Model-Driven Business Process Platforms

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Economic Drivers

The Evolution of the Software Platform

Why This is Difficult

Meeting the Challenges: Metadata

Meeting the Challenges: Product Lines

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Economic Driver: The Innovation Economy

Last-generation value proposition

- Applications embody well-validated, accepted business processes

Next-generation business reality

- Innovative business model and associated processes define an enterprise's competitive advantage
  - Not enough to have a great product
  - Must also have a great business model
- Not attractive to simply follow a business process defined elsewhere
- Outsourcing all but core business processes
- Need flexibility in designing and executing innovative business processes
  - Core business processes
  - Value Chains / Value Networks for accessing mission-critical, non-core processes

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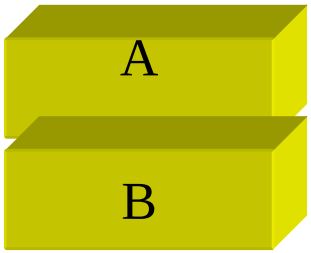
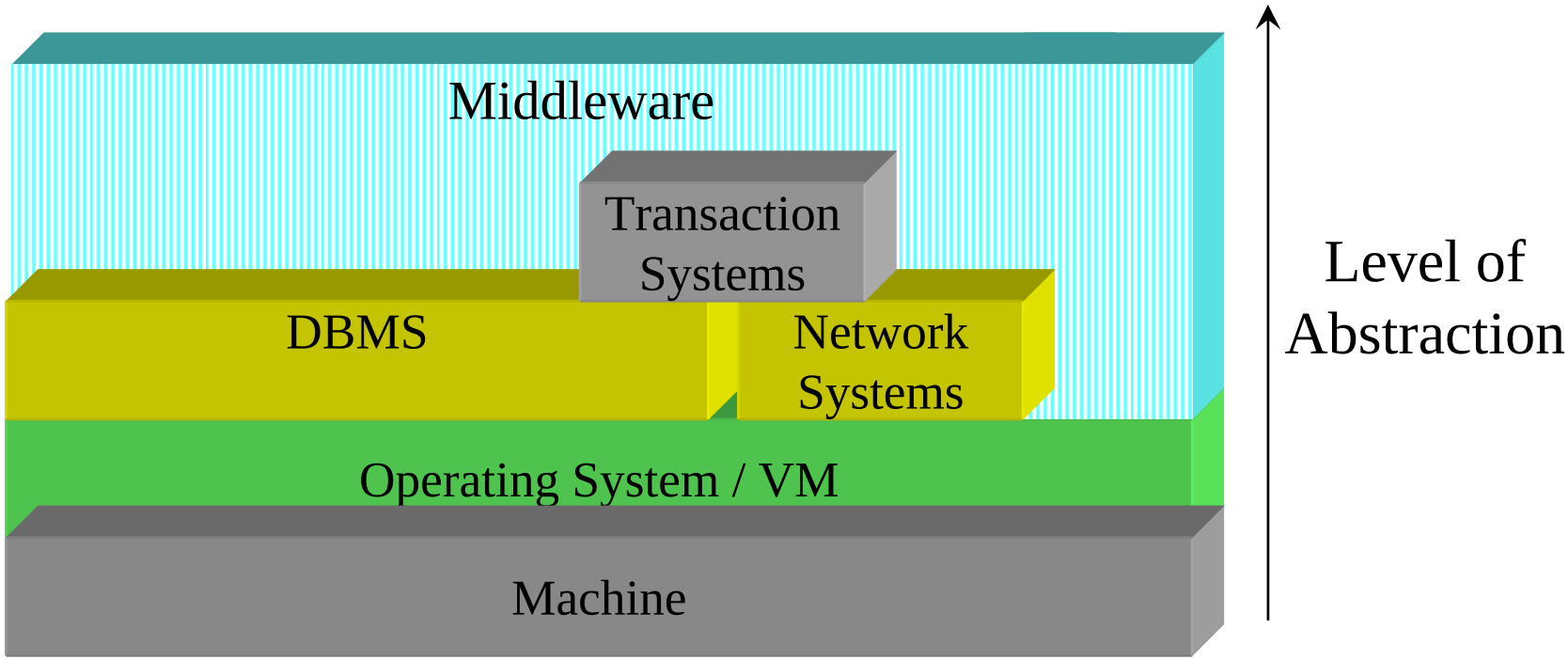
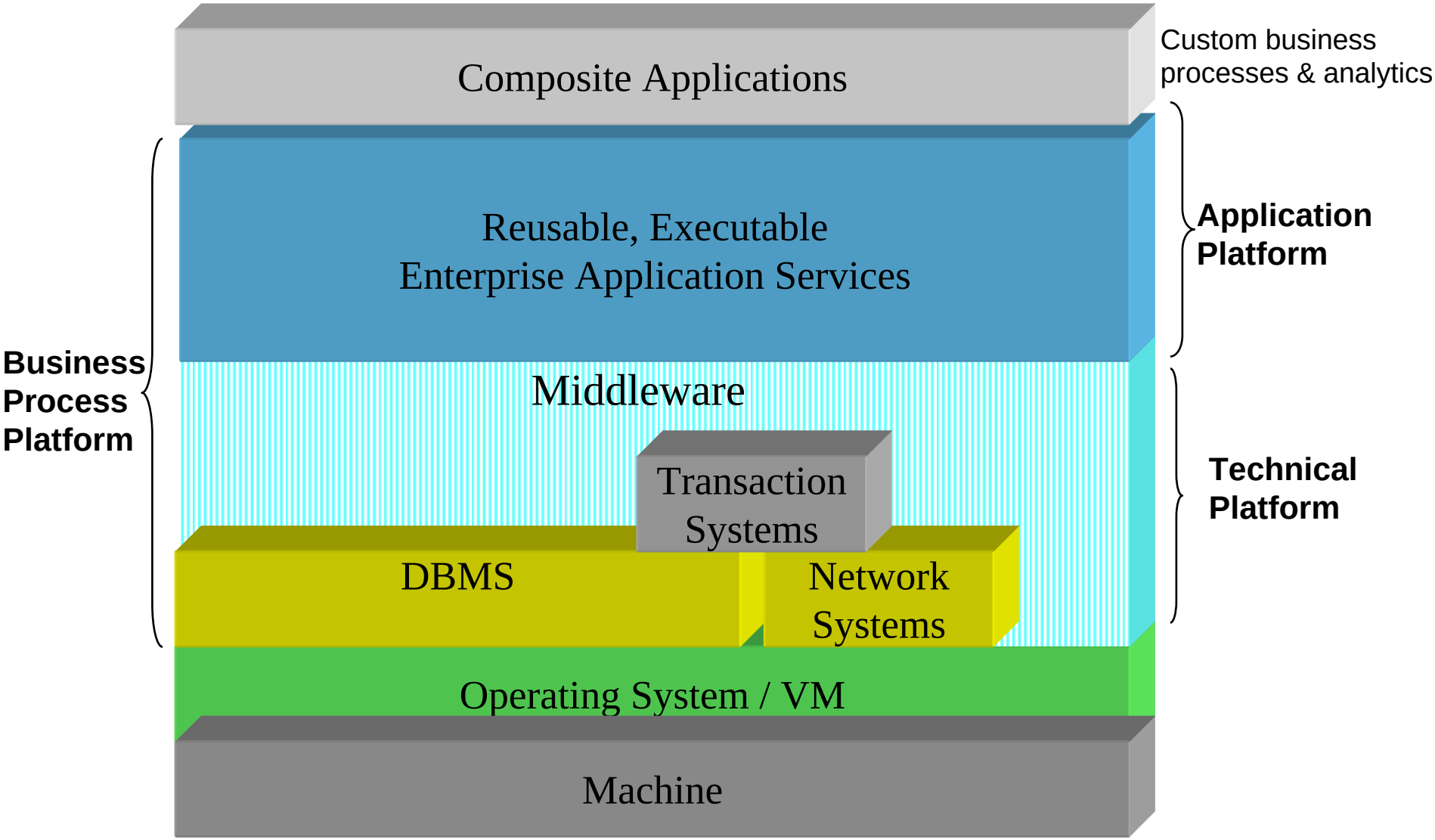
The Technical Platform Stack



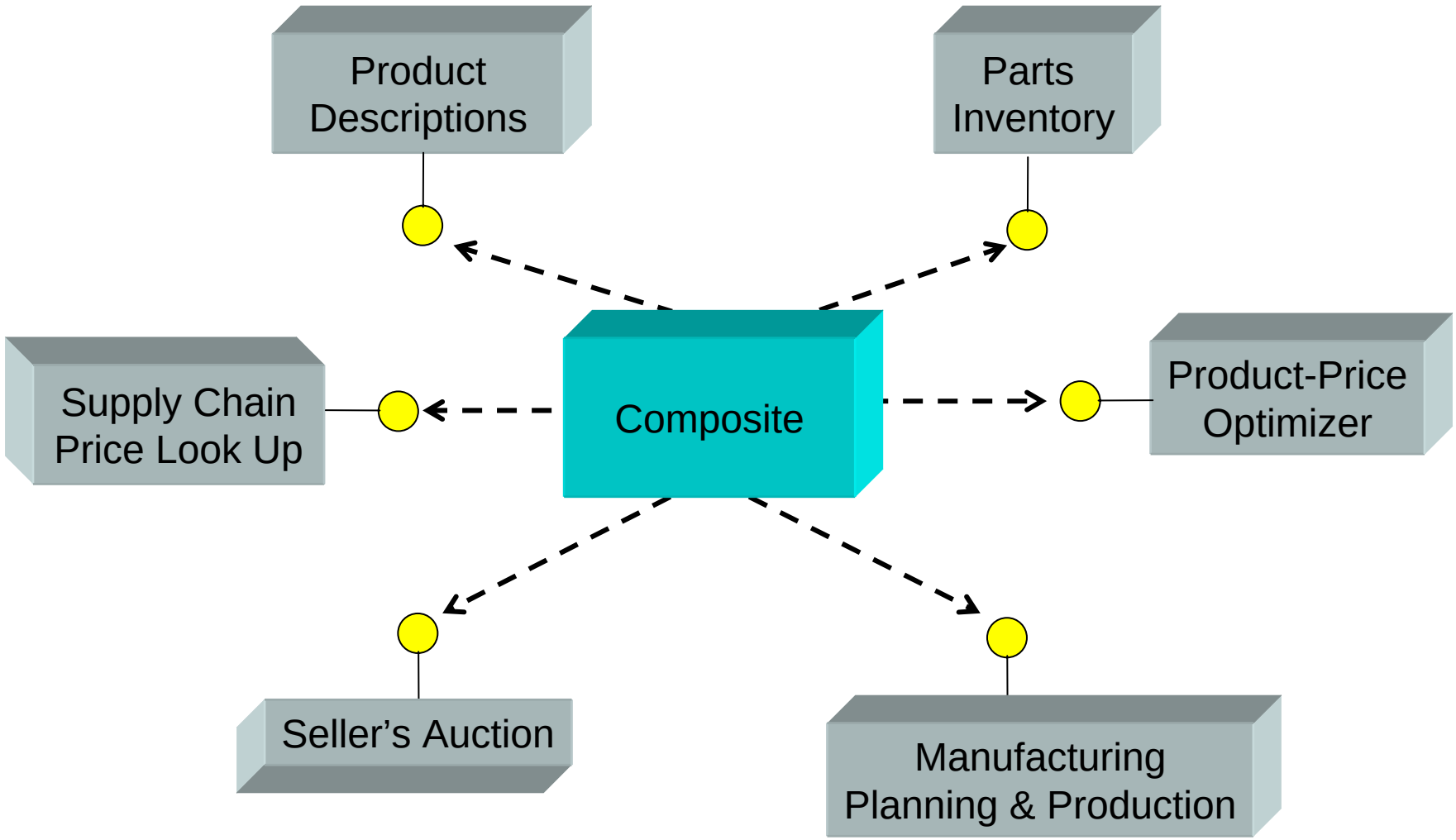
Means A depends on B



Business Process Platform

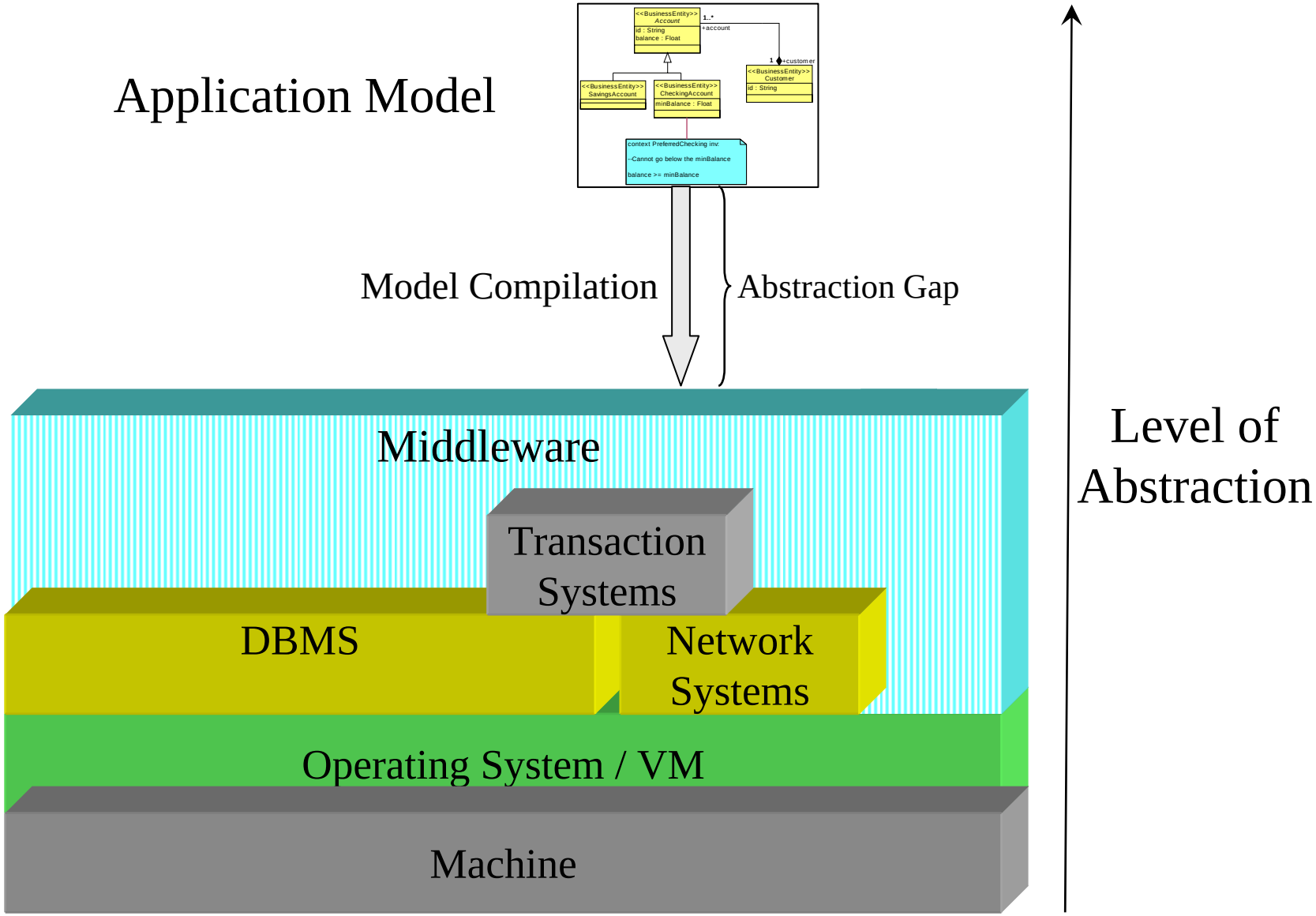


Composite App: Procure-to-Pay, Order-to-Cash, Manufacture-to-Inventory

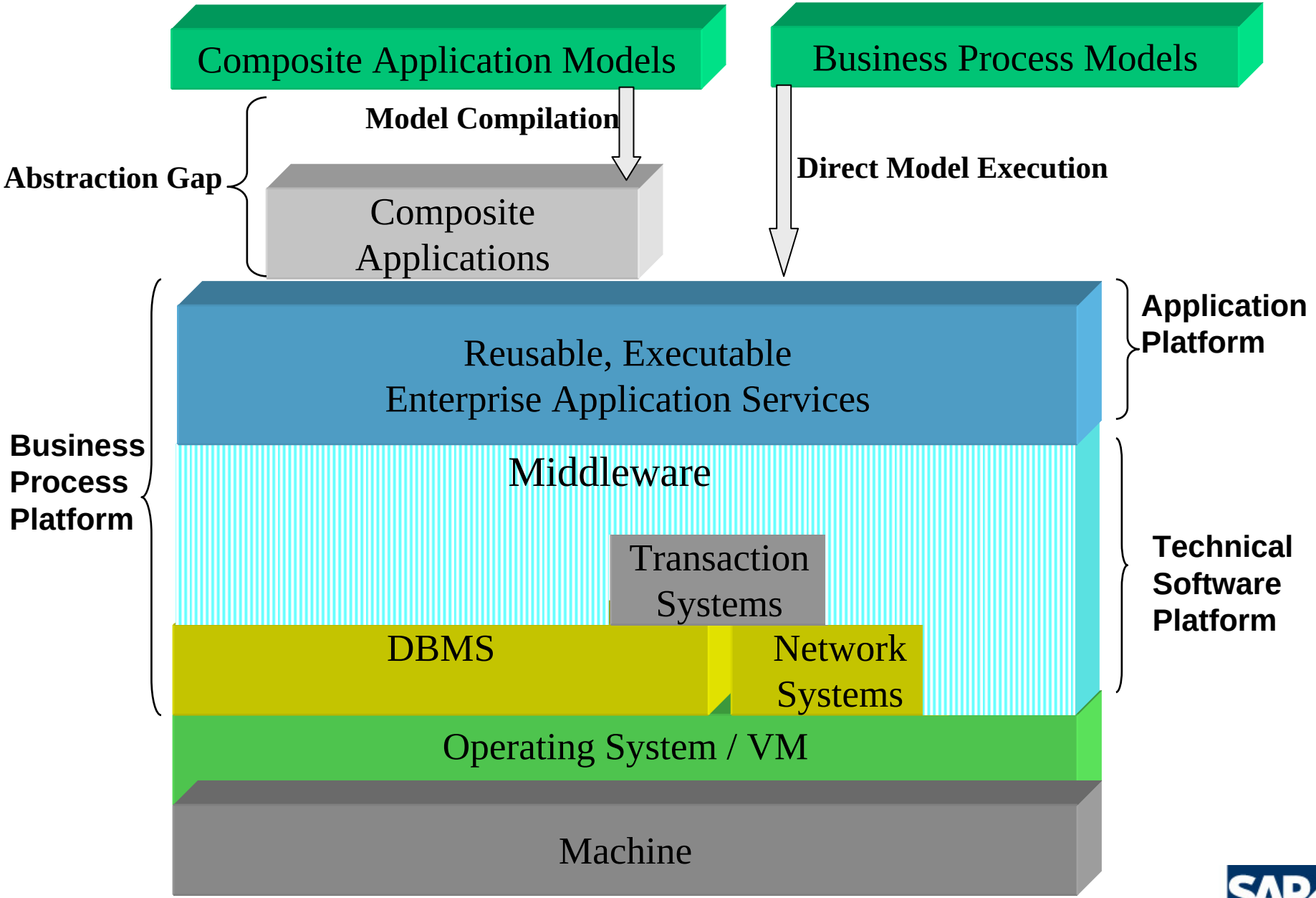


David Burdett, SAP Labs

Model Compilers and the Abstraction Level



Raising the Level of Abstraction



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This Will Not be an Easy Transition

This jump in the platform abstraction level is more difficult than the last jump (middleware)

- **Just as raising the abstraction level for development languages above 3GLs is more difficult than the last jump to 3GLs**

Crawl, Walk, Run

- **Provide business value at every step**

As Service-Oriented BPPs Scale Up...

Semantically thin specifications reach their limits

- How do you achieve semantic interoperability on top of syntactic interoperability?
  - Do collaborating parties have a common understanding the contract of a service?
  - You can't rely on informal conversations among people
  - The parties might have different human languages as native tongues
- How do you find suitable services to compose?
  - Suitable functional behavior
  - Suitable quality of service?
- Same for reusable business processes

How do you build reusable components?

- Component-based development has proven hard in practice
- How do you anticipate requirements of composite applications?

Configuration/version/dependency management problems do not go away

- They can even get worse

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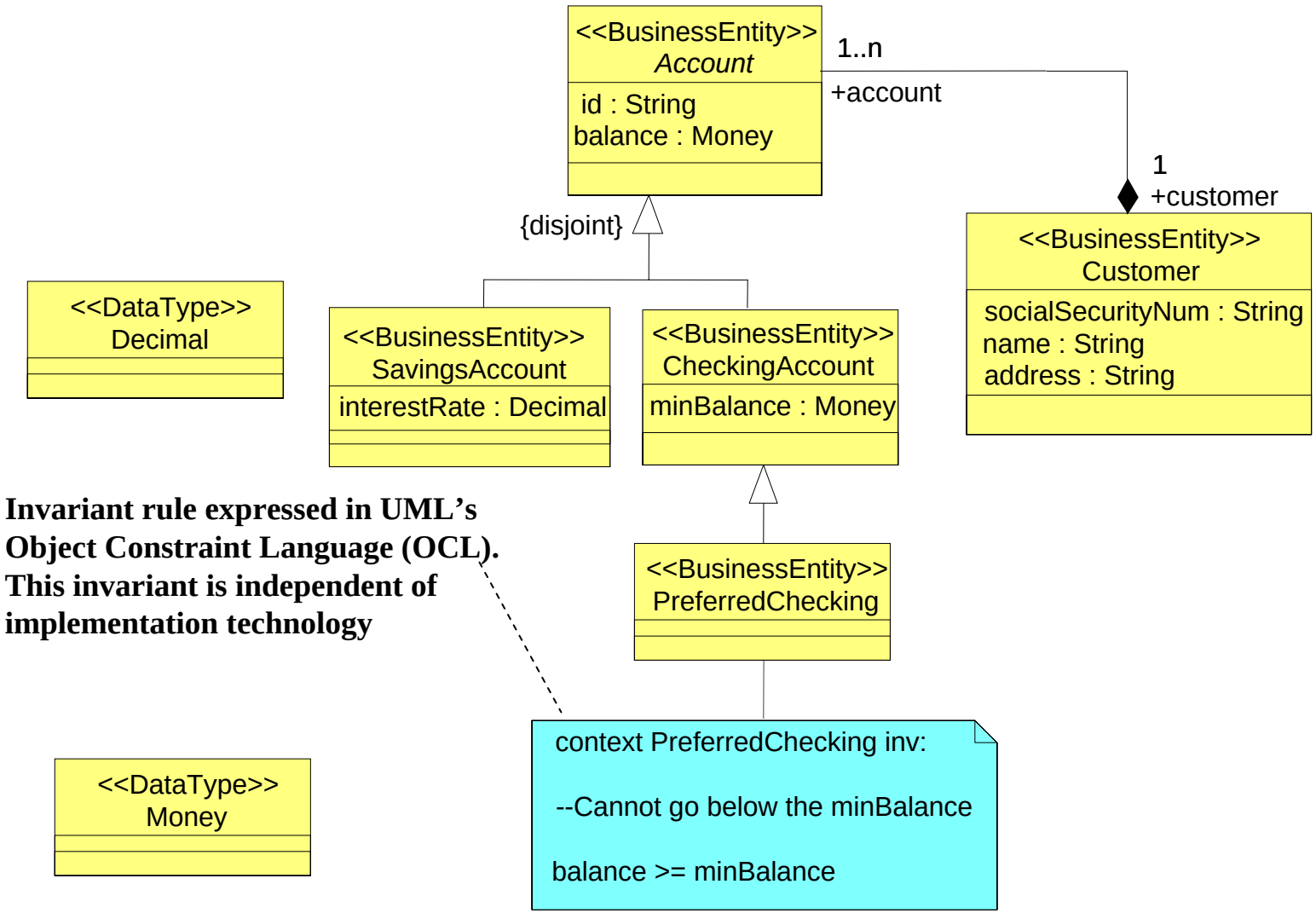
Semantically Rich Specifications

Need a metadata-rich environment to *assist* humans using the business process platform

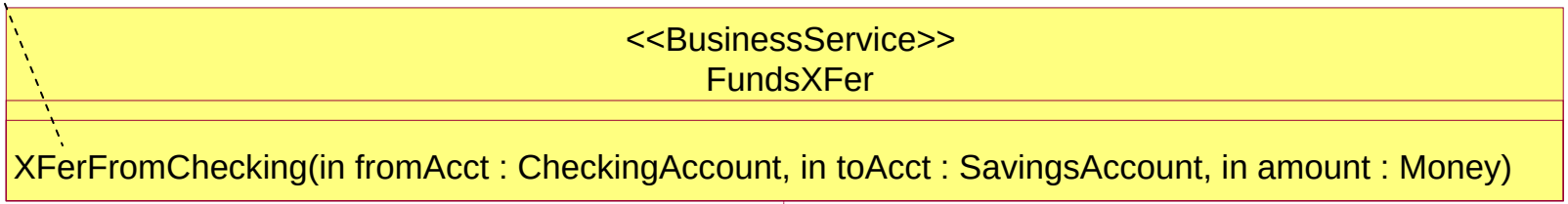
- Design by Contract™
  - Service message types specified as precisely as possible
    - Invariants
  - Service operations functional contract specified as precisely as possible
    - Preconditions and postconditions (more numerous than invariants)
  - Using machine-readable, declarative constraint languages
  - We've know how to do this for decades
  - Also improves quality
  - Also need to learn to specify QoS requirements and capabilities as precisely as possible
- Capture dependencies in metadata
  - Don't bury them in code
- Formal grounding of languages
- Inferences identify candidates or flag potential problem combinations
  - Let the human decide what to do
  - Record what the human decides
  - Show the next human what the others decided
  - Learn

Business Information Model
With an Invariant Rule



Formal Abstract Model of a Business Service
With Pre-conditions and Post-Conditions

Signature

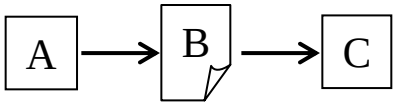



```
context FundsXFer::XFerFromChecking (fromAcct : CheckingAccount, toAcct : SavingsAccount amount : Money) : void
pre:
   --There must be sufficient funds in the checking account to support the transfer
   fromAcct.balance >= amount
pre:
   --The checking account and the savings account must belong to the same customer
   fromAccount.customer = toAcct.customer

post:
   --The balance of the checking account is reduced from its orginal amount by the amount of the transfer
   fromAcct.balance = fromAcct.balance@pre - amount
post:
   --The balance of the savings account is increased from its original amount by the amount of the transfer
   toAcct.balance = toAcct.balance@pre + amount
```

Pre/post conditions—Independent of implementation technology

Bridging the Semantic Web and MDA Worlds



Means tool A outputs B, and B serves as input to tool C.

Generic UML Modeling Tool

UML Model Using UML Profile

Generic UML Model

Native Semantic Web Ontology Development Tool

UML-OWL Bridge

MOF/XMI Based Tooling (e.g. Semantic Web Eclipse Plug-In)

XMI OWL Document

Native OWL Document

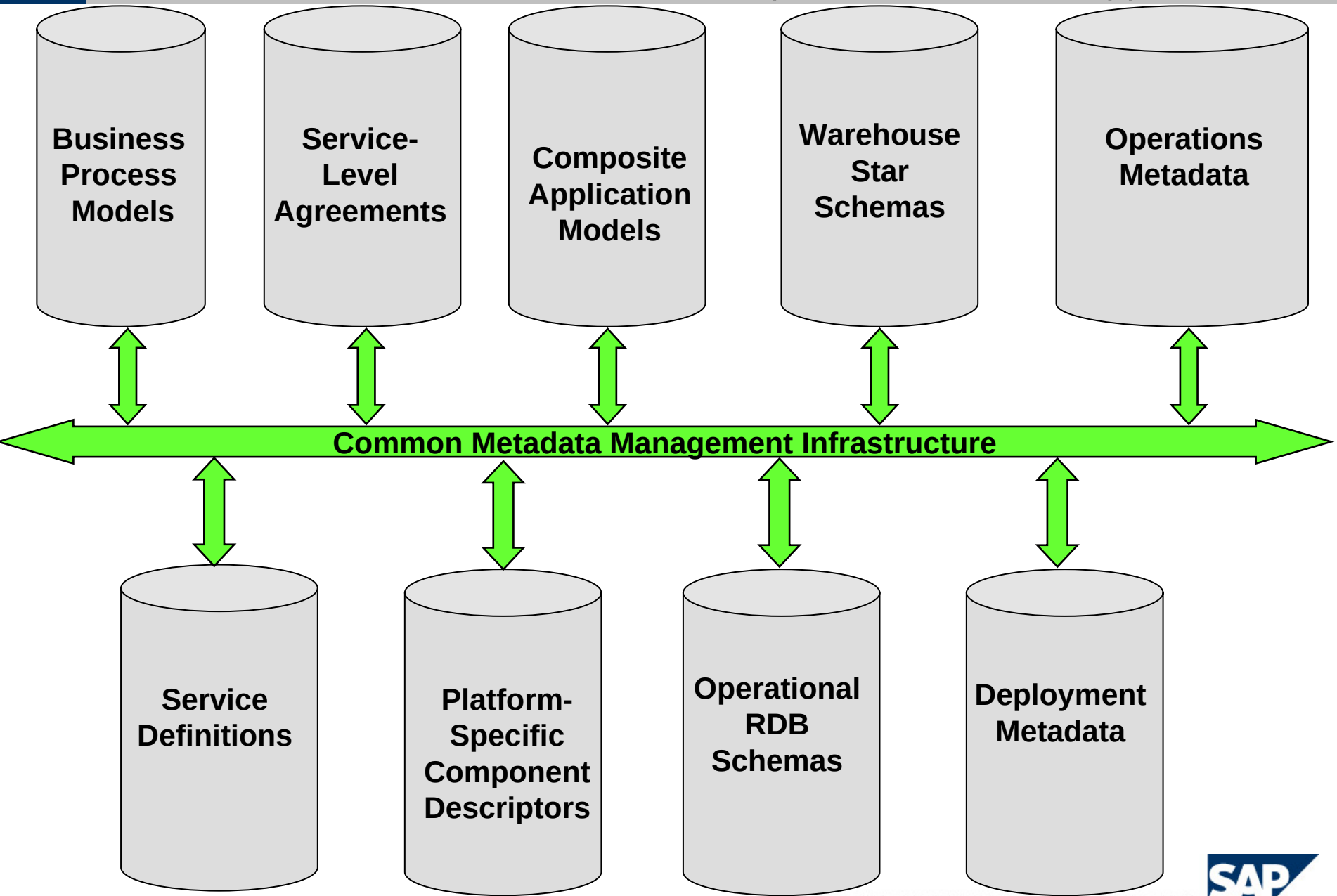
ER Tool

OWL-XMI Bridge

ER-OWL Bridge

ER Model

Metadata Across the Lifecycle
Model-Driven = Metadata-Driven (With Traceability)



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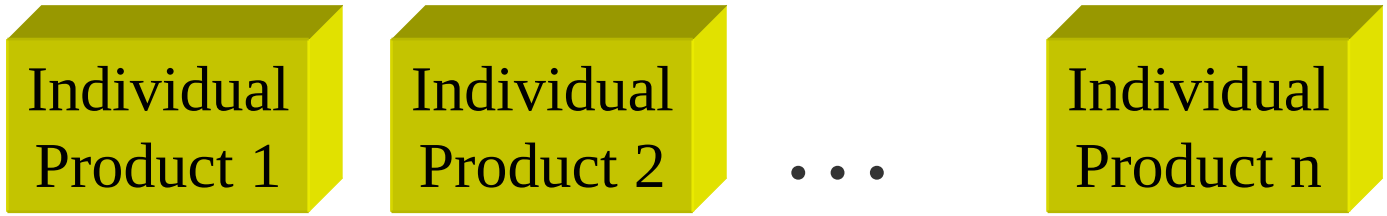
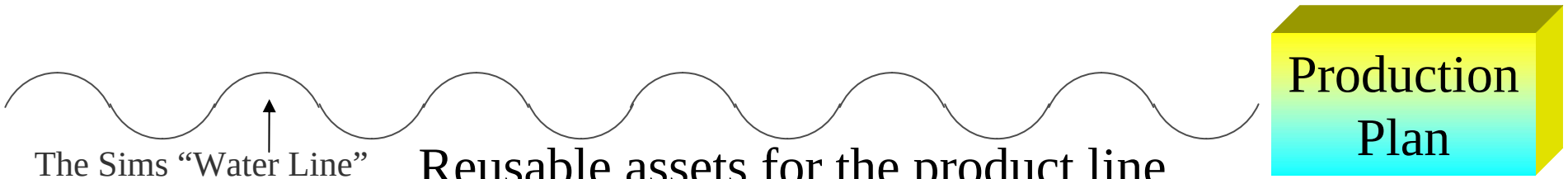
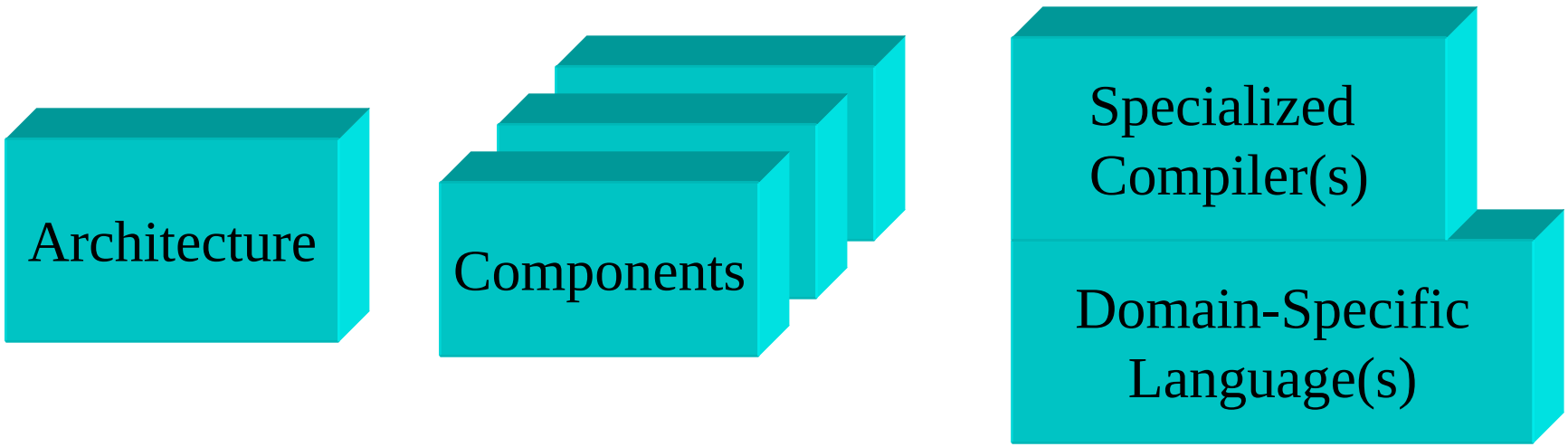
Product Line Practices



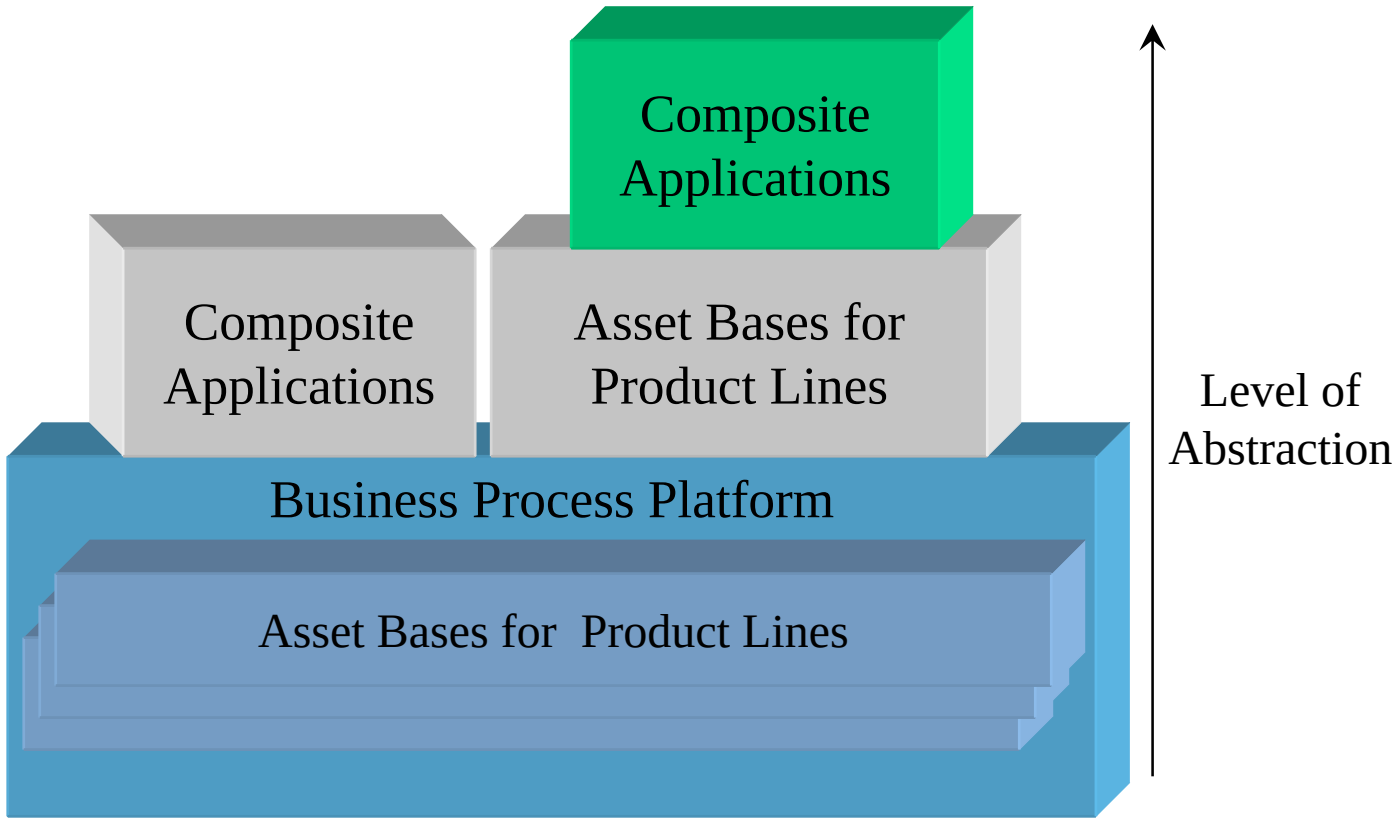
Individual systems produced via *product development*



Reusable assets for the product line
Created via *core asset development*



Applying Product Line Practices



Desktop Application Platforms and BPPs

MS Office is a *desktop application* ***platform***

- Has hundreds of components (has had them for 15 years)
  - Statless: e.g. a thesaurus component
  - Stateful: CRUD operations on office documents and calendars
- Powerful tools for rapid assembly of innovative desktop applications
  - Visual basic
  - Code wizards

A BPP has an *enterprise application platform*

- Will have hundreds (or more) components
  - Stateless, e.g. calculations
  - Stateful: CRUD operations on systems of record
- Model-driven tools
  - Cpplication construction tools
  - Business Process Management tools

Synergy

- Integrating desktop and enterprise application platforms
  - Opens up another order of magnitude of possibilities for innovative composite applications

Summary

Business process platforms are coming

- **Transition will be gradual, but powerful**
- **Model-driven tools are important for making the platforms usable**

Configuration management has to be faced square-on

Metadata-rich environment, formal grounding, and product line practices needed to manage the complexity

Vigorous competition for a growing pie—if we do this right

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