



Dr. Keith Collyer

Session

Innovate2010

The Rational Software Conference

Let's **build** a smarter planet.



Our world is becoming more complex everyday...

162 million

Almost 162 million smart phones were sold in 2008, surpassing laptop sales for the first time.

90%

Nearly 90% of innovation in automobiles is related to software and electronics systems.

1 trillion

Soon, there will be 1 trillion connected devices in the world, constituting an "internet of things."



...and the challenge of managing this complexity has never been greater

48 months

Five years ago, a typical manufacturer's concept-through production cycle time was 48 months. Within four years, that time dropped to 18 months—with a goal of reaching a 12 month cycle within the next year.

\$300 billion

66% of software products are deemed unsuccessful, costing the industry nearly \$300 billion annually.

42,000 units recalled

KAC1

More than 42,000 defibrillators had to be recalled in 2007 due to faulty software.



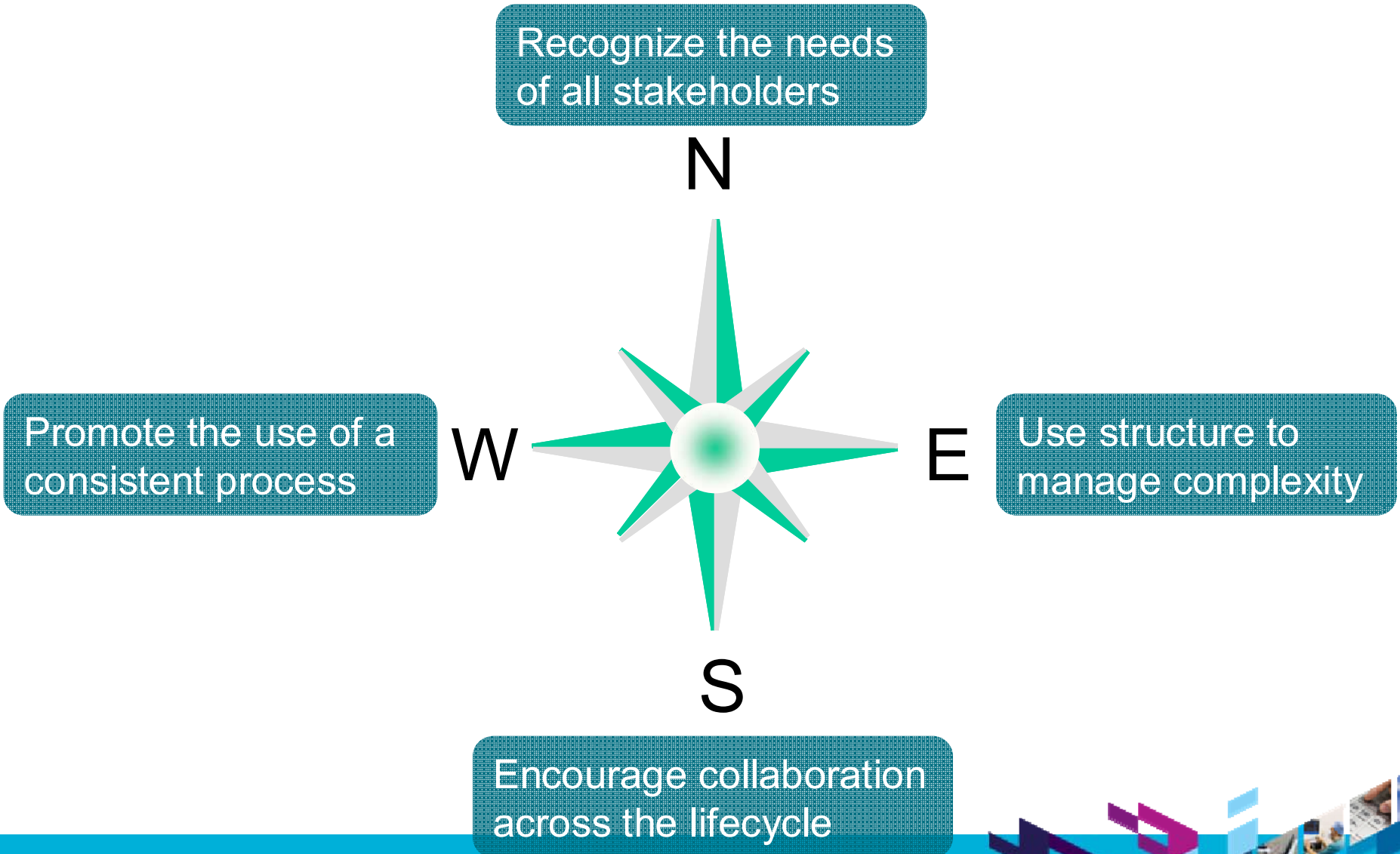
Slide 3

KAC1

Replace with Toyota example

Keith Collyer, 3/19/2010

4 Principles for Effective Requirements Lifecycle Management



Principle 1: Recognize the needs of all stakeholders

Who are the stakeholders?

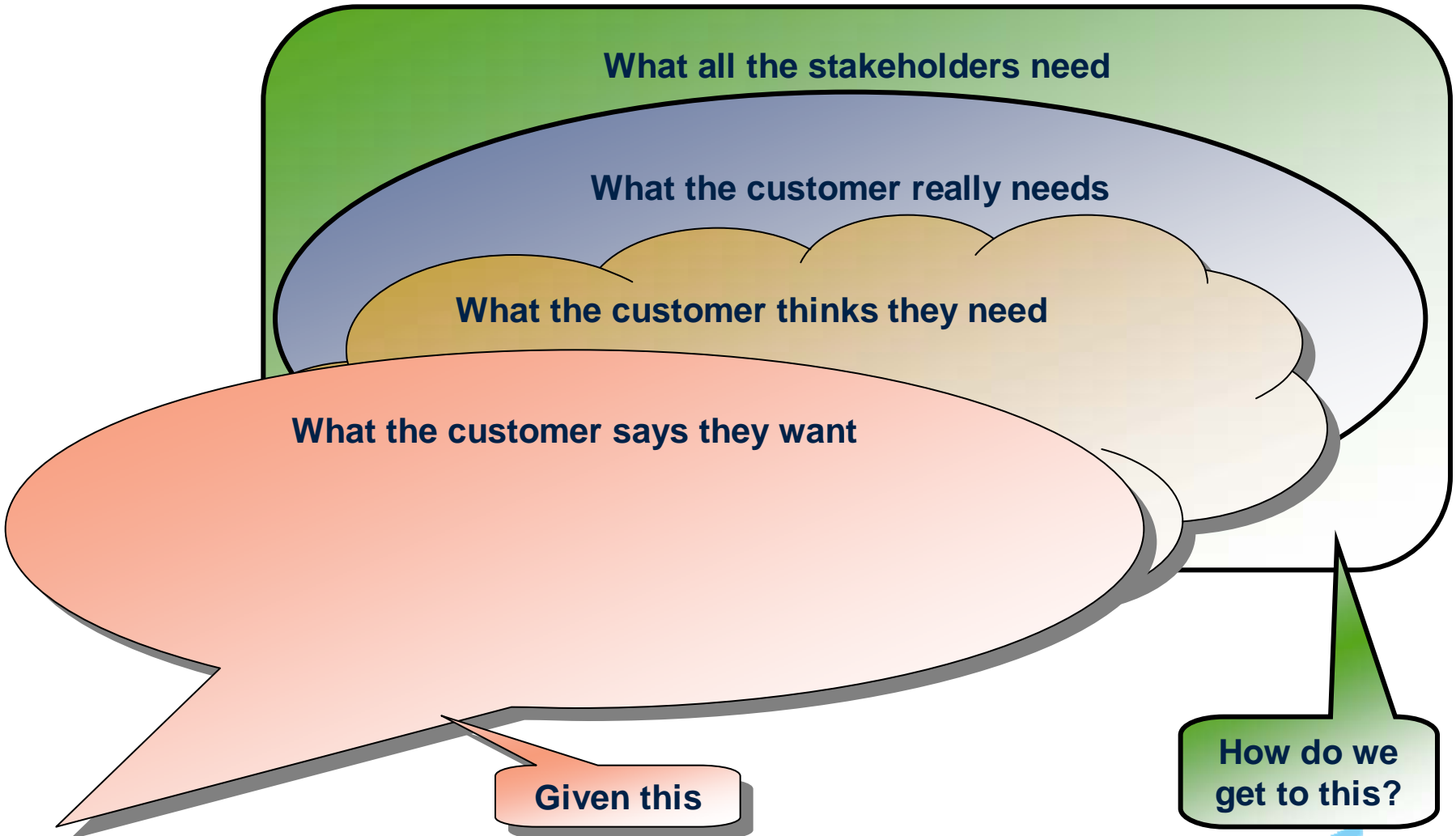


An Exercise in clear and concise descriptive writing?

Traffic shall be able to flow at the maximum rate at all times except that in emergencies it shall be diverted away from main roads and be delayed by no more than 10 minutes, unless the emergency condition continues for more than 15 minutes in which case the delay may be increased to 30 minutes but in the event that delays are more than 10 minutes then the system shall activate an excess delay exception and shall maintain the maximum delay 10% of the stated values for a minimum of 90 minutes.

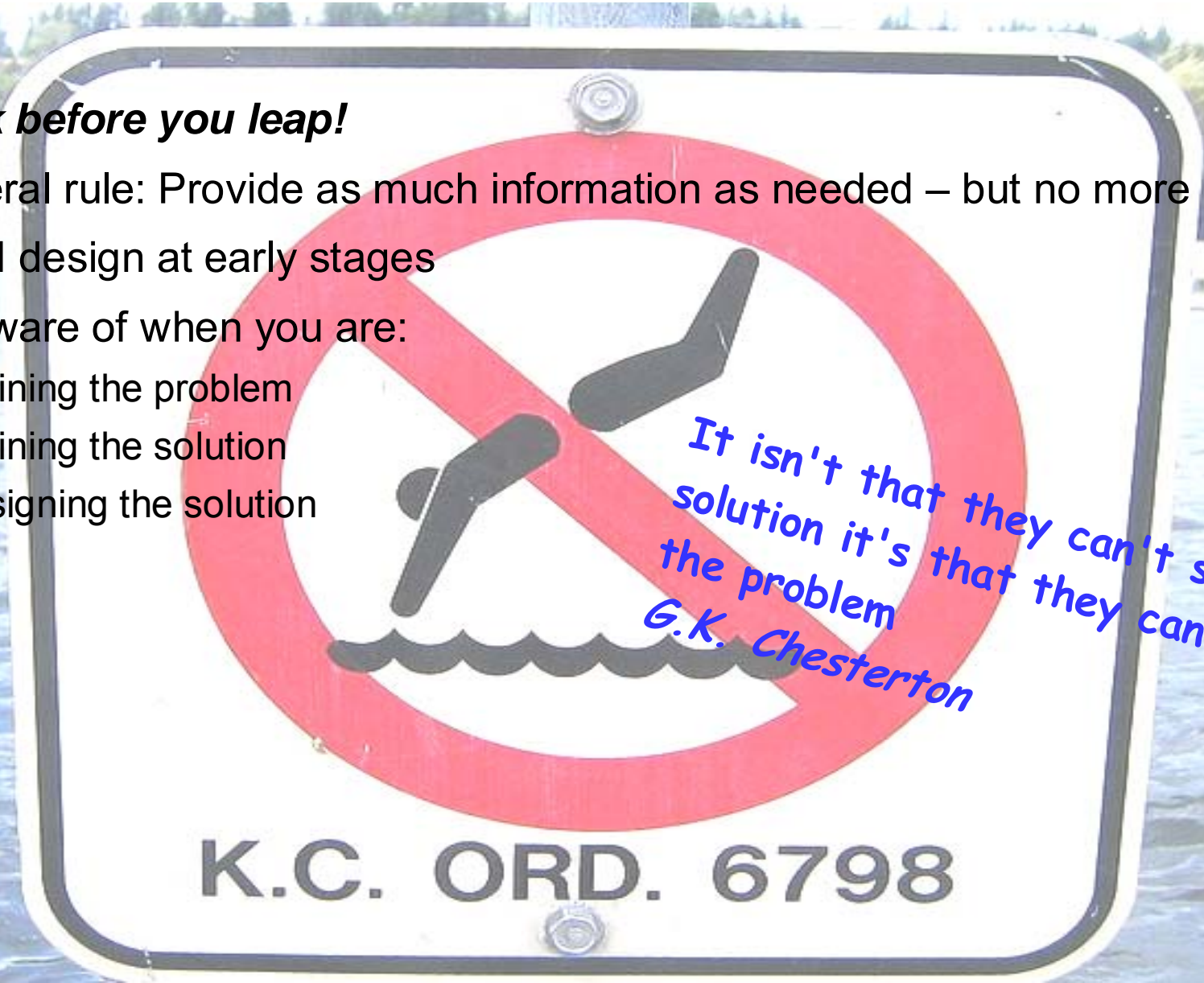


Different perspectives



Keep information at the right level

- ***Look before you leap!***
- General rule: Provide as much information as needed – but no more
- Avoid design at early stages
- Be aware of when you are:
 - ▶ Defining the problem
 - ▶ Defining the solution
 - ▶ Designing the solution



It isn't that they can't see the solution it's that they can't see the problem
G.K. Chesterton

K.C. ORD. 6798

Avoid Premature Details at Top Levels

Problem

State what the stakeholders want to be able to do: **Capabilities**

Solution

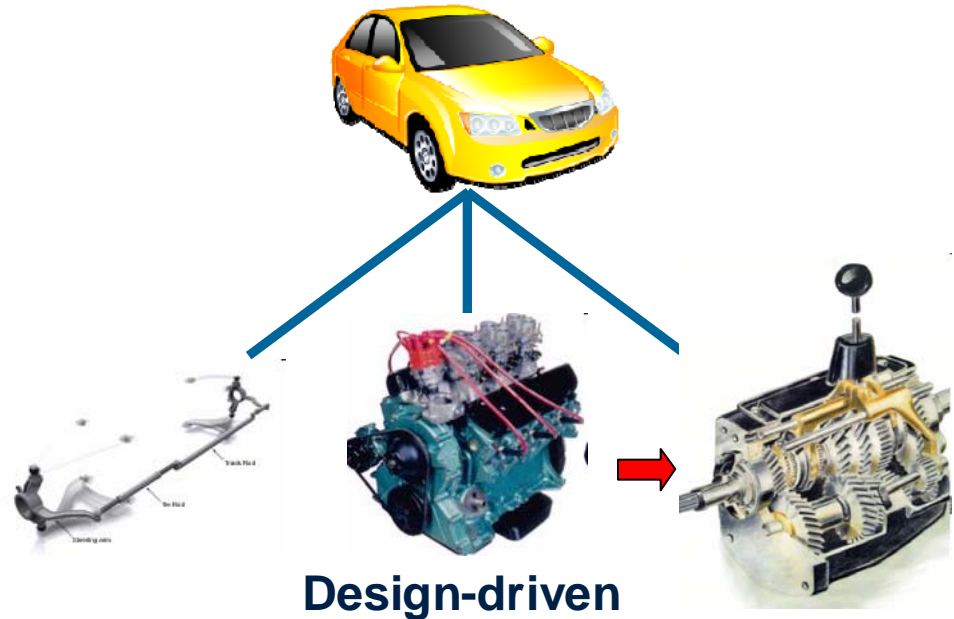
State what the system must do: **Function**



Building a Requirements Hierarchy



Decomposition

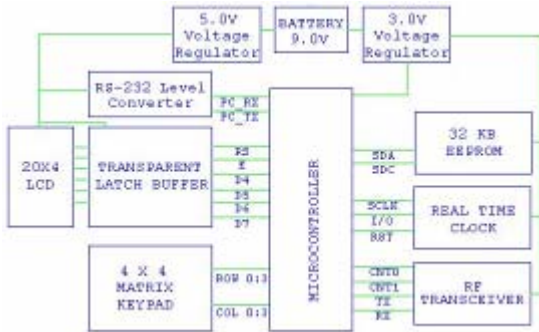


Design-driven



Tracing through the hierarchy

Why are we building this?



Where is this implemented?

How do I test this?



Can we show these answers? (Governance)



Managing requirements in the hierarchy – Attributes



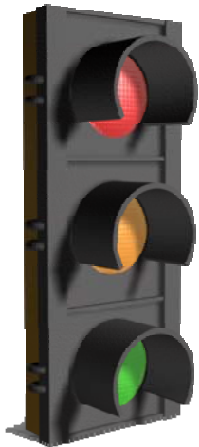
Identification



Type



Performance



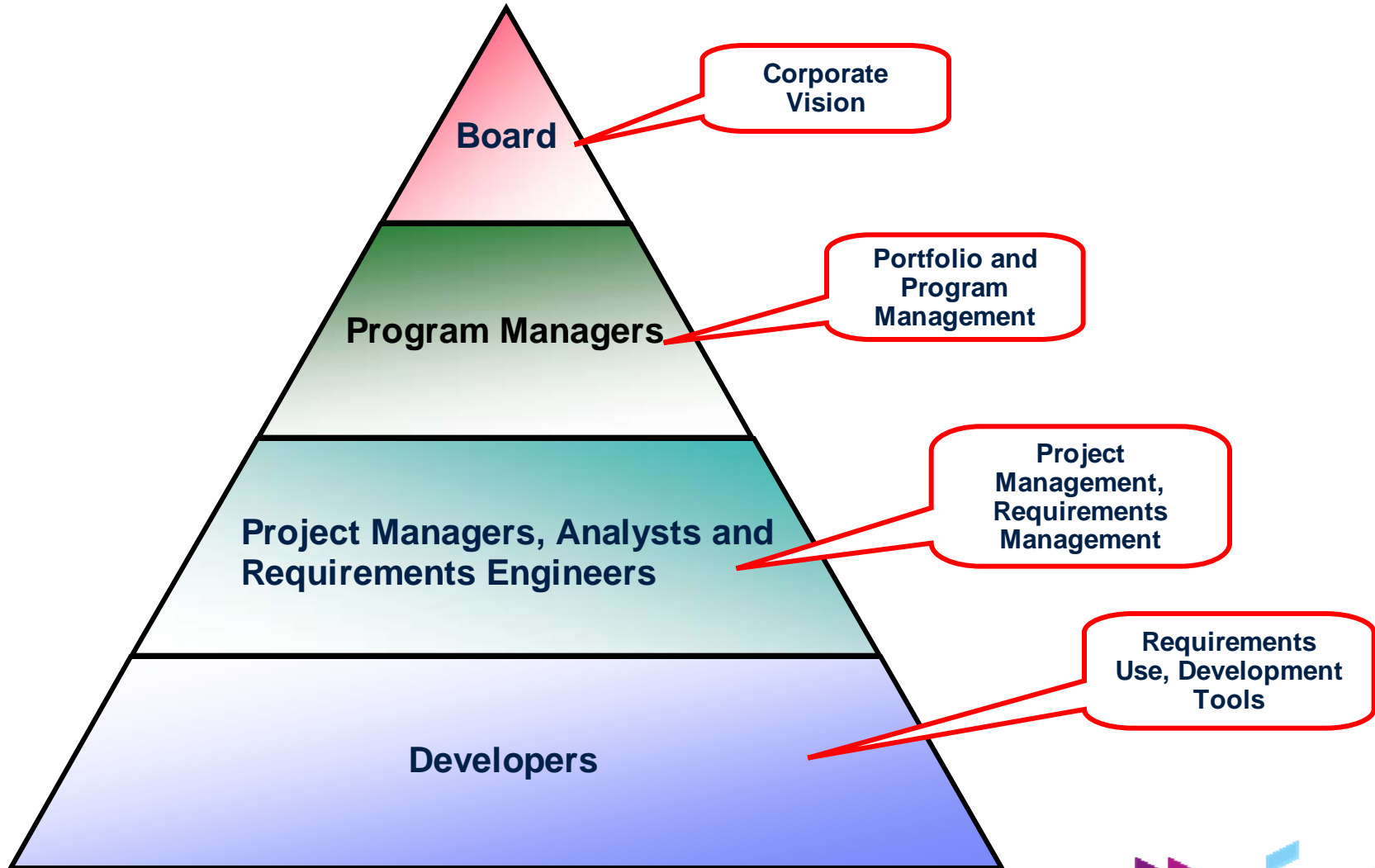
Priority



Status



RM across the Enterprise

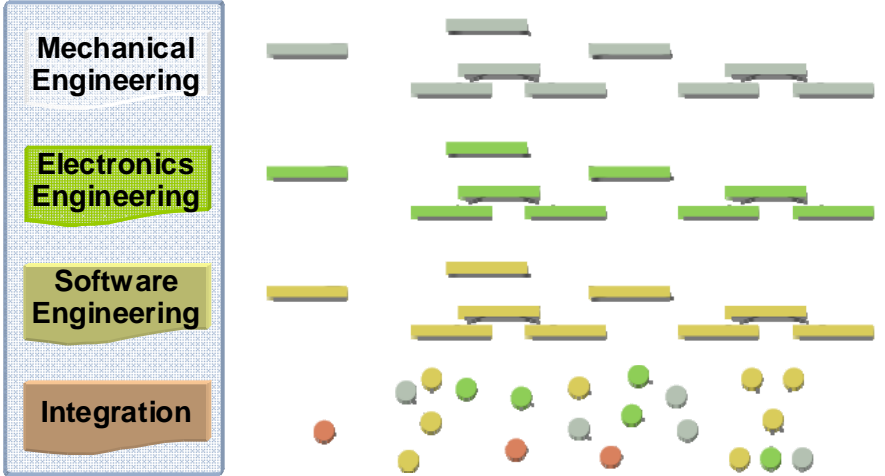


Requirements Definition & Management *Must Be Integrated into the Product Lifecycle*



Business Analysis: *Enterprise Architecture, Business Process Mgmt, Product Mgmt, Portfolio Mgmt*
Program & Project Management: *Cost Accounting, Scheduling, Measurements, Reporting, Risk Mgmt*
Requirements Management

Detailed Design and Implementation

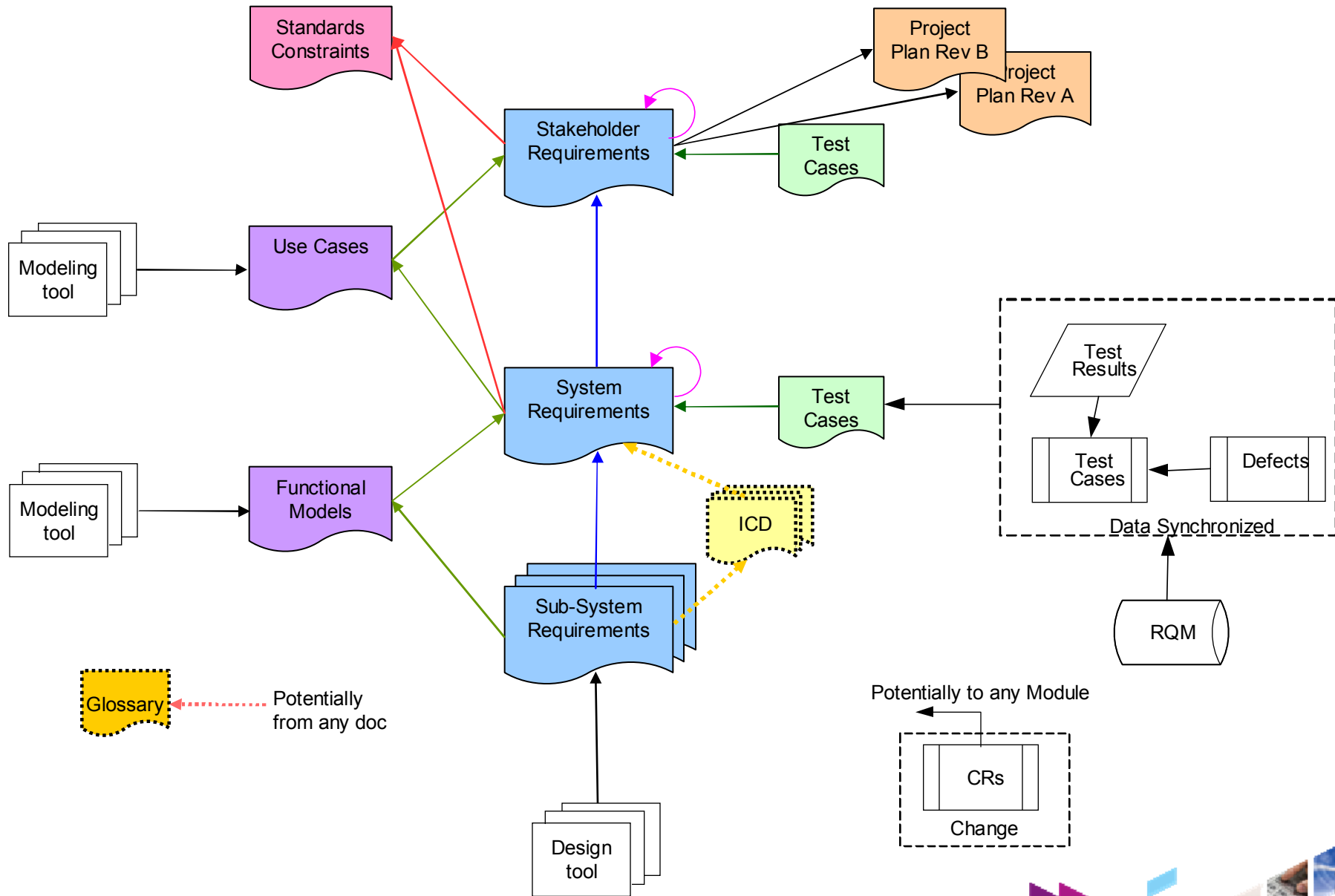


Verification and Validation – Test Management

Change and Configuration Management



Principle 3: Integrate RM across the lifecycle



Measure the requirements process

- CMMI, ITIL and other process assessment frameworks expect measurement
 - ▶ CMMI needs RM to get to level 2
 - ▶ Need measurement to understand efficiency and consistency
 - ▶ Key to continuous process improvement

Metrics Collection	Total NC	Total C	Agreed C	Delta NC	Delta C	Allocated NC	Allocated C	Proven NC	Proven C	Deleted NC	Deleted C
24 21/5/05 - 22/5/05											
24.1 21/5/05 - 21/5/05											
24.1.1 /01 - Period ending now - real time/Reqts - Standard view	4	13	0	0	0	3	10	1	4	0	0
24.1.2 /01 - Period ending now - real time/Reqts -01 - Data Entry	4	13	0	0	0	3	10	1	4	0	0
24.2 22/5/05 - 22/5/05											
24.2.1 /01 - Period ending now - real time/Reqts - Standard view	0	0	0	0	0	0	0	0	0	0	0
24.2.2 /01 - Period ending now - real time/Reqts -01 - Data Entry	0	0	0	0	0	0	0	0	0	0	0



Effective Requirements Management realizes quantifiable savings

and with a tool you are able to measure

Example: how to measure and results

- Development releases consisting of typically 8000 requirements used to take 6 months
- Phase 1 - Application of robust process and tool enforcement reduced this period to 12 Weeks over a period of 1 year
- Phase 2 - Continuous process improvement for a further 12 months reduced this period to 6 weeks
- Over time, defect removal and effectiveness was 55% at phase 1, 88% at phase 2 and still improving
- Defects undetected end up with the customer – the figures represent huge improvements in cost of re-work, quality and customer satisfaction



Principle 4: Automate your requirements process

Use a Requirements Management Tool

Document structure

2 User types

2.1 Nationalities
The car will be used in the following countries: UK, USA, Northern Europe, Eastern Europe, Japan, Russia, Australia.

2.2 User sizes
People come in all shapes and sizes. The car must be suitable for people maximum and minimum sizes 1.3 m to 2 m weighing 25 kilograms to 140 kilograms.

3 Requirements

3.1 Capability Requirements

3.1.1 Carrying Capacity

3.1.1.1 Number of people
Four average size adults shall be able to travel in comfort for a period of 4 hours. This level of comfort is defined as being equivalent to the standard of comfort provided by the top 30% of cars produced in 2006.
The top level of cars are those in the price range £13,000 to £30,000 at 2006 prices.
Five average size adults shall be able to travel in comfort for a period of 4 hours.

Attributes

Order Requirements' current 1.0 (Issue 1) in /Training Database (Formal module)

Car user requirements	Percentage cost	Progress
1 Introduction	0.172835	0
This module contains the user requirements for a new car to be commercially available by 1 August 2006.		0
2 User types	1.370889	0
2.1 Nationalities	0.642687	0
The car will be used in the following	0.769025	0

Filter to focus

ID	Car user requirements
TRN-CSR-3	2 User types
TRN-CSR-4	2.1 Nationalities
TRN-CSR-5	The car will be used in the following countries: UK, USA, Northern Europe, East Japan, Russia, Australia.
TRN-CSR-6	2.2 User sizes
TRN-CSR-7	People come in all shapes and sizes. The car must be suitable for people maximum sizes 1.3 m to 2 m weighing 25 kilograms to 140 kilograms.

View related information

Car user requirements	In-links (System Requirements)
3.1.2.1.1 Forwards	
Users shall be able to travel at speeds up to 200 kilometers per hour.	<p>TRN-SR-5 The car shall be able to move forwards at all speeds from 0 to 220 kilometers per hour on standard flat roads with winds of 0 kilometers per hour, with 280 BHP. Not Set</p> <p>TRN-SR-26 The car shall have a mechanism to enable it to be moved forwards or backwards. Not Set</p>

View historical information

3.1.1.1 Number of people	<p>3.1.1.1 Number of people <i>(Next object differs.)</i> Deleted object 'TRN-CSR-12' follows here:- Four average size adults shall be able to travel in comfort for a period of 4 hours. This level of comfort is defined as being equivalent to the standard of comfort provided by the top 30% of cars produced in 2006.</p>
Five average size adults shall be able to travel in comfort for a period of 4 hours.	Five average size adults shall be able to travel in comfort for a period of 4 hours. <i>(Previous object differs.)</i>
Two average size adults and 3 average size children shall be able to travel in comfort for a period of 3 hours. This could be accomplished with a three seat arrangement.	Two average size adults and 3 average size children shall be able to travel in comfort for a period of 3 hours. This could be accomplished with a three seat arrangement.
This level of comfort required is defined as being equivalent to the standard of comfort provided by the top 30% of cars produced in 2009.	<u>This level of comfort required is defined as being equivalent to the standard of comfort provided by the top 30% of cars produced in 2009.</u>
Users shall have easy entry and exit.	Users shall have easy entry and exit.



Benefits of Effective Requirements Lifecycle Management

Greater Confidence

Ability to manage change

Improved customer/supplier relations

Visibility of progress/status

Improved Cost / Benefit Decisions



4 Principles for Effective Requirements Lifecycle Management

Recognize the needs of all stakeholders

N

W

Promote the use of a consistent process

E

Use structure to manage complexity

S

Encourage collaboration across the lifecycle



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THANK YOU

