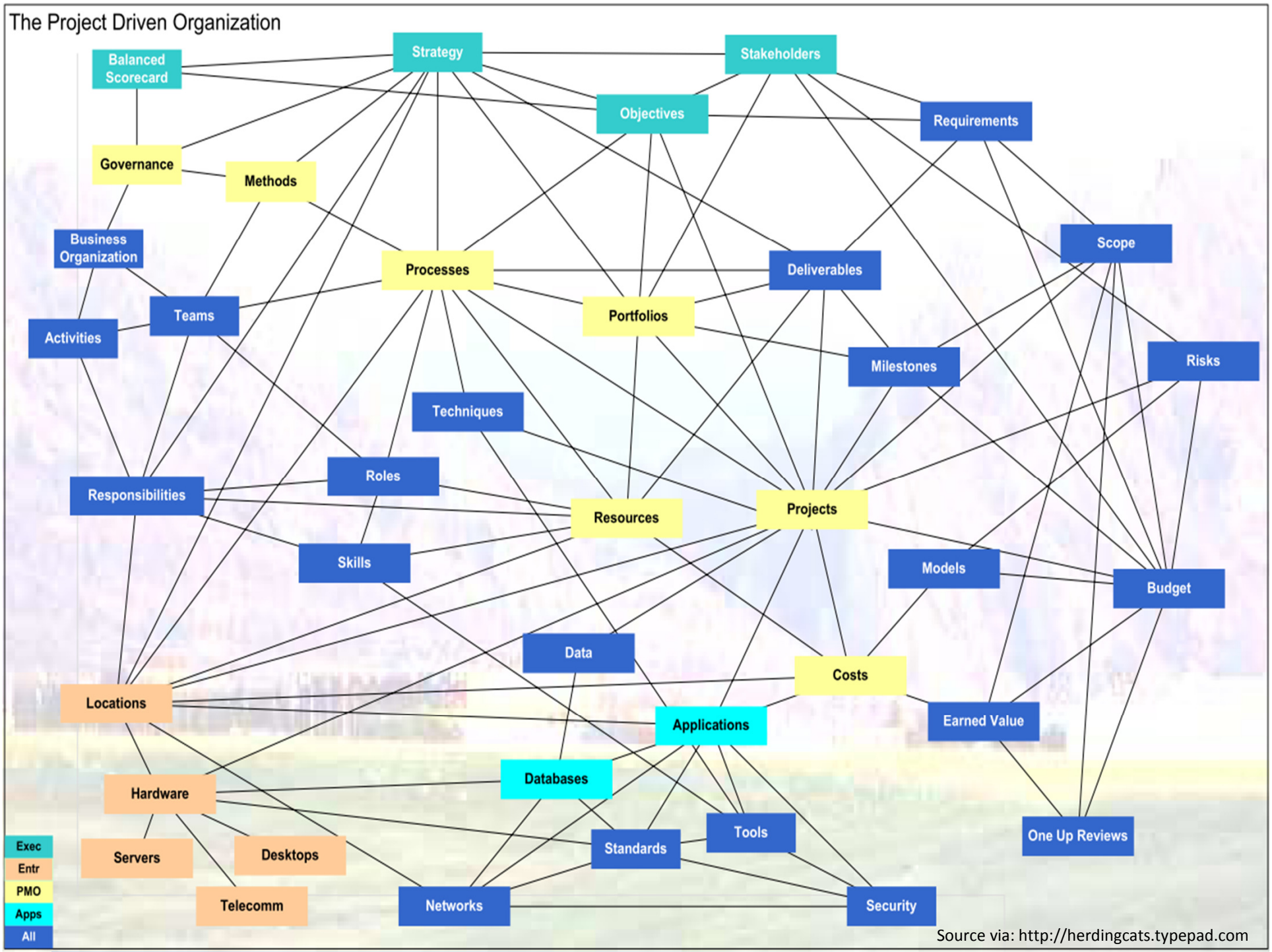
The Project Driven Organization
Balanced Scorecard
Strategy
Stakeholders
Objectives
Requirements
Governance
Methods
Business Organization
Scope
Processes
Deliverables
Portfolios
Teams
Activities
Milestones
Risks
Techniques
Roles
Responsibilities
Resources
Projects
Skills
Models
Budget
Data
Costs
Locations
Applications
Earned Value
Databases
Hardware
Tools
One Up Reviews
Standards
Servers
Desktops
Telecomm
Networks
Security
Exec
Entr
PMO
Apps
All
Source via: http://herdingcats.typepad.com

What Type of Problems?

- Type of Problems
  - Multi-faceted data with many interdependencies and viewpoints
  - Emergent information needs driven by user-value
  - Information missing, unaffordable, unspecifiable, unlocatable, not visible
  - Coordination across people and organisational boundaries
- Examples
  - Evidence and measures
    - progress, milestones, maturity, performance
    - quality, safety, compliance, issues
    - uncertainty, opportunity, risk, mitigations
    - benefits, affordability, targets
  - Capabilities, competencies, skills, expertise, learning
  - Organisation, roles, responsibilities

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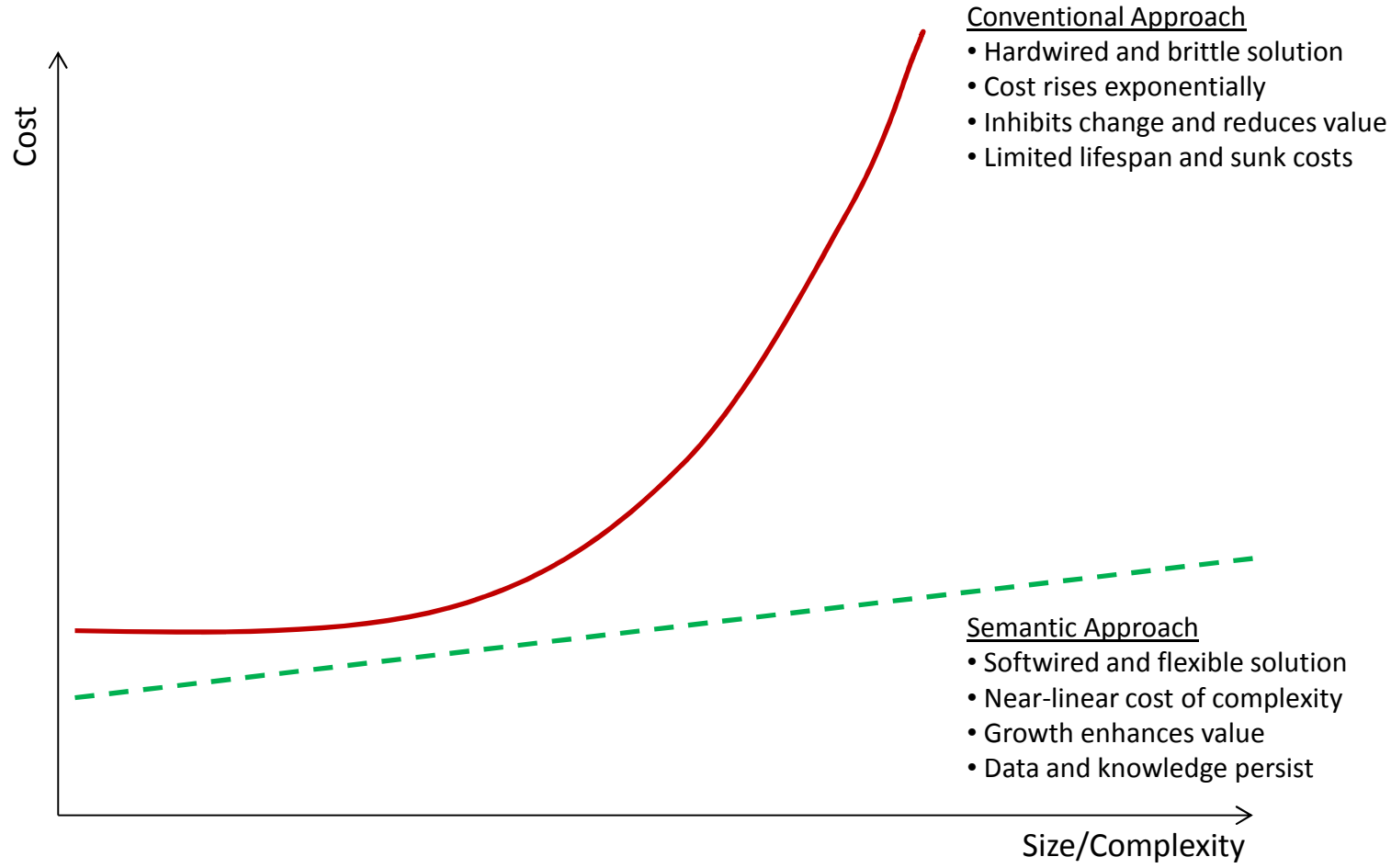
The Benefits Case



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Conclusions & Next Steps

- Context-based Measurement uses semantics to support rich multi-faceted analysis to maximise emergent value from our data.

- Can we share contextual metadata in order achieve greater understanding and insight?

Any Questions?

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Critical Review of Methods and Technology

- Review conducted by Professor Richard Paige:
  - "*The YM method provides a particularly novel approach to data modelling that goes far beyond basic relational calculus and querying via SQL statements. It also* ***goes beyond state-of-the-art modelling technology****, particularly Eclipse/EMF, in its support for flexible querying.*"
  - "*Another innovation of the YM approach is its* ***coherent approach to modelling****: all modelling features and query features are integrated, contained within the same framework*"
  - "*Perhaps the most important novelty of the technology is its* ***conceptual coherence*** *– that is, there is a single piece of technology that supports the methodology. This should be compared with traditional modelling approaches that require a number of technologies – modelling, validation, graphical UI, querying, transformation – to support many of the same capabilities as YM's technology*"
  - The YM approach has **substantial technical benefits** based on its use of multi-faceted data, pre- and post-coordination, its **flexible approach to managing change**, and its conceptual coherence.