



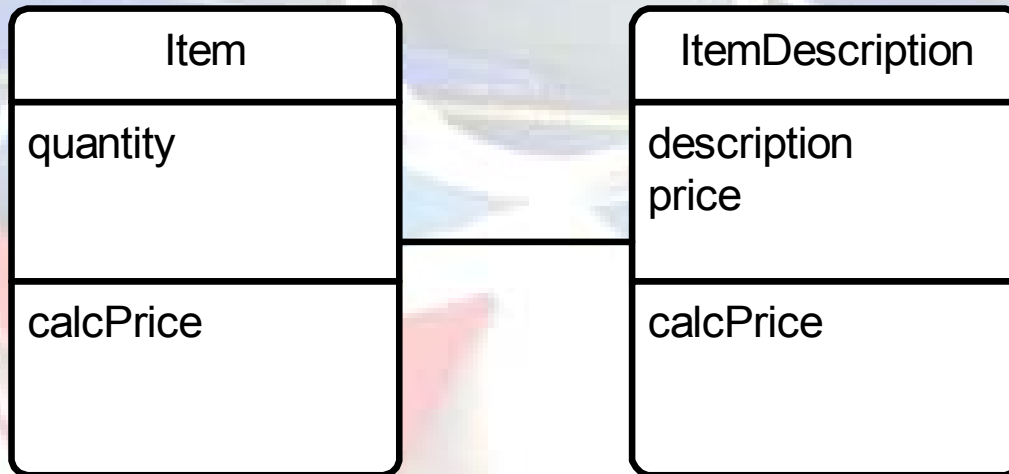
# **The Coad Method's Contribution to Agile**

FDD, Communication,  
Agile QA & Lean Development  
SeaJUG September 2004

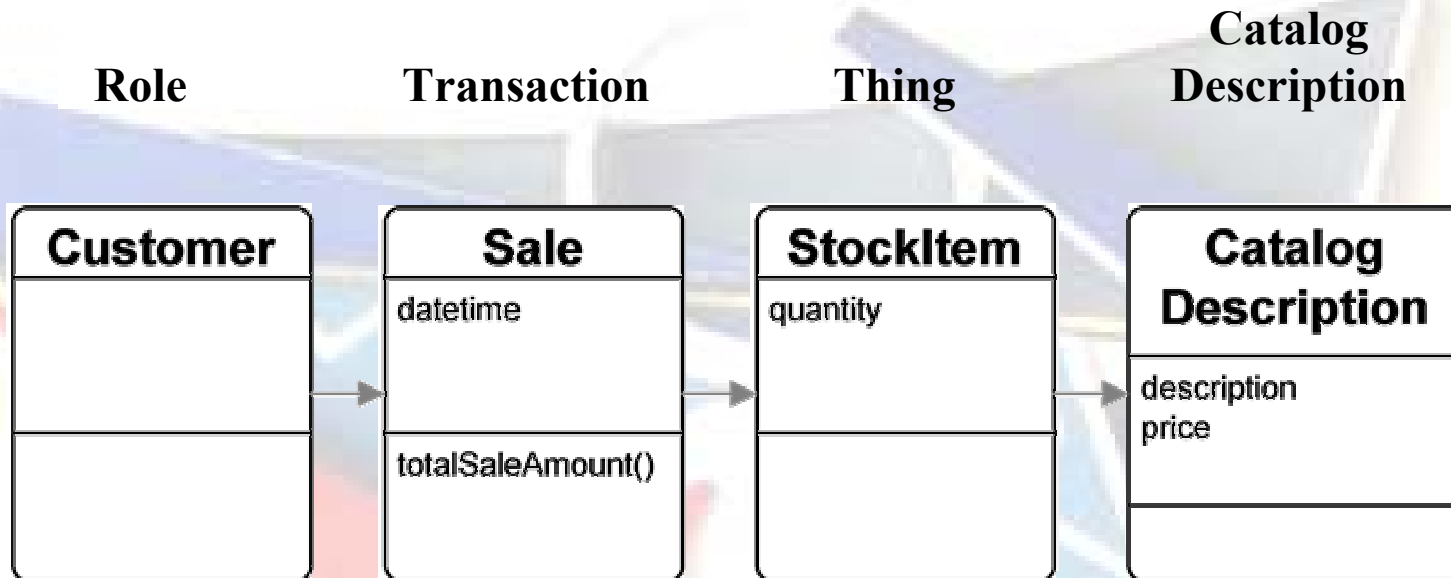
David J. Anderson

Based on the work of Peter Coad, Stephen R. Palmer and others

# History - 1992



# History - 1995



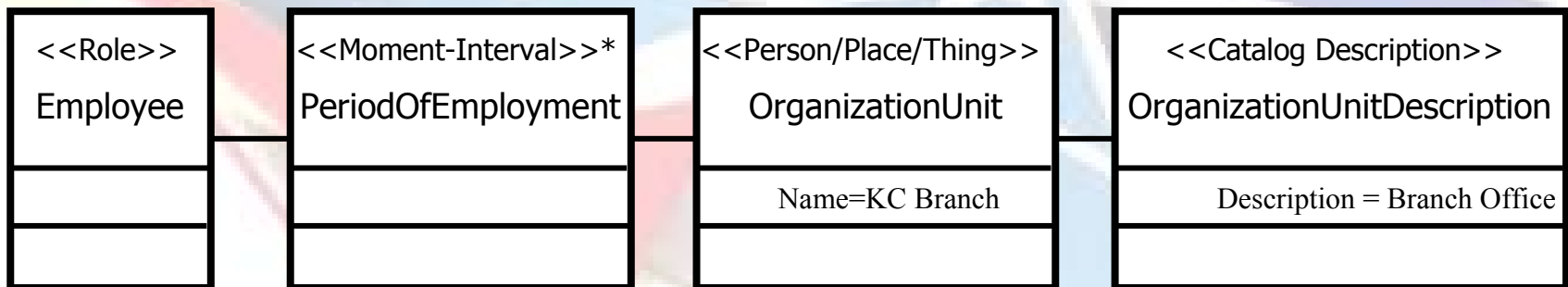
Object Models: Strategies, Patterns & Applications, 1st ed., Coad, Mayfield & North, Yourdon Press, Prentice Hall, 1995

# History – Spring 1997



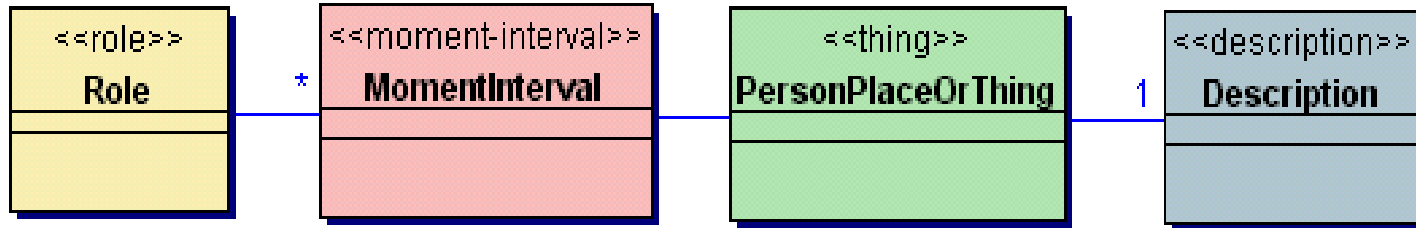
Moment or Interval – a generalization of the idea of a transaction e.g.

- Warranty Period
- Period of Employment
- Loan Approval Request
- Funds Disbursement



[\*still referred to as “Transaction” in], Object Models: Strategies, Patterns & Applications, 2nd ed., Coad, Mayfield & North, Yourdon Press, Prentice Hall, 1997

# History – September 1997



Color instantly communicates the pattern of class relationships to the viewer

If the colors are not configured in the correct pattern then there are strong clues that the model could be improved!

# Agile Link to Coad and FDD



- Agile Manifesto Signatory Jon Kern
- Jon was co-author of 2<sup>nd</sup> edition of Java Design and worked for Togethersoft
- Peter Coad delegated attendance at Snowbird in 2001 to Jon
- Jon was Stephen Palmer's boss

# Practices in FDD



- Frequent, Tangible, Working Results
- A context for best practices
  - Domain object modeling
  - Developing by feature
  - Class (code) ownership
  - Feature teams
  - Inspections
  - Regular builds
  - Configuration management
  - Visibility of results

# Dec 1998 – Archetypes



Philip Bradley argues for Archetypes not stereotypes.

*“ a model from which all things of the same kind more or less follow”*

rather than

*“ a conventional, formulaic, over-simplified conception, opinion or image”*

And that, all business flows should or ought to be basically the same.

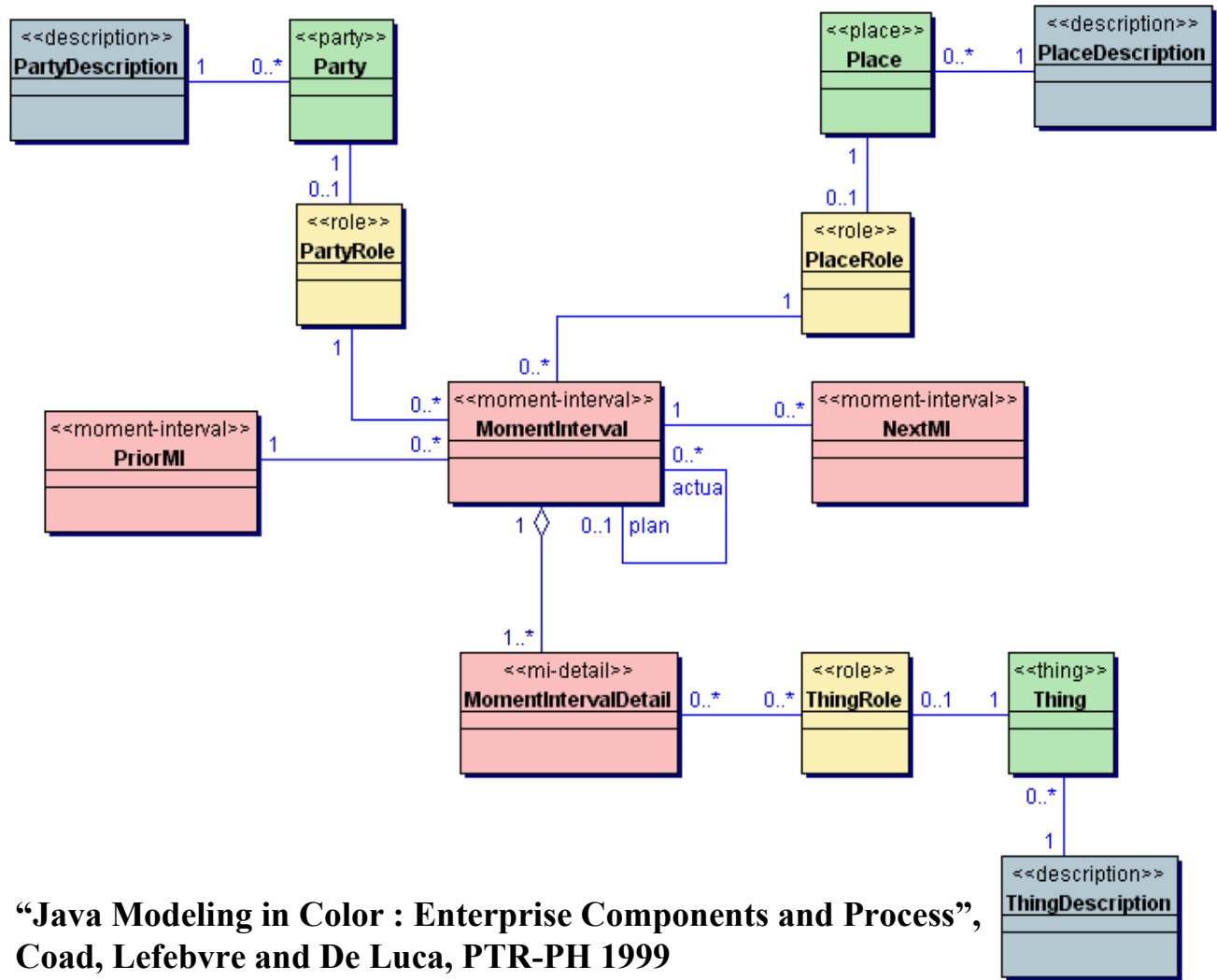
“Data Model Patterns - Conventions of Thought”,

David Hay, Dorset House, 1996

**[The Universal Data Model]**

Phil Bradley was Development Manager Persistence Layer, PowerLender Project, United Overseas Bank, Singapore 1997 - 1999

# History – January 1999



“Java Modeling in Color : Enterprise Components and Process”,  
Coad, Lefebvre and De Luca, PTR-PH 1999

# Behavior of Colors



Courtesy Stephen R. Palmer

<b>&lt;&lt;moment-interval&gt;&gt; Class1</b>
referenceNumber dateOrDateTimeOrInterval priority total status

**totalValue()  
isComplete()  
isUrgent()**

<b>&lt;&lt;role&gt;&gt; Class2</b>
assignedNumber status

**assessPerformance()  
salesMadeInPeriod()  
averageSalesOverPeriod()  
assessAccuracy()  
assessSpeed()  
isActive()  
isSuspended()**

<b>&lt;&lt;party-place-thing&gt;&gt; Class3</b>
identityNumber name address customValue

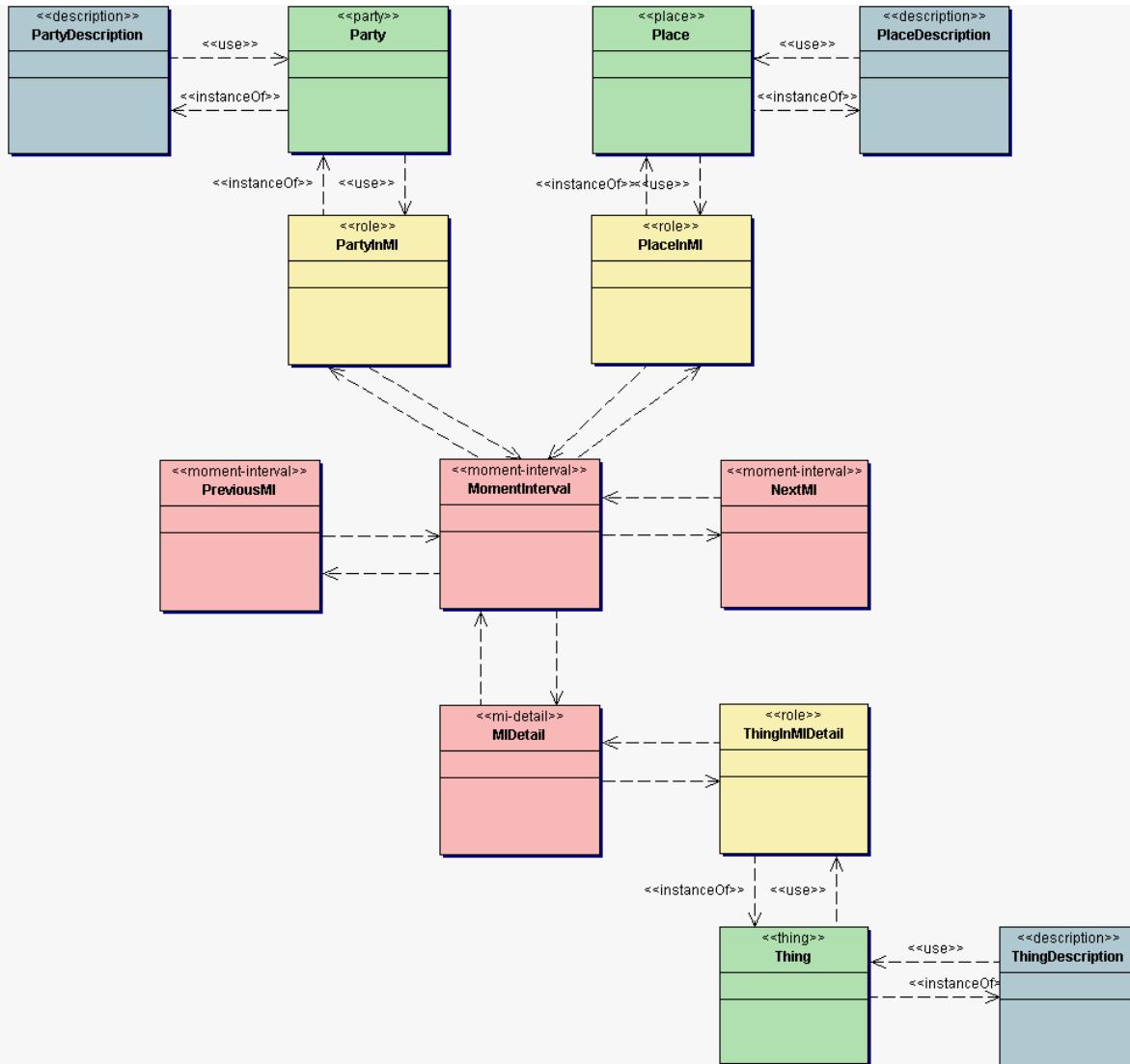
**\_findByIdNumber()  
\_findByName()  
isOfType()  
getValue()  
assessAcrossRoles()  
listRolesPlayedBy()**

<b>&lt;&lt;description&gt;&gt; Class4</b>
type itemNumber Description defaultValue

**totalUnitsAvailable()  
totalUnitsManufactured()  
assessRoleAllowed()**

- Instances of Archetypes share similar attributes
- Instances of Archetypes share similar methods

# Law of Demeter

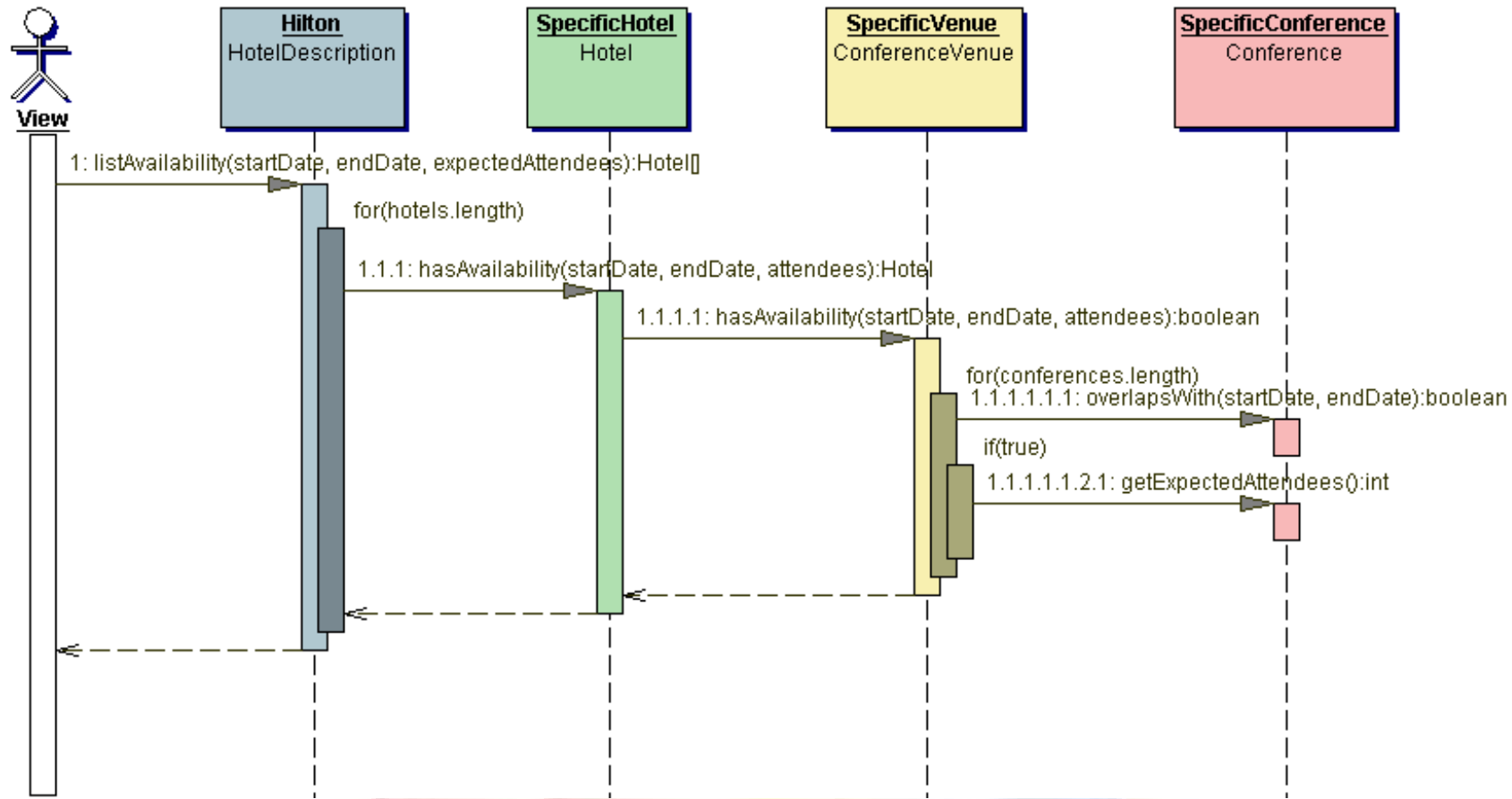


A different view of the DNC showing the dynamic dependencies between classes.

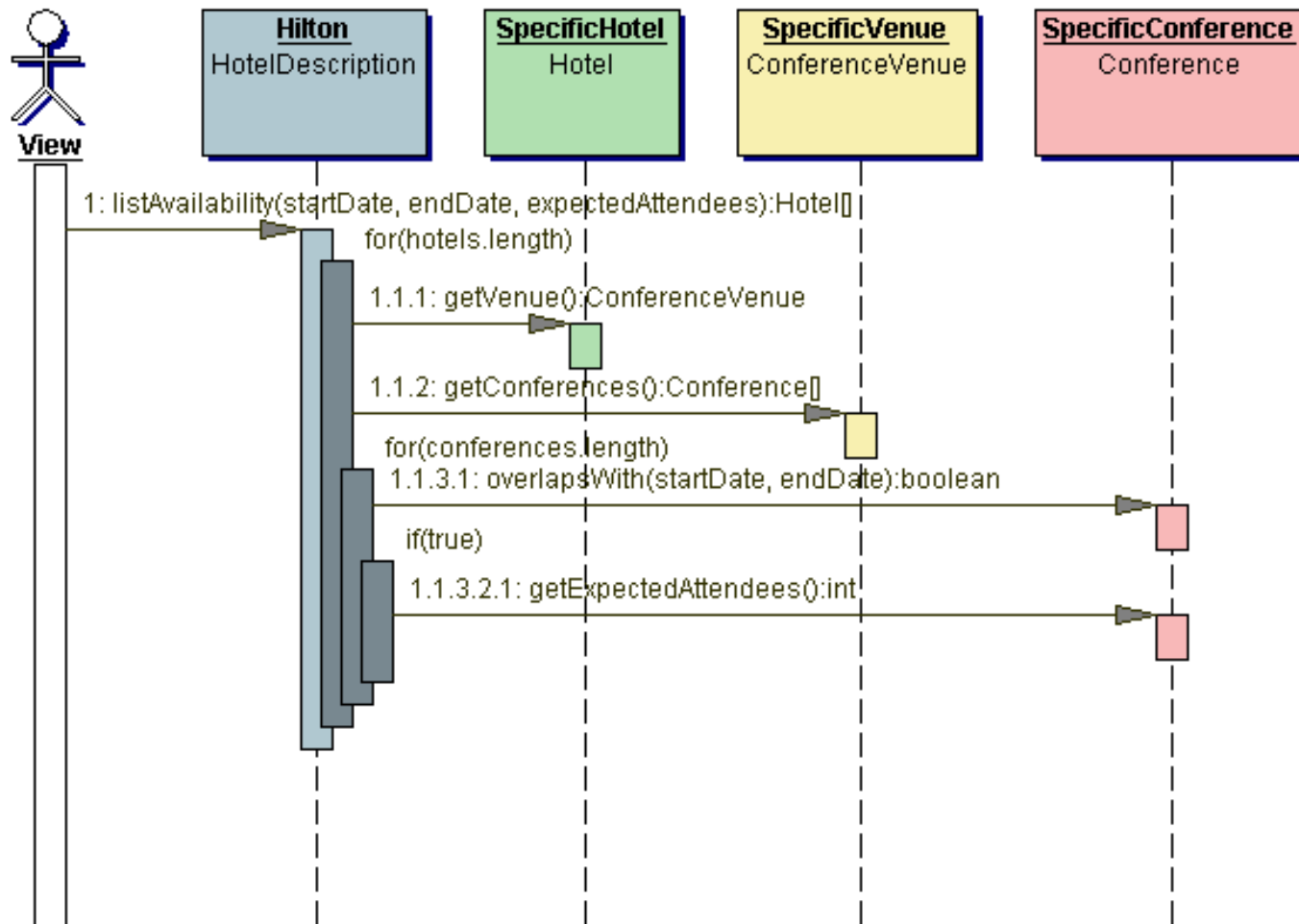
Classes only hold dependencies to their immediate neighbors

The DNC is very loosely coupled

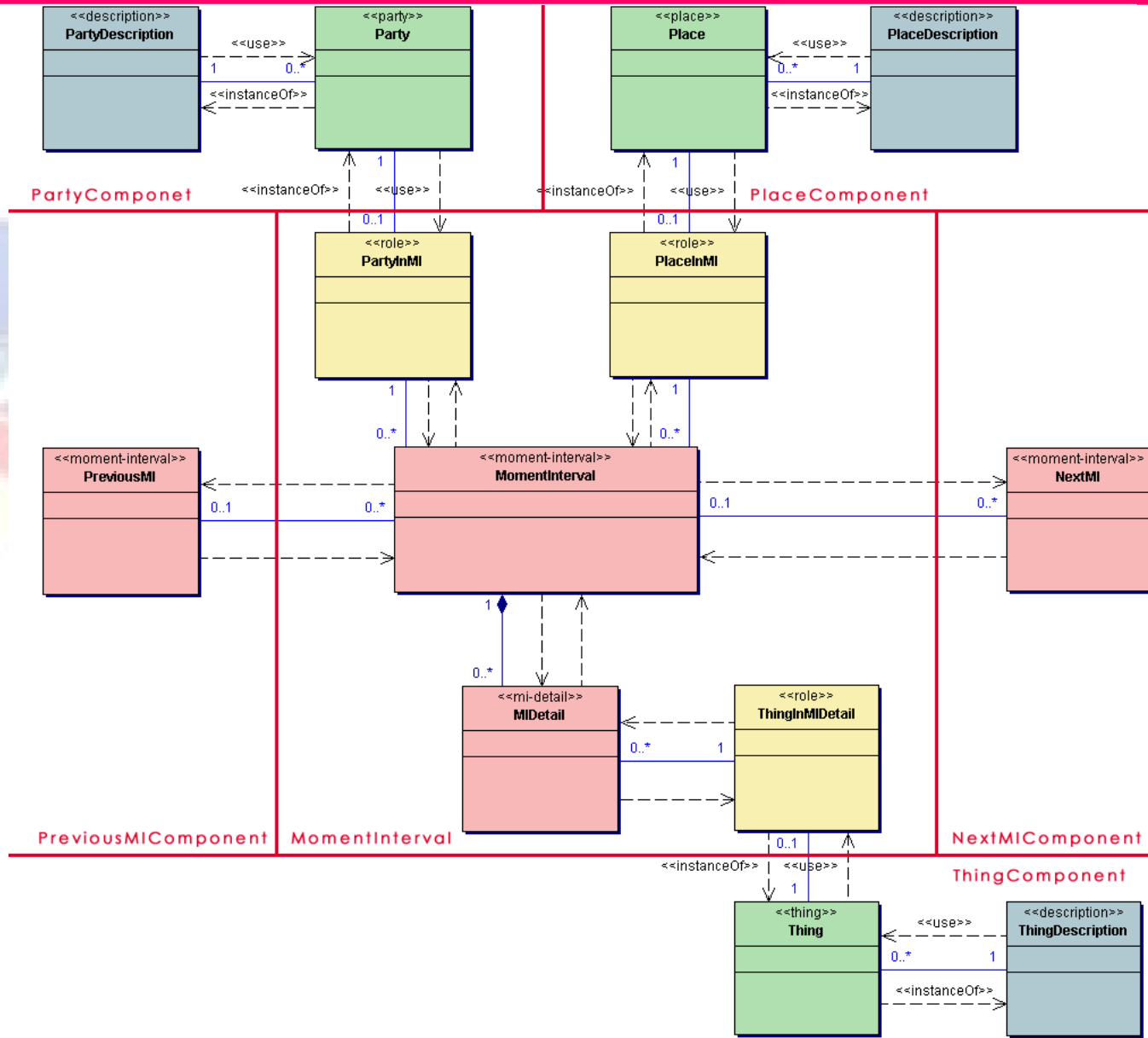
# LoD Compliant Sequence Diagram



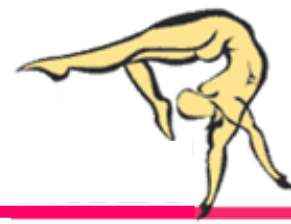
# Wrong – not LoD Compliant



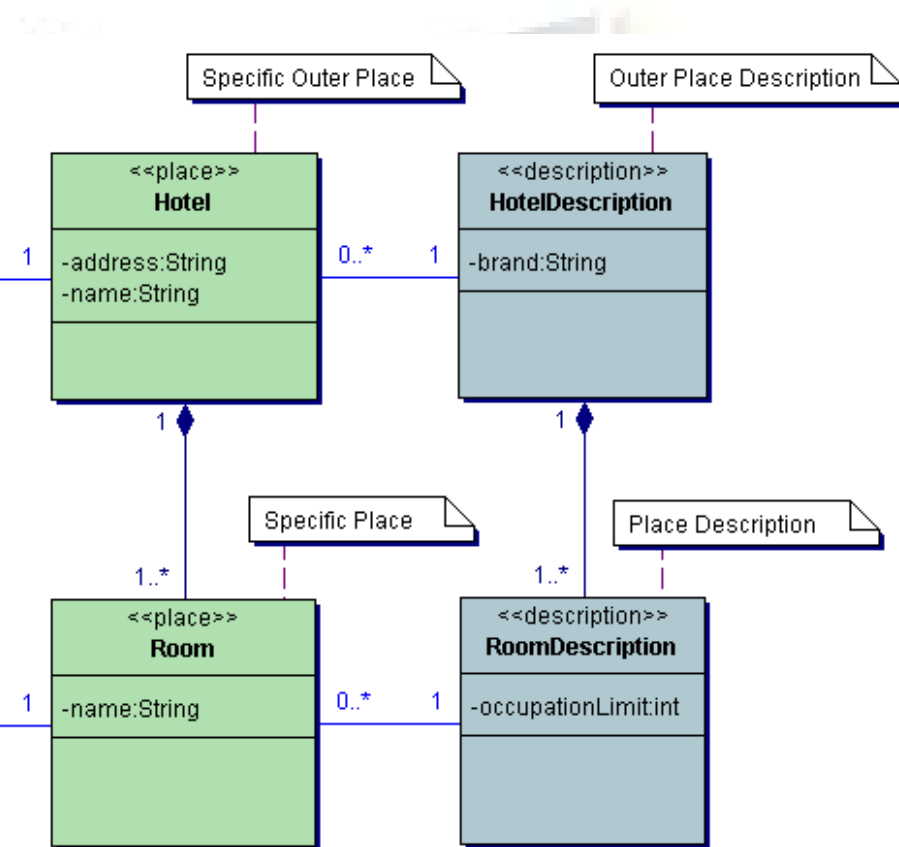
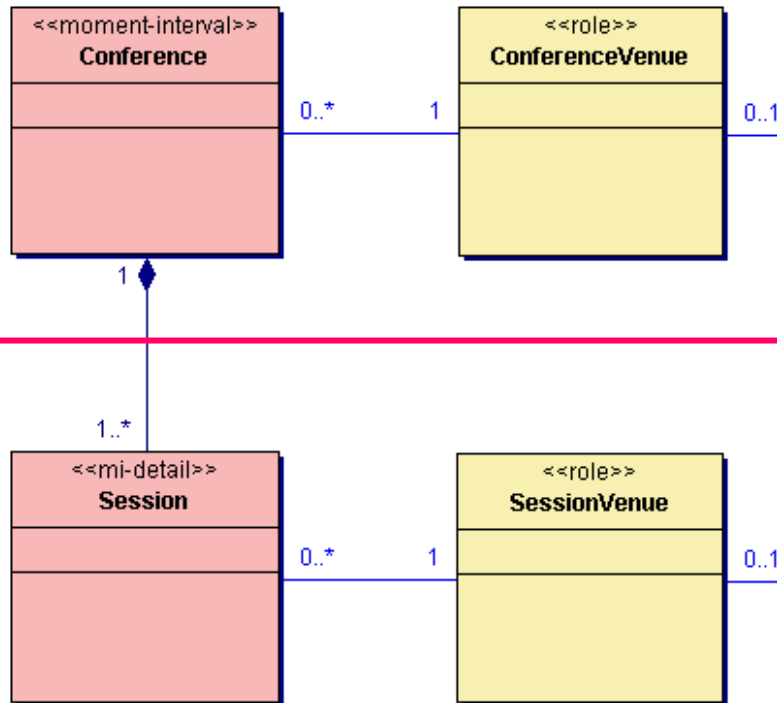
# Postponed Component Definition



# Re-usable Enterprise Components



Pinks and yellows are re-usable across multiple greens – the core Enterprise Components



Greens and blues are re-usable across discrete Enterprise Applications modeled as sequences of pinks

# Definition of an Agile Model

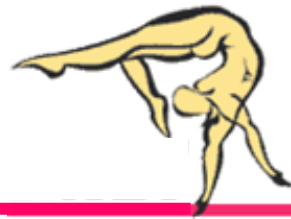


- Elegant
- Enough to get the job done and no more
- Extensible
- Loosely coupled
- Robust and resilient to change
- Communicates clearly

*“ In anything at all, perfection is finally attained not when there is no longer anything to add, but when there is no longer anything to take away”*

Antoine de Saint Exupery

# Summary – Coad Method in Agile



- Domain Modeling is the basis of communication
- Coad's color modeling – powerful technique designed to facilitate agility
- DNC is reliable and repeatable
  - a basic pattern even novice modelers can follow
  - Reduces uncertainty and variability, makes estimating easier
- Small batch sizes – 2 weeks
- Small release sizes – 3 months
- Tracks value delivered not programmer tasks or effort
- Features focused on fine grained value
- **The Coad Method & FDD – the original Lean Development Method**



# **Feature Driven Development**

Evolution of The Coad Method

# Engineering Excellence



Fine grained control  
End-to-end Traceability  
Focus on Quality

With Feature Driven Development

# FDD – an agile methodology

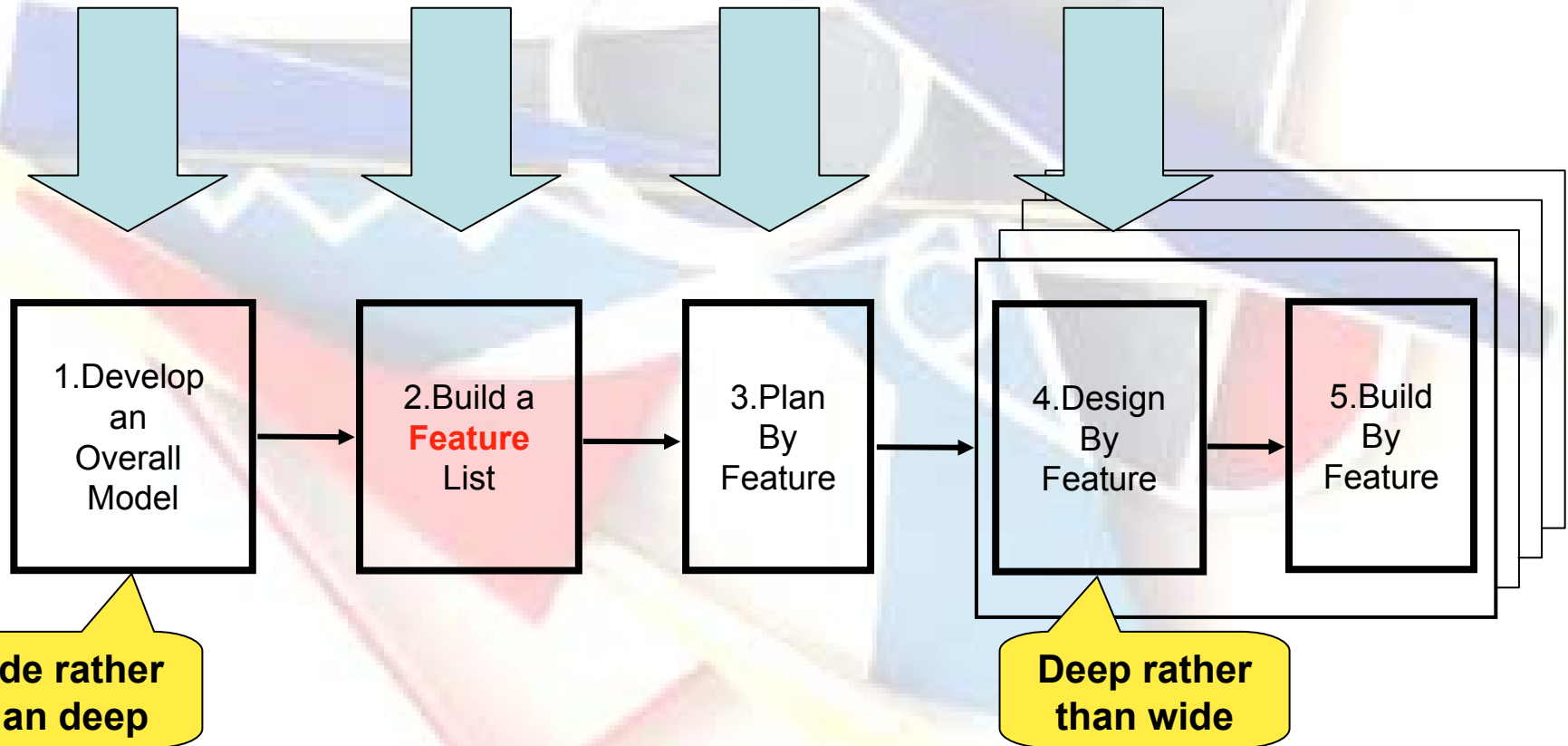


Marketing participates  
MRD input

Carefully  
Analyze  
MRD

Prioritize and plan  
Code development

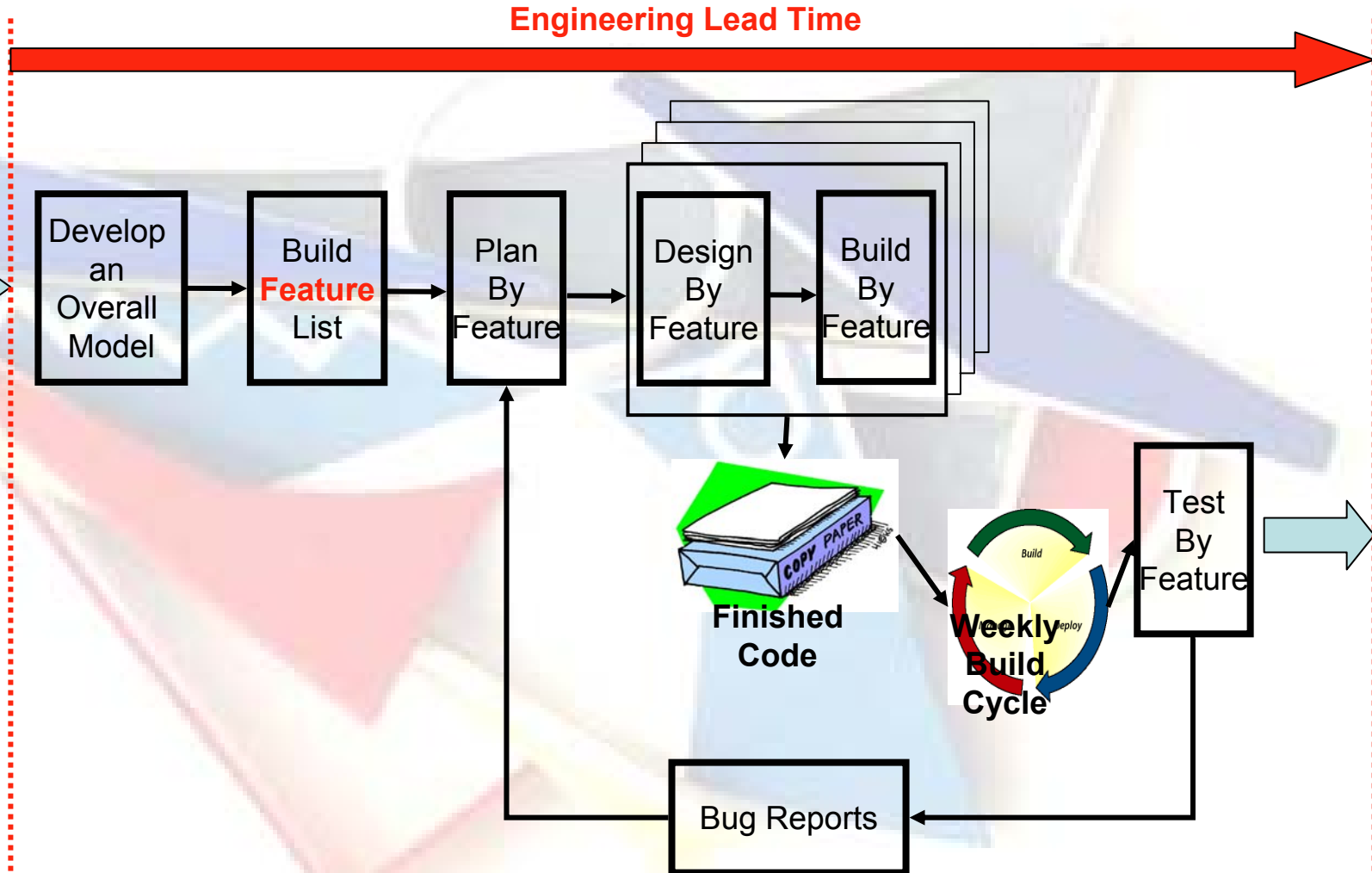
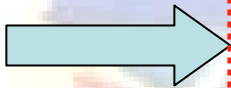
Build code  
in small  
batches



# Engineering process



Marketing Requirements



# Practices in FDD



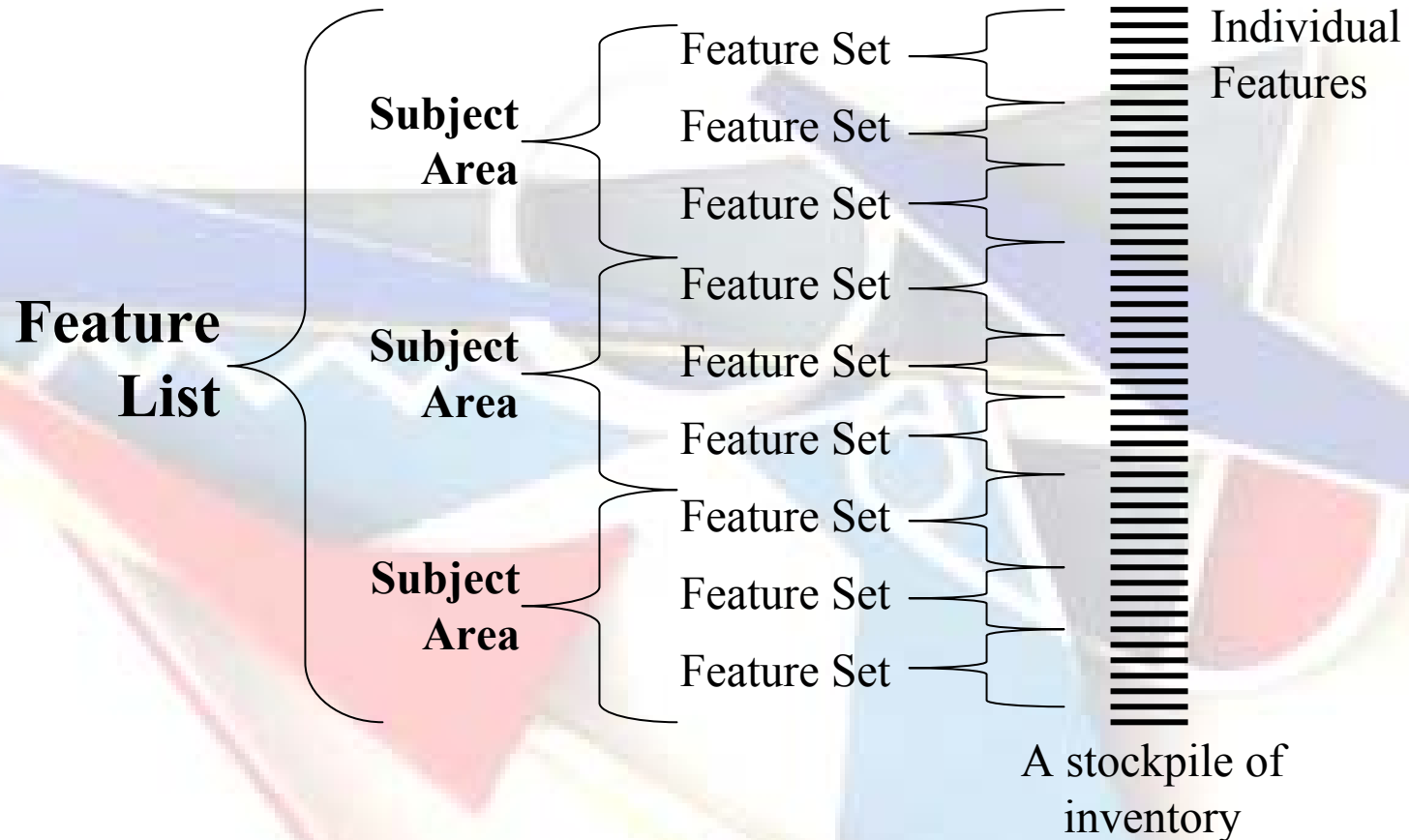
- Frequent, Tangible, Working Results
- A context for best practices
  - Domain object modeling
  - Developing by feature
  - Class (code) ownership
  - Feature teams
  - Inspections
  - Regular builds
  - Configuration management
  - Visibility of results

# Definition of a Feature



- Tiny piece of client-valued functionality which can be delivered in less than 2 man weeks
- PD (Problem Domain) Feature
  - <action> <result> [of|to|from|for] <object>
  - E.g. calculate the interest for the bank a/c

# FDD – How it works



# FDD – How it works



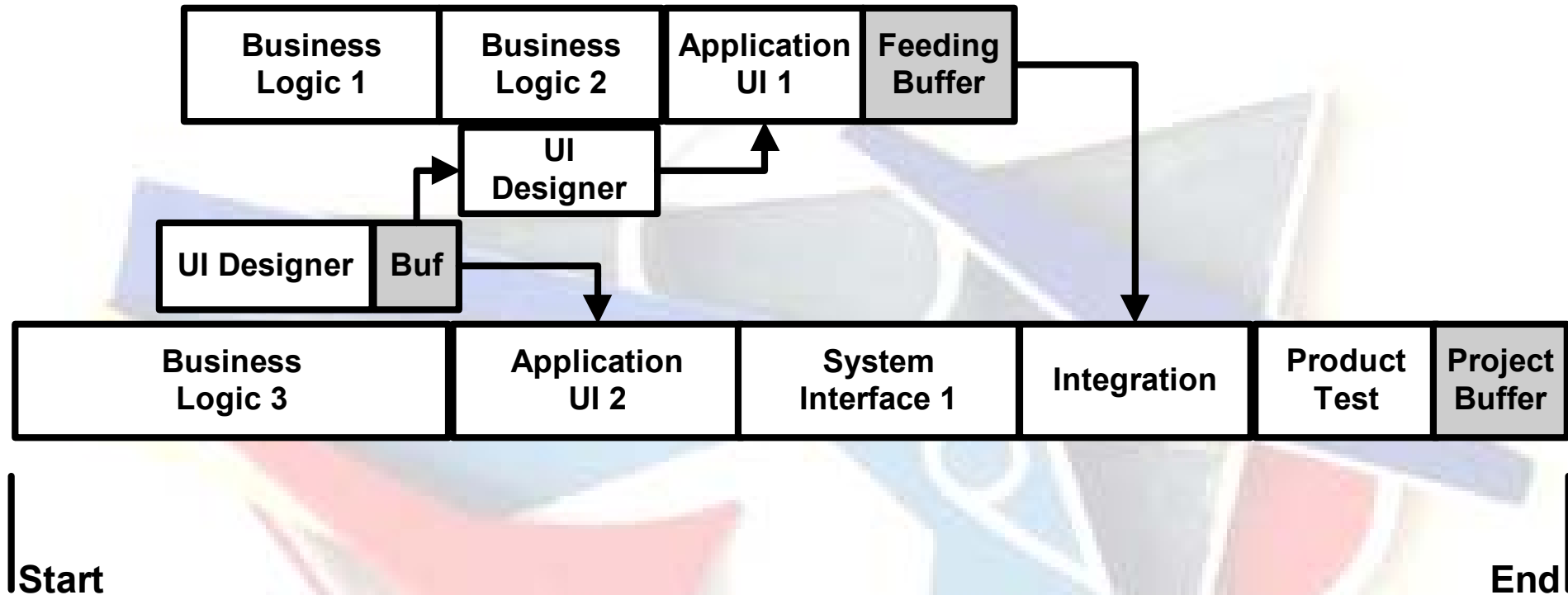
- Feature = Unit of Inventory
- Chief Programmer Worksheet = Batch of inventory to be designed/developed together
- Feature Set = Sub-assembly
  - Can be integration tested
- Subject Area = Assembly
  - Can be system tested
- Release Feature List = Product
  - Can be product, stress & regression tested

# Relating Features to the Model



- Feature
  - A method on the domain model
  - 1 UML Sequence Diagram per Feature
- Feature Set
  - Related to a <<moment-interval>> on the domain model
  - All features in a set touch the same pink
- Subject Area
  - Related to a chain of <<moment-interval>>s

# Critical Chain Schedule



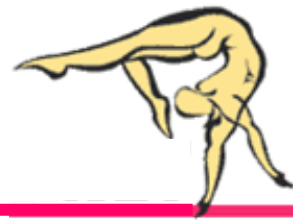
- Schedule based on Feature Set groupings
- Buffers aggregated across many Features
- This example has UI Designer as system constraint

# Definition of a CPWP



- Chief Programmer Work Package
- A collection (or batch) of Features which can logically be grouped for development simultaneously, and can be delivered within 2 weeks or less
  - i.e. each Feature must be less than 2 weeks and each CPW must be less than 2 weeks

# Reporting Progress



- FDD uses automated reporting
  - Eliminates needs for PITA project management
- Each Feature has 6 stages
  - Requirement walkthrough, design, review, code & unit test, review, promote to build
- Each stage tracked through artifacts in version control system
- Progress is reported on a website

# Project Overview

Features			Issues		Milestones								Complete
					Modeling		Planning		Design & Build		Ship		
Started	Completed	Total	Open	Blocked	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual	
116	60	572	1	1	9/27/02	9/27/02	10/4/02	10/4/02	12/23/02				33.84%

Not Started
  Started
  Watch
  Late
  Completed

## Issue List

ID	Issue Description	Assigned to	Planned date	Solved on	Features affected:
6	Development database down.	Lang Hoang	11/4/02		507 , 508 , 509 , 511 , 515 , 516 , 517 , 518 , 519 , 520 , 521

Not Started
  Started
  Late
  Completed

## Subject Area Summary

ID	Subject Area Name	Features			Complete
		Started	Completed	Total	
4	content management	33	47	159	47.24%
6	device management	25	0	69	31.84%
10	Rules Engine	1	7	8	87.62%
13	Filtering	6	6	12	50.5%
17	SOAP API	0	0	1	0.0%
18	Transport	34	0	48	31.17%
19	Subscriber Mangement	0	0	1	0.0%
20	Admin and Deployment	0	0	62	0.0%
29	Navigation	17	0	20	59.4%
30	Messaging	0	0	45	0.0%
31	Digital Rights Management	0	0	20	0.0%

## CPW Summary

ID	Brief Description	Issues		Complete
		Open	Blocked	
11	DeviceTypeManager - bundle parsing.	0	0	99.0%
12	FilterManager - pipeline configuration and basic filtering.	0	0	100.0%
13	FilterManager - caching and device compatability updates	0	0	1.0%
14	DeviceTypeManager - load and store functionality	1	1	99.0%
15	Incompatibility Reasons	0	0	1.0%
16	FilterManager - Rules Engine	0	0	100.0%
17	Content Scanning and Verification	0	0	100.0%
18	First Content Browser	0	0	99.0%
19	Delivery Manager Implementation + Gif for MMS/HTTP, Java for HTTP	0	0	44.0%
20	Content Management: Screen Savers and Wallpaper	0	0	0.5%

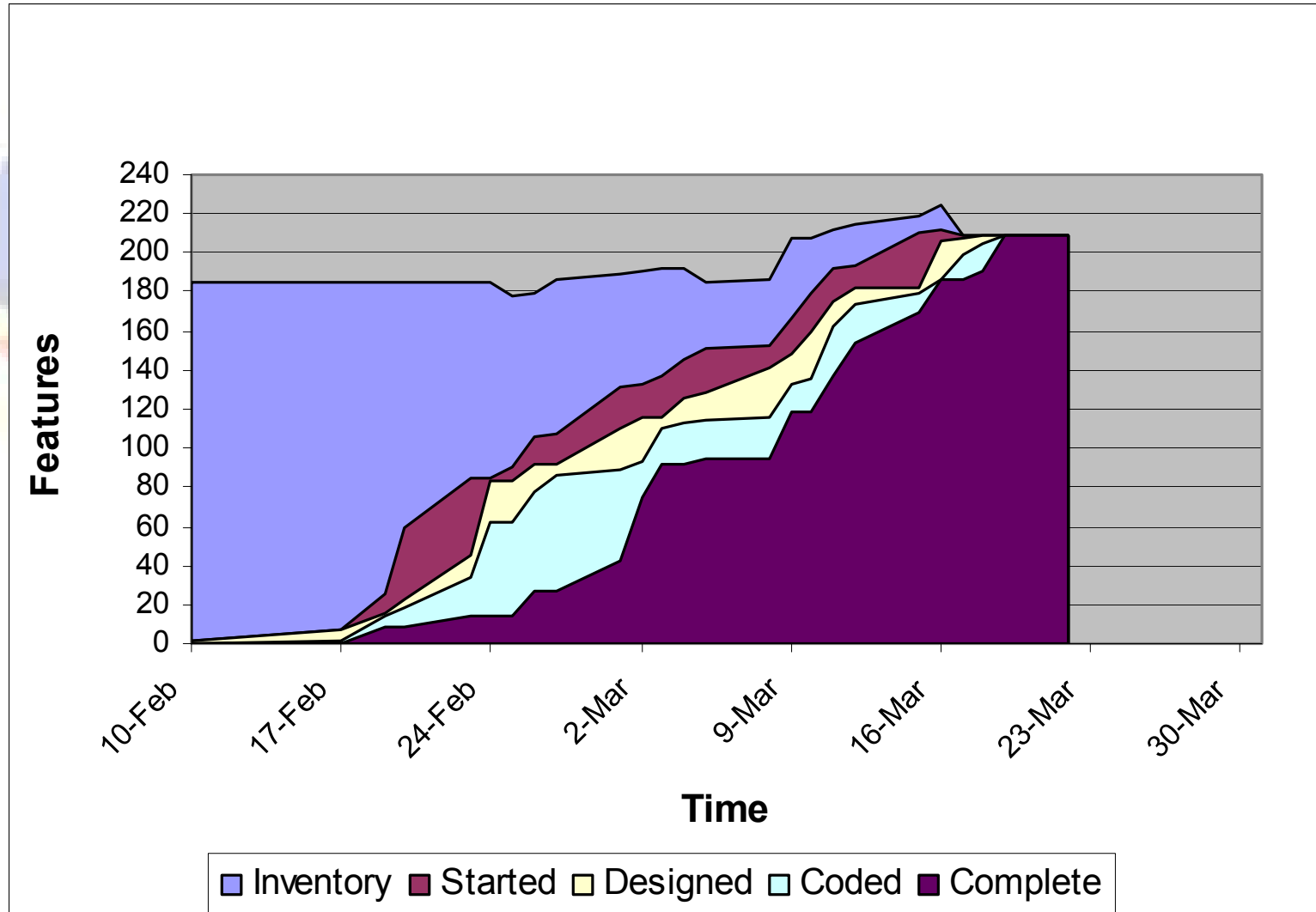
# Feature List

## List of features

	ID	Feature Name	Type	Subject Area	Feature Set	Cmplx.	Complete	Complete date
	407	normalize boolean expression	PD	Rules Engine	Initialization	5	100.0%	10/16/02
	408	generate RuleSystem from normalized expression	PD	Rules Engine	Initialization	2	100.0%	10/16/02
	409	get relevant content profiles from device	PD	Rules Engine	Matching	1	100.0%	10/16/02
	410	get RuleSystem from content profile	PD	Rules Engine	Matching	1	100.0%	10/16/02
	411	get possible Delivery Methods for content profile	PD	Rules Engine	Matching	1	100.0%	10/16/02
	412	get RuleSystem from Delivery Method	PD	Rules Engine	Matching	1	100.0%	10/16/02
	413	match Content attributes against RuleSystem	PD	Rules Engine	Matching	2	100.0%	10/16/02
	414	determine Incompatibility reasons	PD	Rules Engine	Matching	3	1.0%	
	420	filter CatalogEntry with FilteringComponent	PD	Filtering	Filtering	3	100.0%	10/16/02
	421	filter Category using AccessFilter	PD	Filtering	Filtering	2	100.0%	10/16/02
	422	filter PhysicalContent using DeviceCompatabilityFilter	PD	Filtering	Filtering	3	100.0%	10/16/02
	423	filter ApplicationPhysicalContent using APISecurityFilter	PD	Filtering	Filtering	2	100.0%	10/16/02
	424	build FilterPipeline using FilterConfiguration	PD	Filtering	Filtering	3	100.0%	10/16/02
	429	update FilterCache for added FirmwareFamily	PD	Filtering	Filter Management	3	1.0%	
	430	update FilterCache for removed FirmwareFamily	PD	Filtering	Filter Management	2	1.0%	
	431	update FilterCache for added CatalogEntry	PD	Filtering	Filter Management	4	1.0%	
	432	update FilterCache for updated CatalogEntry	PD	Filtering	Filter Management	3	1.0%	
	433	update FilterCache for removed CatalogEntry	PD	Filtering	Filter Management	3	1.0%	
	434	update FilterCache for updated FirmwareFamily	PD	Filtering	Filter Management	3	1.0%	
	435	process FilterConfiguration from FilterConfigFile	PD	Filtering	Filter Management	3	100.0%	10/16/02
	455	Validate GIF Content type for the Content	PD	content management	validating content	2	100.0%	10/16/02
	456	SOAP API additions	PD	SOAP API	SOAP	3	0.0%	
	457	Log Purchase Agreement as Billing Event	PD	content management	logging content events	2	0.0%	
	458	Log Download Attempt	PD	content	logging content events	2	0.0%	



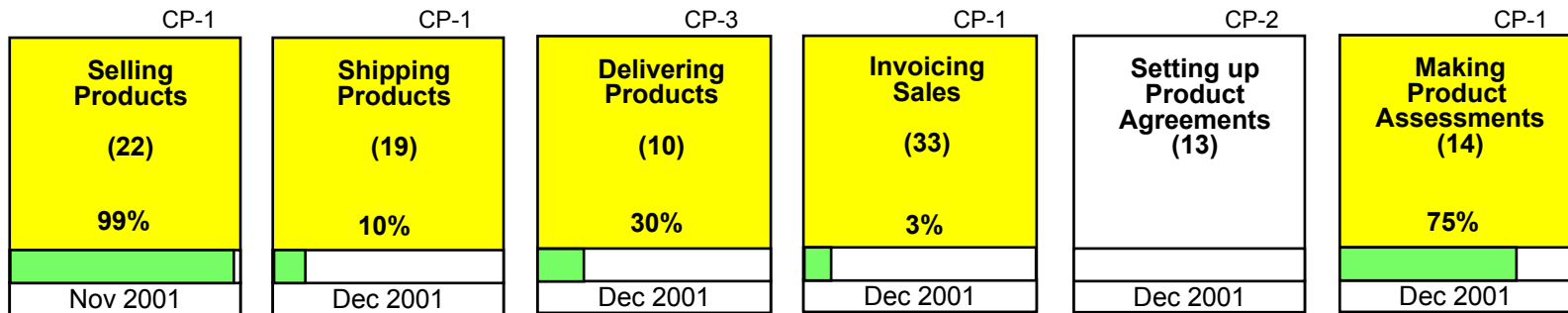
# Cumulative Flow Diagram



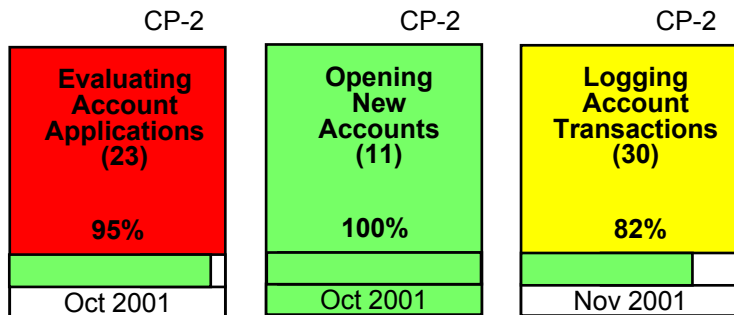
# Parking Lot Chart



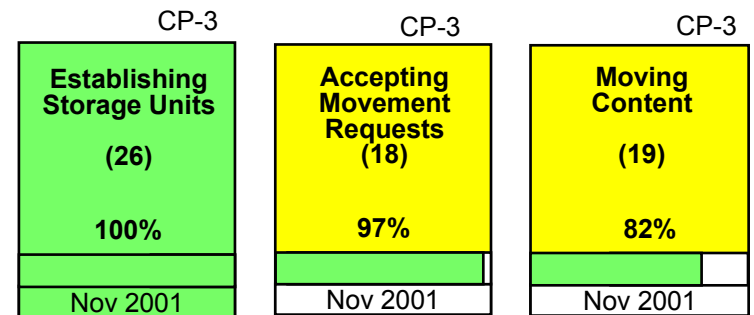
## Product Sale Management (PS)



## Customer A/C Mgmt (CA)



## Inventory Mgmt (IM)



KEY: ■ Work In Progress ■ Attention ■ Completed ■ Progress Bar  Not Started

# Subject Area

Logged in as: Guest Log out

**Products:**

- > **MAS**
  - None
  - Bogus
  - 2.5.1
  - Pele
  - Pele
  - FO
- > **Galileo**

## Subject Area Filtered by Release

Products > Product 1 [ MAS ] > Release 16 [ Pele ] > SA 18 [ Transport ]

**Full Description**

**Actions**

- [Edit this Subject Area](#)
- [Create a new Feature Set](#)
- [View for All Releases](#)

**Subject Area Detail**

	ID	Subject Area Name	Features			Complete
			Started	Completed	Total	
	18	Transport	34	0	48	31.17%

**Feature Set Summary**

	ID	Feature Set Name	Features			Complete
			Started	Completed	Total	
	39	instrumenting content	0	0	4	0.0%
	40	delivering content	32	0	41	34.34%
	41	monitoring network & system	2	0	3	29.33%

Not Started    Started    Watch    Late    Completed

Galileo Feature Tracking System, 0.22  
4thpass, Inc.

# Feature Set

## Feature Set Detail

ID	Feature Set Name	Features			Complete
		Started	Completed	Total	
40	delivering content	32	0	41	34.34%

Not Started  
  Started  
  Watch  
  Late  
  Completed

## List of features

ID	Feature Name	Milestone					
		Walk through	Design	Design Review	Coded	Code Review	Promote to Build
491	Deliver application for MS Smartphone devices						
504	Record successful/unsuccessful confirmation for download event						
522	deliver ring tone in SMS    MIDI	10/7/02	10/14/02	10/23/02			
523	deliver ring tone in MMS    MIDI	10/7/02	10/14/02	10/23/02			
524	deliver ring tone in HTTP/WAP    MIDI	10/10/02	10/14/02	10/23/02			
525	deliver ring tone in EMS    MIDI	10/10/02	10/14/02	10/23/02			
526	deliver ring tone in SMS    iMelody	10/7/02	10/14/02	10/23/02			
527	deliver ring tone in MMS    iMelody	10/7/02	10/14/02	10/23/02			
528	deliver ring tone in HTTP/WAP    iMelody	10/10/02	10/14/02	10/23/02			
529	deliver ring tone in EMS    iMelody	10/10/02	10/14/02	10/23/02			
530	deliver ring tone in HTTP/WAP    MP3	10/10/02	10/14/02	10/23/02			
531	deliver screen saver in SMS    GIF	10/7/02	10/14/02	10/23/02			
532	deliver screen saver in MMS    GIF	10/7/02	10/14/02	10/23/02			
533	deliver screen saver in HTTP/WAP    GIF	10/10/02	10/14/02	10/23/02			
534	deliver screen saver in EMS    GIF	10/10/02	10/14/02	10/23/02			
535	deliver screen saver in SMS    WBMP	10/7/02	10/14/02	10/23/02			
536	deliver screen saver in HTTP/WAP    WBMP	10/10/02	10/14/02	10/23/02			
537	deliver screen saver in EMS    WBMP	10/10/02	10/14/02	10/23/02			
538	deliver wall paper in SMS    GIF	10/7/02	10/14/02	10/23/02			



# Chief Programmer Worksheet

## CPW Summary

	Chief Programmer	Developers	Planned Date	Actual Date
	John Snell	John Snell Markus Jansen	(None)	(None)

## Issue List

	ID	Issue Description	Assigned to	Planned date	Solved on	Features affected:
	2	Delivery Manager Design Review	John Snell	10/18/02	10/18/02	522 , 523 , 524 , 525 , 526 , 527 , 528 , 529 , 530 , 531 , 532 , 533 , 534 , 535 , 536 , 537 , 538 , 539 , 540 , 541 , 542 , 543 , 544 , 545 , 546 , 547 , 553 , 555 , 556 , 557 , 558 , 560 , 561 , 562 , 563 , 564
	7	EADS is flaring up again. And again. And again.	John Snell	11/5/02	11/5/02	532 , 539 , 540 , 547 , 553 , 555 , 557 , 558 , 562 , 564

Not Started  
  Started  
  Late  
  Completed

## Feature Detail

	ID	Feature Name	Milestone											
			Walk through		Design		Design Review		Coded		Code Review		Promote to Build	
			Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual
	532	deliver screen saver in MMS    GIF	10/7/02	10/7/02	10/14/02	10/14/02	10/15/02	10/23/02						
	533	deliver screen saver in HTTP/VAP    GIF	10/10/02	10/10/02	10/14/02	10/14/02	10/15/02	10/23/02						
	539	deliver wall paper in MMS    GIF	10/7/02	10/7/02	10/14/02	10/14/02	10/15/02	10/23/02						
	540	deliver wall paper in HTTP/VAP    GIF	10/10/02	10/10/02	10/14/02	10/14/02	10/15/02	10/23/02						
	547	deliver application in HTTP/VAP    Java	10/10/02	10/10/02	10/14/02	10/14/02	10/15/02	10/23/02						
	555	receive success message from bearer	10/7/02	10/7/02	10/14/02	10/14/02	10/15/02	10/23/02						
	557	check timeout for message	10/10/02	10/10/02	10/14/02	10/14/02	10/15/02	10/23/02						
	560	manage time for response	10/10/02	10/10/02	10/14/02	10/14/02	10/15/02	10/23/02						

# References



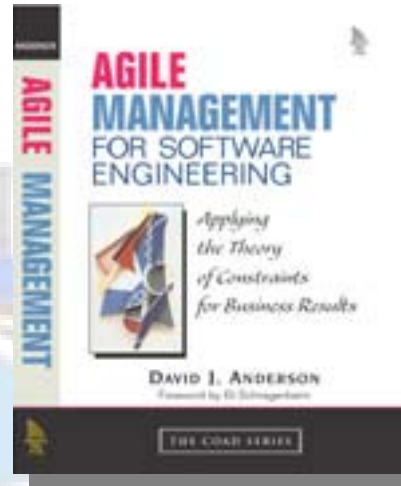
**Object Models: Strategies, Patterns & Applications**, 2nd ed., Coad, Mayfield & North, Yourdon Press, Prentice Hall, 1997

**Java Modeling in Color with UML : Enterprise Components and Process**, Coad, Lefebvre, De Luca, Prentice Hall, 1999

A Practical Guide to Feature Driven Development, Palmer, Stephen R., and John M. Felsing, Prentice Hall, 2001

**Data Model Patterns : Conventions of Thought**, David Hay, Dorset House, 1996

# Contact Details



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