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Standards, Modeling and Collaboration

Why you should care

Alain Picard – Chief Strategy Officer



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or why...

Society needs you and you need
Standards...and models.



Who is Benchmark

- We are a small research oriented consultancy helping clients with system modernization.
- We also help clients with other aspects of system evolution:
 - Quality improvement
 - System understanding
 - Impact analysis
 - Code Level Data Lineage
 - And many more
- Specialize in heterogeneous systems
- And we are bullish on standards.



Today's Menu

On the menu today we have a Smörgåsbord of items:

- PASED Mission Statement
- The importance of your research work
- System Evolution and Modernization
- Standards and our work with the OMG
- Modeling and model sharing
- Collaboration
- Q & A



PASED Mission Statement

The scientific goals of PASED are:

- **to disseminate** the benefits of supporting decision-making processes using empirical evidence;
- to emphasize the use of empirical studies of all kinds **to accumulate knowledge about software projects**;
- to describe the application of methods and approaches borrowed from other research domains, such as psychology, biology, and social sciences, to analyse software engineering data;
- and, more generally, to bridge the gap between data-mining techniques for software repositories and empirical software engineering to build actionable knowledge via sound techniques to support decision making.



Changing the World

**YOU
CAN CHANGE
THE WORLD**



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Puts dependency on software and the ability of those software systems to perform reliably and with expected level of quality as paramount to the advancement of the Japanese society.

Globalization

- Not a debate on pros/cons
- Great thing is Collaboration
- Sharing knowledge
 - **From lab to industry**
- We're all part of global collaboration network



Advancing Research

Incremental vs. Breakthrough research

- Research has shown:
 - **99.97% of advancement in research is incremental (or decremental as Prem taught us all).**
 - **0.03% is breakthrough research**
- Incremental research is what pushes the boundaries all the time
 - **Remember 20 years ago (??)**
 - Facing hard drive size limits
 - Thought that computers could keep following Moore's law
 - **Not sensational and doesn't make headline news**
- And now?
 - **Incremental research has overcome many of the barriers by constantly pushing back. Almost defying nature and the laws of physics.**
- Ultimately we need breakthrough research, but it is not the holy grail.



Aligning Research

Reshaping the discourse

- Your work is very much behind the scenes
- Not well publicized at large
- Often leads to discrediting of your research when things like IT project failure happens, or modernization project fails.
- Need for the discourse to move to real challenges
 - **Offer solution better adapted to customers**
- Need to align advancements around standards that promote information sharing
- Our (My) role from industry is:
 - **Help bridge gap between your work and business usage**
 - **Show the value of your work to the world**



The World is Evolving

- Started unstructured programming
- Moved to structured programming
- OO
- API
- Frameworks and connected frameworks
- More interconnections
 - **Sun used to say : “The network is the computer”**
- Web services, SOA
- Now cloud
- This is all just the beginning
- Very dramatic paradigm shift next 15-20 years



Heterogeneous Reality

- So we are kidding ourselves if we work on single applications
- Things happen in heterogeneous system, multi-language, connectivity, interfaces, paradigm, etc
- We are inter-connected
 - Could represent those other systems as black box but often too limiting
 - So much so that true analysis will often be inter-systems



Legacy Systems

- What do you imagine when you hear about legacy
 - Huge computer rooms
 - Punch cards
 - Reel to reel tapes spinning in all directions



Legacy Systems

Is that only what legacy is all about, or could this also be legacy?



Legacy Systems

- Better definition of legacy
 - Any system that has been put into production
 - As soon as it gets into maintenance mode it is legacy
 - Could have been released last month
- Not much sex appeals to legacy
 - How many of you are excited about research on legacy systems?
 - After all you're forward thinkers, you're looking at the future not the past



Legacy Systems

- For a start other discipline study the past:
 - **Archeology**
 - **History**
 - **Many others**
- To avoid the errors of the past
- Contains huge amount of codified knowledge
- And some of those old systems are not that old as well
- When looking at legacy
 - **Important to understand what it means**



Legacy Systems: Rebuilding

- Can't destroy and rebuild all of them tomorrow
- Easy for simple system
 - **Analogous to a house**
- Not so easy for bigger ones
 - **Take for example bigger structures**

- But
 - **Paradigm shift over the years**
 - **Very different approaches**
 - **Ways of doing things**
 - **Old "siloed" systems**
 - **Replicated business logic (not only code clones)**

- This is not what modernization want to replicate and move forward



Understanding/Comprehension

- Reality is that even to get rid of them
 - **We need to understand those system**
 - **Need to recover from code/implementation:**
 - Functional specifications
 - Architecture (depending on use case)
 - Business rules
 - **Analysis to be conducted based on current business drivers.**
 - **Triage of what to keep and what to throw away**
 - **Uncover deeply buried business knowledge accumulated over the years.**
 - This is often not well understood but CRITICAL
- Knowledge capture is key to moving forward
 - **And ultimately getting rid of those old systems**



Getting rid of Old Legacy

- No one wants those old systems around forever
- So **WE** need to provide a path
 - **WE need to lead the way**
- More people is not the solution
 - **Huge Data → Huge Brain**
 - **Specialized skills needed here prohibits going down that road. You just don't create SME's out of thin air**
 - **Cost would be prohibitive**
 - **Risk is too high**
 - **Would take too much time**
- And this is all why the transition takes so long
- So what is the solution
 - **Intelligent tools**
 - **Serve to EMPOWER limited number of SME**



From Legacy to ??

- Often hear that we don't need to look at those legacy systems, since we're going with COTS or huge packaged systems
 - **This is a total fallacy**
 - **You need to analyze your current systems before adapting/configuring new systems**
- Or we get armies of business analysts to conduct interviews with help from a few developers to look in ad-hoc fashion
- Then surprise
 - **We have all heard about those SAP integration horror stories**
 - **Ask yourself, is SAP as a product to blame or is the approach to the transition more at fault?**



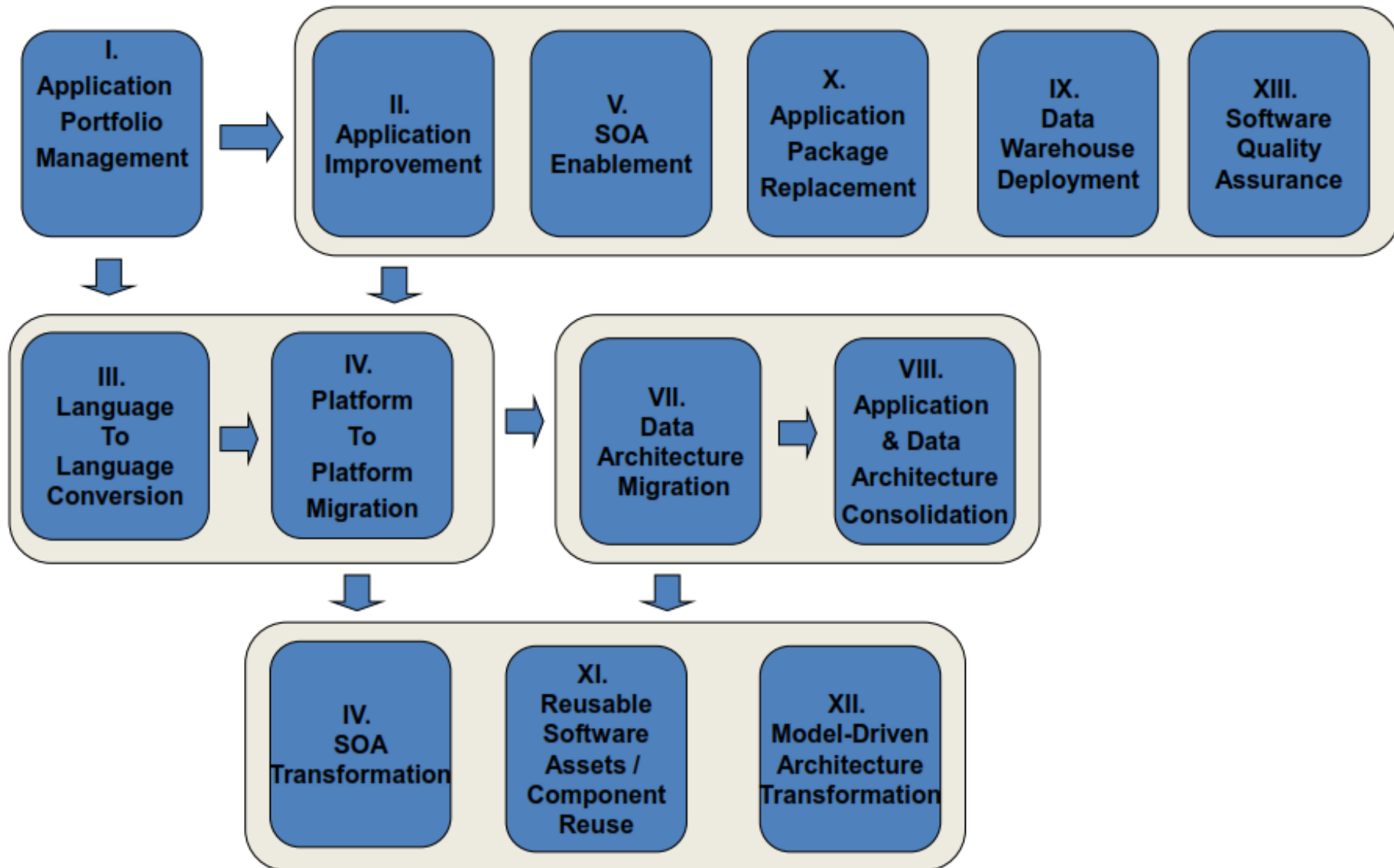
OMG- Object Management Group

Why do we need standard groups:

- Need unified voice around sound usage
 - **Also need to call out snake oil vendors**
 - They only hurt everyone's credibility
 - Enough "vapor" out there.
- Need to understand what we need to share
- Need to develop consensus (standards) around this knowledge representation
- Collaboration platforms like the OMG are critical to align research and industry.
- Let's talk about ADM
 - **Architecture Driven Modernization**



OMG ADM Modernization Scenarios

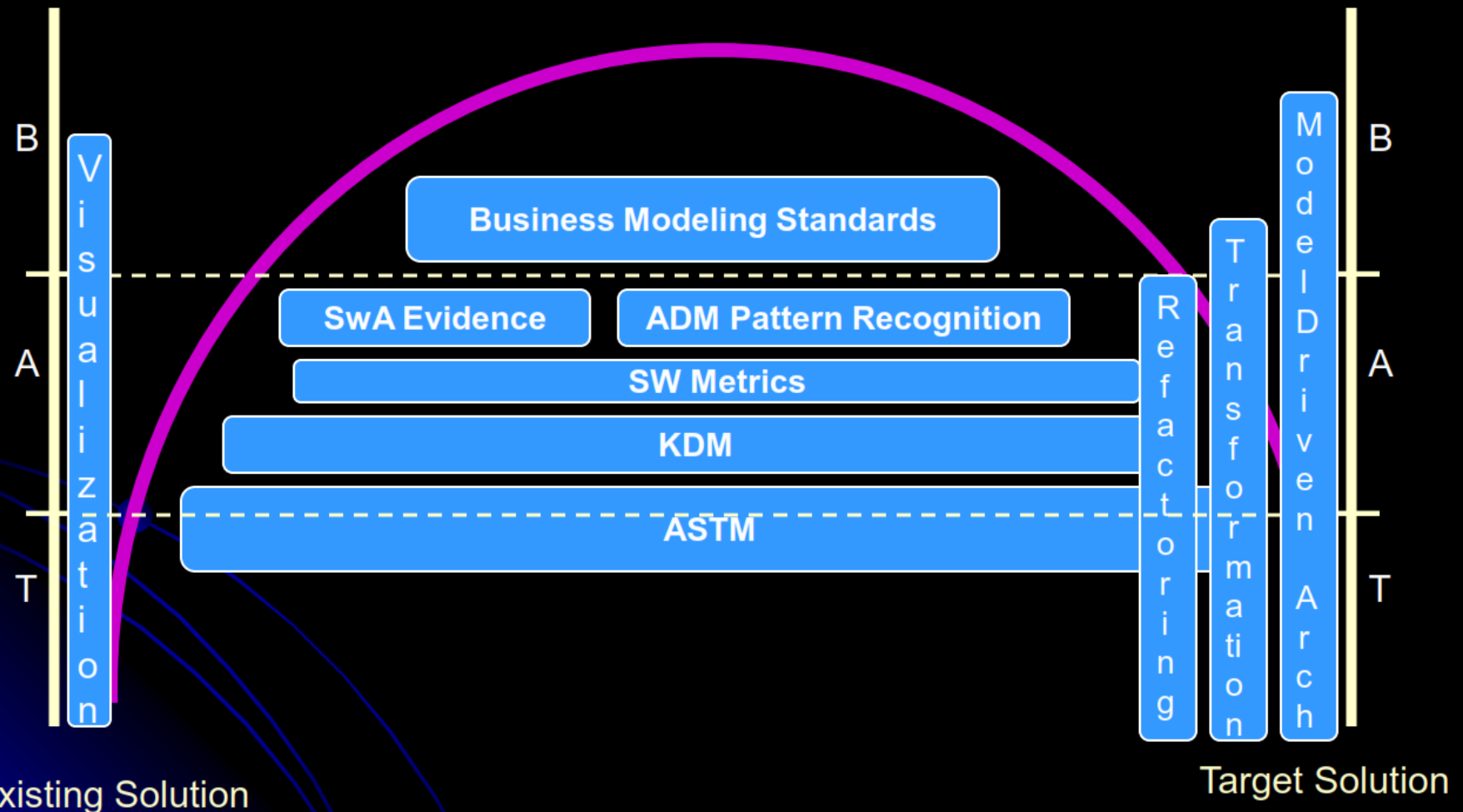


OMG ADM Standards

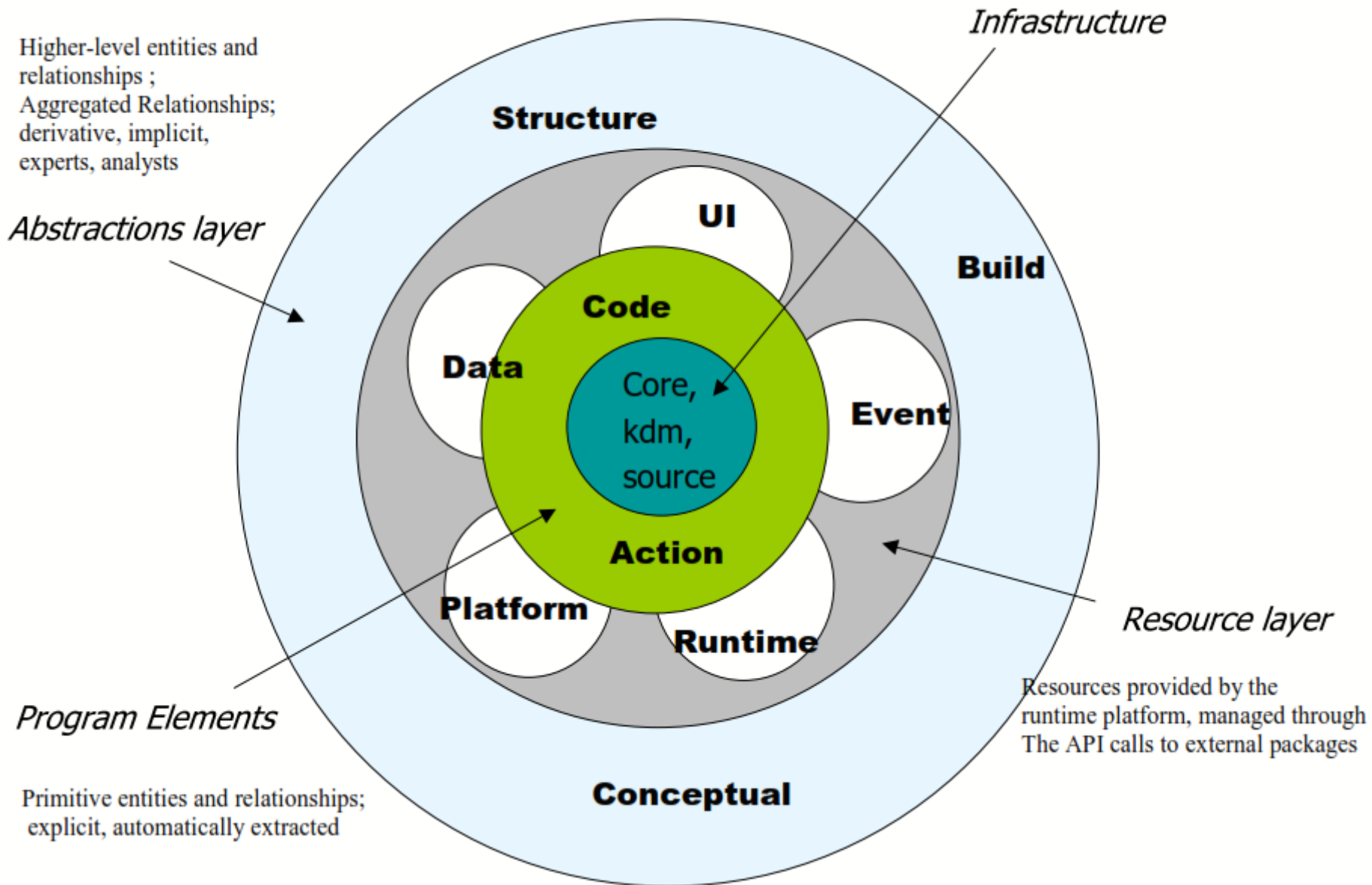
- ASTM
 - **Abstract Syntax Tree Metamodel**
- KDM
 - **Knowledge Discovery Metamodel**
 - **ISO 19506**
- SMM
 - **Structure Metrics Metamodel**
- SWA Evidence Metamodel
 - **Software Assurance**
- Pattern identification and recognition



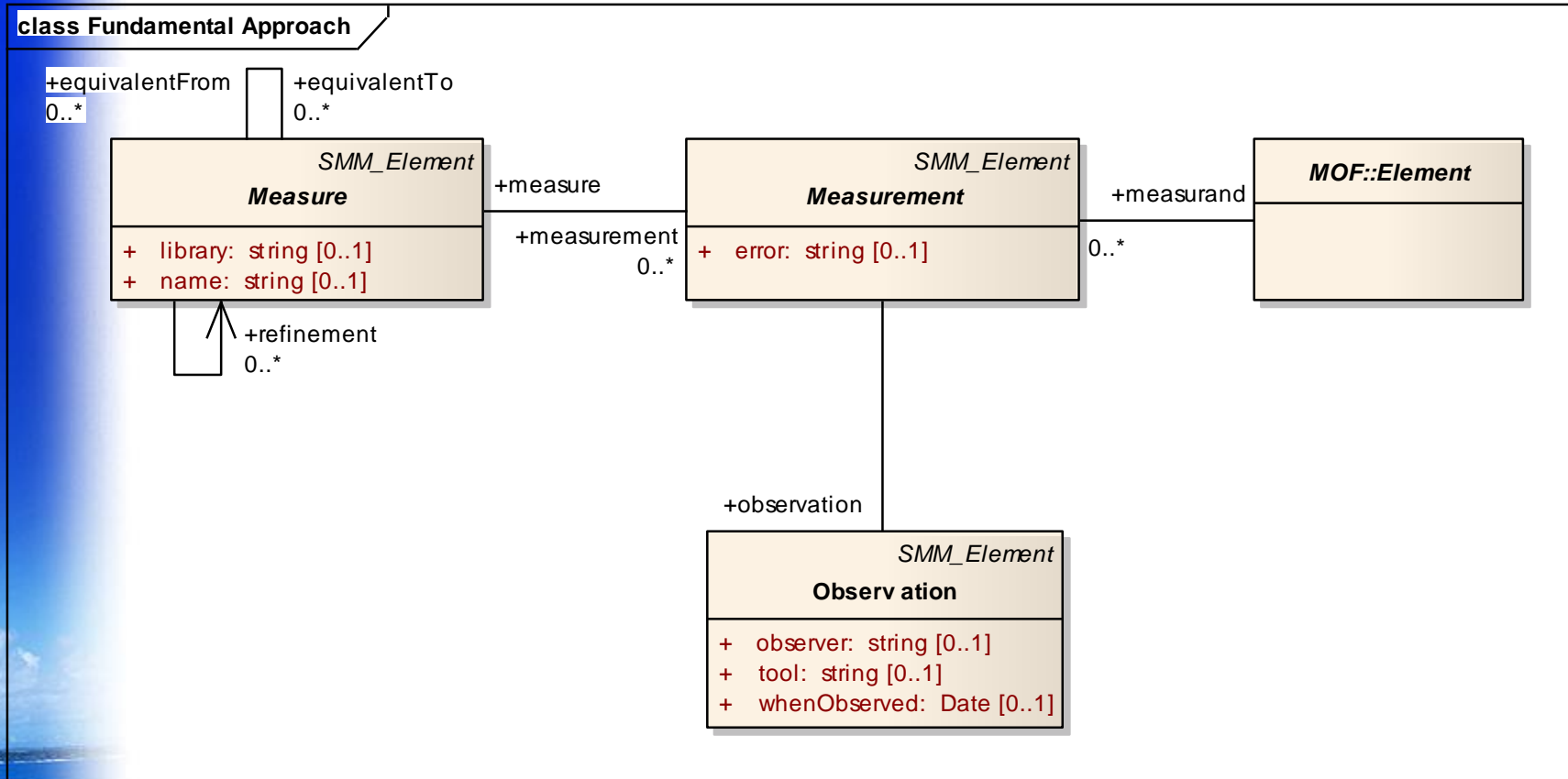
ADM Standards Span the Entire IT Architecture Spectrum



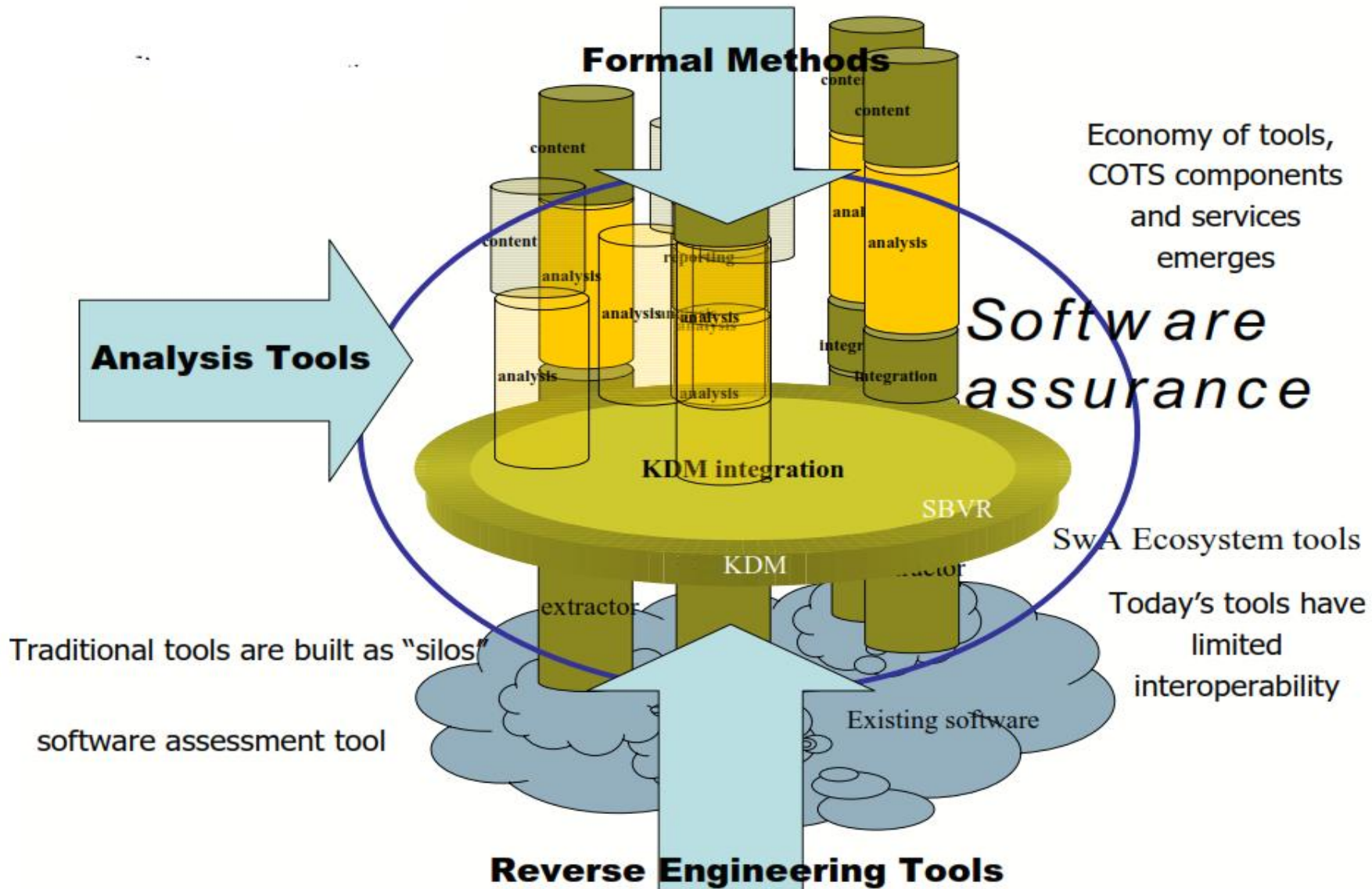
KDM architecture



SMM- At a High Level



What collaboration looks like



Think Globally – Act Locally

When designing a better mouse trap:

- Always think of the repercussion that it can have in helping others
 - **In the world**
 - **In their future research**
 - **Work in a way where others can expand on your findings.**
- Most importantly
 - **Have Fun doing what you're doing**
- Enjoy.





Q&A



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