

Staying Agile Inside a Large Software Development Organization

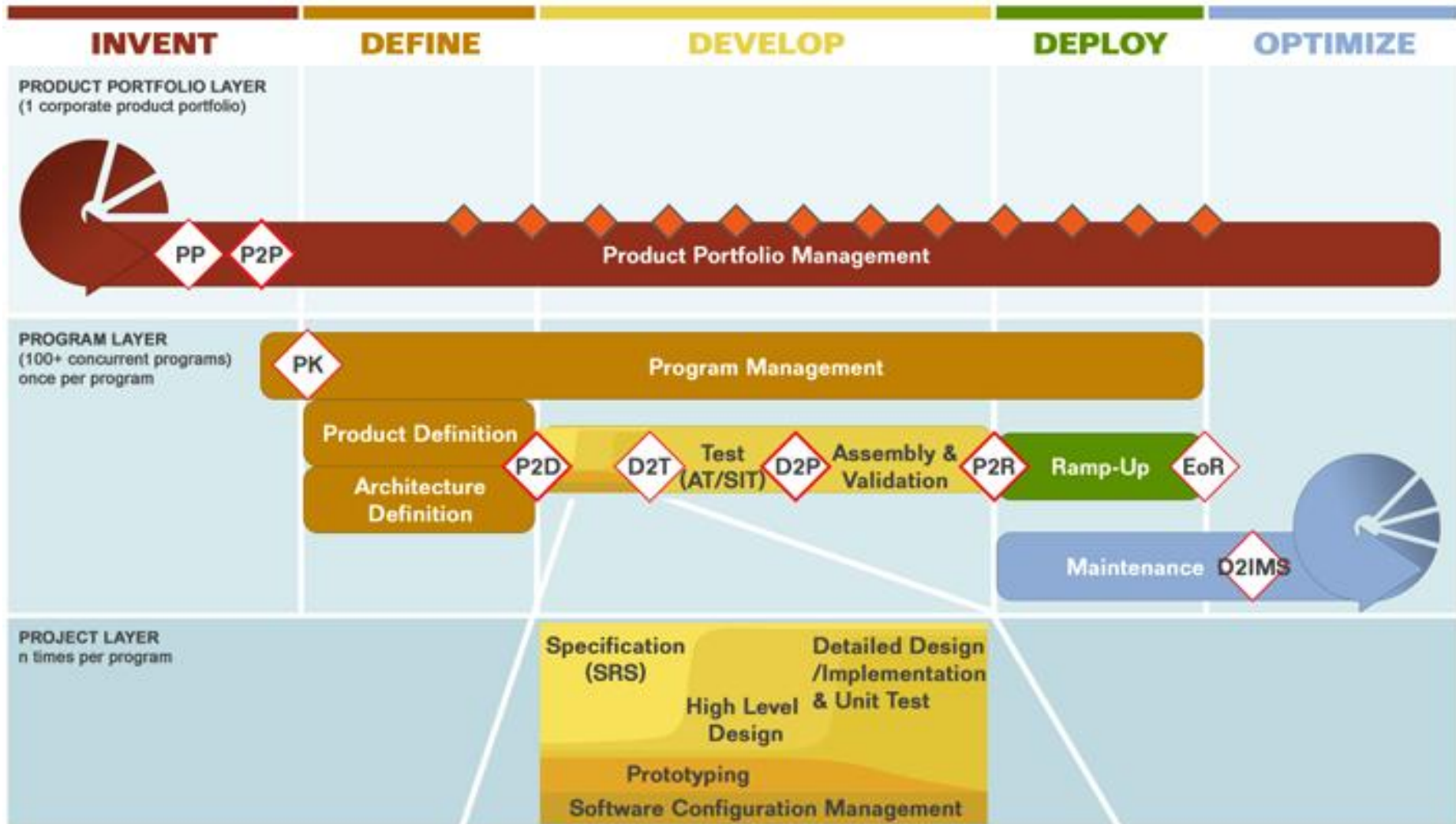
Embrace Your Constraints

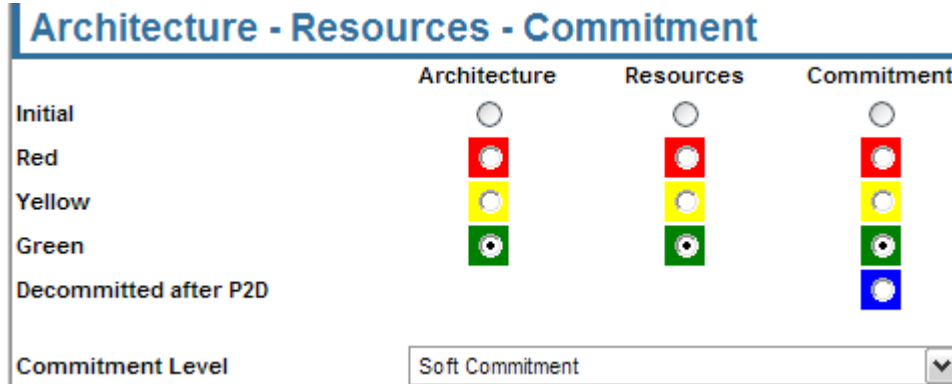
Andreas Fröhlich
Stefan Schonger

Public

SAP - Financial Services
November 2009

Process Innovation Lifecycle



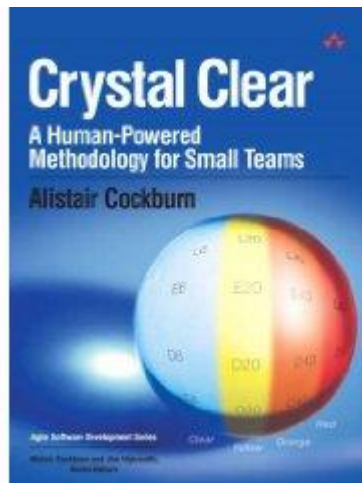


The Team





Extreme Programming



Crystal Clear

ABAP Unit: Ergebnisanzeige

Aufgabe/Programm/Klasse/Methode	S...	F...	Cr...	T...	Inf...
TASK_SCHONGER_20091119_17525	0	0	0	12	
/BA1/CL_AL_DMCPM_DATA_ENR	0	0	0	1	
/BA1/CL_AL_DMCPM_EXPECTED	0	0	0	1	
/BA1/CL_AL_DMCPM_FOURIER==	0	0	0	1	
/BA1/CL_AL_DMCPM_FOURIER_C	0	0	0	1	
/BA1/CL_AL_DMCPM_FOURIER_L	0	0	0	1	
/BA1/CL_AL_DMCPM_FOURIER_S	0	0	0	1	
/BA1/CL_AL_DMCPM_FOURIER_X	0	0	0	1	
/BA1/CL_AL_DMCPM_PANJER==	0	0	0	1	
/BA1/CL_AL_DMCPM_SADDLE_P	0	0	0	1	
/BA1/CL_AL_DMCPM_STAB_REC	0	0	0	1	
/BA1/CL_AL_DMCPM_ST_DEV==	0	0	0	1	
/BA1/CL_AL_DMCPM_ST_DEV	0	0	0	1	
LCL_UNIT_TEST	0	0	0	0	
CALCULATE_RISK_MEASU	0	0	0	0	
CALCULATE_RISK_MEASU	0	0	0	0	
/BA1/CL_AL_DMCPM_TOTAL_LOS	0	0	0	1	
/BA1/CL_AL_DMCPM_TOTAL_L	0	0	0	1	
LCL_TEST	0	0	0	0	
TEST_TOTAL_LOSS_CSFE	0	0	0	0	
TEST_TOTAL_LOSS_CSFE	0	0	0	0	

Alerts und Meldungen

Art	Meldung
Abdeckung	Abdeckungsergebnisse für Programm/BA1/CL_AL_DMCPM TOTAL

ABAP Unit: Statement Coverage

Programm	/BA1/CL_AL_DMCPM_SADDLE_POINT
76	
77	LOOP AT m_tab_sector_data ASSIGNING <i_str_sector_data>. " build sums over the sectors
78	IF <i_str_sector_data>-sector_id <> i_str_parameters-ideosyncratic_sector_id.
79	CASE 1_curr_deriv.
80	WHEN 0. " Q_k(z) - mu_k for k=0 or ... for k=0
81	i_psi_value = get_v(i_tab_q_k = 1_tab_q_k i_sector_id = <i_str_sector_data>-sector_id i_deriv = 0).
82	WHEN 1. " alpha_k * V_k(z, 1)
83	" Python: sum(self.alpha[k] * self.funcV(k,z, 1))
84	i_psi_value = <i_str_sector_data>-alpha * get_v(i_tab_q_k = 1_tab_q_k i_sector_id = <i_str_sector_data>-sector_id i_deriv = 1
85	WHEN 2. " alpha_k * (V_k(z, 2) + V_k(z,1) ** 2.0)
86	" Python: lambda k, z: self.alpha[k] * (self.funcV(k,z, 2) + self.funcV(k,z,1) ** 2.0)
87	i_psi_value = <i_str_sector_data>-alpha * (get_v(i_tab_q_k = 1_tab_q_k i_sector_id = <i_str_sector_data>-sector_id i_deriv = 2
88	get_v(i_tab_q_k = 1_tab_q_k i_sector_id = <i_str_sector_data>-sector_id i_deriv = 1
89	WHEN 3. " alpha_k * (V_k(z, 3) + 3.0 * V_k(z, 2) * V_k(z, 1) + 2.0 * V_k(z, 1) ** 3.0),
90	" Python: lambda k, z: self.alpha[k] * (self.funcV(k,z, 3) + 3.0 * self.funcV(k,z, 2) * self.funcV(k,z, 1) + 2.0 * self.funcV(k
91	i_psi_value = <i_str_sector_data>-alpha * (get_v(i_tab_q_k = 1_tab_q_k i_sector_id = <i_str_sector_data>-sector_id i_deriv = 3
92	3 * get_v(i_tab_q_k = 1_tab_q_k i_sector_id = <i_str_sector_data>-sector_id i_deriv = 2
93	2 * get_v(i_tab_q_k = 1_tab_q_k i_sector_id = <i_str_sector_data>-sector_id i_deriv = 1
94	WHEN 4. " alpha_k * (V_k(z, 4) + 4.0 * V_k(z, 3) * V_k(z, 1) + 3.0 * V_k(z, 2) ** 2.0 + 12.0 * V_k(z, 2) * V_k(z, 1) ** 2.0 + 6.0
95	" Python: lambda k, z: self.alpha[k] * (self.funcV(k,z, 4) + 4.0 * self.funcV(k,z, 3) * self.funcV(k,z, 1) + 3.0 * self.funcV(k
96	i_psi_value = <i_str_sector_data>-alpha * (get_v(i_tab_q_k = 1_tab_q_k i_sector_id = <i_str_sector_data>-sector_id i_deriv = 4
97	4 * get_v(i_tab_q_k = 1_tab_q_k i_sector_id = <i_str_sector_data>-sector_id i_deriv = 3
98	3 * get_v(i_tab_q_k = 1_tab_q_k i_sector_id = <i_str_sector_data>-sector_id i_deriv = 2
99	12 * get_v(i_tab_q_k = 1_tab_q_k i_sector_id = <i_str_sector_data>-sector_id i_deriv = 2
100	6 * get_v(i_tab_q_k = 1_tab_q_k i_sector_id = <i_str_sector_data>-sector_id i_deriv = 1
101	ENDCASE.
102	ELSE.
103	i_psi_value = get_v(i_tab_q_k = 1_tab_q_k i_sector_id = <i_str_sector_data>-sector_id i_deriv = 1_curr_deriv). " use pre-calculate
104	ENDIF.
105	
106	* build sum over the sector: psi(z) = sum(psi_k(z)), create line if non-existing

ABAP Unit: Ergebnisanzeige

Programmebenenabdeckung durch Anweisungen


Ab.	Prozedur...	TCode/Programm	Obj-Typ	Objekt...
86,792453	/BA1/CL_AL_DMCPM_SADDLE_POINT=CP	CLAS	/BA1/CL	
100,000000	/BA1/CL_AL_DMCPM_STAB_REC_COMPCP	CLAS	/BA1/CL	
100,000000	/BA1/CL_AL_DMCPM_ST_DEV=====CP	CLAS	/BA1/CL	





Prozedurebenenabdeckung durch Anweisungen

Ab.	Anweisun...	Typ	Name des Verarbeitungsblocks	Klasse des Verarbeitungsblocks	Σ Anwei...	Σ Aufw
0,000000	METH /BA1/IF_AL_DMCPM_FUNCTION_X_Y-FUNCTION		LCL_Q_K_ZERO		5	
100,000000	METH /BA1/IF_AL_DMCPM_FUNCTION_X_Y-FUNCTION		LCL_Q_K_ZERO_CACHING		8	
100,000000	METH /BA1/IF_AL_DMCPM_LOSS_DISTR-CALCULATE_LOSS_DISTRIBUT		/BA1/CL_AL_DMCPM_SADDLE_POINT		5	
100,000000	METH /BA1/IF_AL_DMCPM_PORTFOLIO_R-CALCULATE_PORTFOLIO_RE		/BA1/CL_AL_DMCPM_SADDLE_POINT		9	
67,000000	METH /BA1/IF_AL_DMCPM_RISK_CONTR-CALCULATE_RISK_CONTRIBU		/BA1/CL_AL_DMCPM_SADDLE_POINT		24	
78,000000	METH /BA1/IF_AL_DMCPM_SADDLE_FUNC-CALCULATE_ES_BASED_ON		/BA1/CL_AL_DMCPM_SADDLE_POINT		9	
75,000000	METH /BA1/IF_AL_DMCPM_SADDLE_FUNC-CALCULATE_EXPECTED_SF		/BA1/CL_AL_DMCPM_SADDLE_POINT		8	
100,000000	METH /BA1/IF_AL_DMCPM_SADDLE_FUNC-CALCULATE_P_K_BASED_O		/BA1/CL_AL_DMCPM_SADDLE_POINT		8	
80,000000	METH /BA1/IF_AL_DMCPM_SADDLE_FUNC-CALCULATE_SADDLE_POINT		/BA1/CL_AL_DMCPM_SADDLE_POINT		5	
80,000000	METH /BA1/IF_AL_DMCPM_SADDLE_FUNC-CALCULATE_VALUE_AT_RIS		/BA1/CL_AL_DMCPM_SADDLE_POINT		5	
73,000000	METH CALCULATE_ALPHA_DELTA		/BA1/CL_AL_DMCPM_SADDLE_POINT		11	
100,000000	METH CALCULATE_CGF_DERIV_ES		/BA1/CL_AL_DMCPM_SADDLE_POINT		17	
96,000000	METH CALCULATE_CGF_DERIV_PSI		/BA1/CL_AL_DMCPM_SADDLE_POINT		46	
100,000000	METH CALCULATE_MOMENTS		/BA1/CL_AL_DMCPM_SADDLE_POINT		10	
100,000000	METH CALCULATE_Q_K		/BA1/CL_AL_DMCPM_SADDLE_POINT		13	
100,000000	METH CALCULATE_Q_K_FOR_ONE_SECTOR		/BA1/CL_AL_DMCPM_SADDLE_POINT		11	

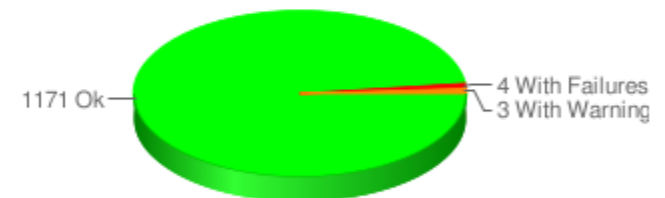
Unit Tests for One Project




----- ABAP UNIT TEST REPORT -----

Run Details	
Variant	PA_BA_UT_RISK
System	FPA
Client	525
User Name	AUT_PA_BA
Run Date	14.11.2009
Start Time	23:30:21
End Time	23:51:42
Overall result	 Failures occurred

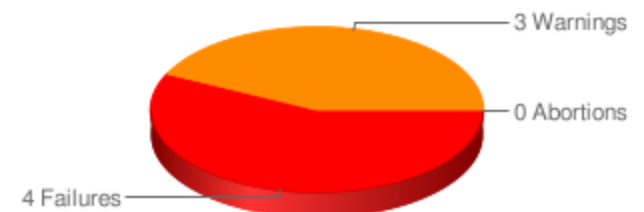
Method Statistics							
Packages	Programs	Testclasses	Testmethods	OK 	With Failures 	With Warnings 	Indisposed 
35	265	299	1.178	1171	4	3	0

Method Statistics



Message Summary		
Abortions 	Failures 	Warnings 
0	4	3

Message Summary



Automated Scenario Tests



Subject: Automated Test Execution Results for Financial Services Banking in CW 47 2009

Message | Weekly_Run_Report_Bank.rar (358 KB)

Test Plan/Case	NOK	NE	OK
BA 8.0 SLS SDA	10	0	21
BA 8.0 SLS, DM & B2	27	0	93
BA 8.0 MS	7	0	15
BA 8.0 IOA	39	0	0
BA 7.0 SLS, DM & B2	19	0	118
BA 7.0 SLS SDA	7	0	26
BA 7.0 MS	2	0	22
BA 7.0 IOA	0	0	39
BA 6.0 SLS, DM & B2	31	0	129
BA 6.0 SLS, DM & B2 Add On	3	0	118
BA 6.0 MS	20	0	4
BA 6.0 IOA	5	0	0
BA 5.0 SLS & DM	2	0	76
BA 5.0 MS	1	0	44
BA 5.0 Basel	0	0	37
BP FS-PP 1.0	0	0	47

Two Main Takeaways

Unit Tests



Retrospectives

Keep	Try
- ~~~~~	- ~~~~~
- ~~~~~	- ~~~~~
- ~~~~~	- ~~~~~
- ~~~~~	- ~~~~~
- ~~~~~	- ~~~~~
- ~~~~~	- ~~~~~
<hr/>	
Problems	
= ~~~~~	
= ~~~~~	

Scrum – Burndown Chart

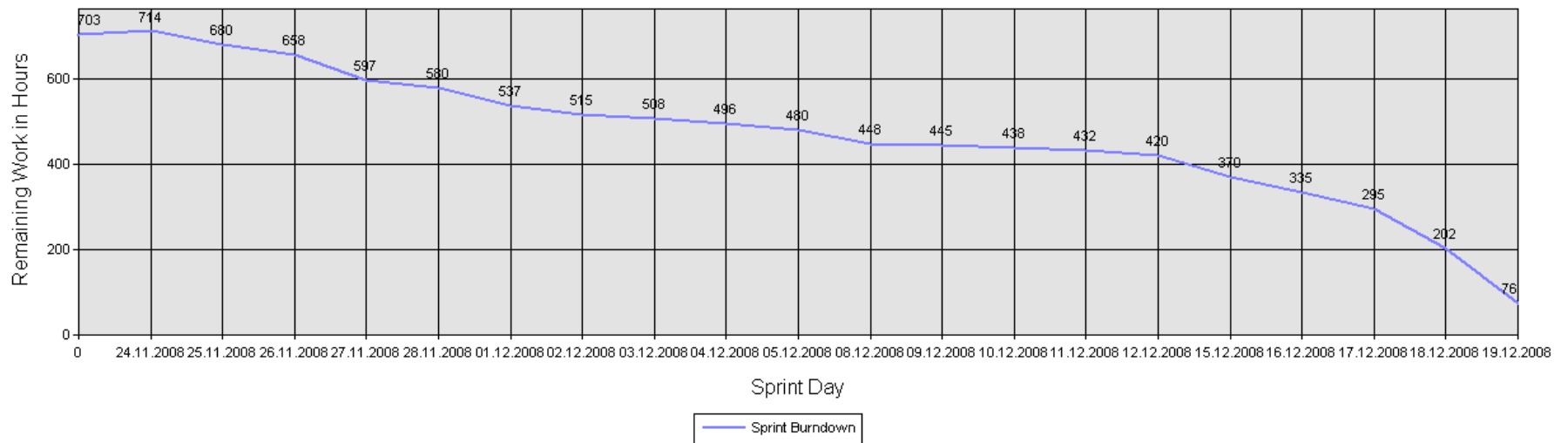
[etup Scrum Project](#) | [Define Product Backlog](#) | [Plan Sprint](#) | [Tracking](#) | [My Tasks](#)

[Burndown Graphs](#) | [Work Progress Graphs](#) | [Task Overview](#) | [Block Report](#)

Show Burndown Chart of Sprint **Sprint** S15 : CPM W3 implementation phase - I for Project Team

Display: ☒ Hours ☐ Percent

Sprint Burndown Chart



Start Date (24.11.2008)

Finish Date (19.12.2008)

Scrum – Sprints



Credit Risk > Setup Scrum Project

Detail Table Graph

Phase Create Include Delete Schedule Add to Favorites Copy Link Print



Define Team

Define Sprint

Define Categories

Related Tools

Import & Export Center

Project Element	Stat.
▼ ▲ Credit Risk	
▪ ➤ Setup Scrum Project	
▪ ➤ Define Product Backlog	
▪ ➤ Plan Sprint	
▪ ➤ Tracking	
▪ ➤ Retrospective	
▪ ➤ My Tasks	
▪ ➤ Compliance	

Define Sprints

ID	Sprint Name	Description	Sprint Start Date	Sprint Finish Date	Capacity	Sprint Status
S1	CPM Development	development phase	03.01.2008	25.01.2008	936 h	Closed ▼
S2	CPM Test Prep and MIT	test preparation phase and MIT	28.01.2008	15.02.2008	848 h	Closed ▼
S4	CPM AT	AT including retest	18.02.2008	07.03.2008	776 h	Closed ▼
S5	CPM validation retrofit	validation and retrofit	10.03.2008	04.04.2008	512 h	Closed ▼
S6	CPM CRT and planning/spec I :	CPM CRT and planning 300 including starting first specifications	07.04.2008	18.04.2008	496 h	Closed ▼
S7	CPM W2 spec phase II	CPM FSAPPL200 Wave 2 spec phase	21.04.2008	09.05.2008	552 h	Closed ▼
S8	CPM W2 design phase	CPM FSAPPL200 Wave 2 design phase	12.05.2008	06.06.2008	760 h	Closed ▼
S9	CPM implementation W2 phase	CPM implementation W2 phase 1	09.06.2008	25.07.2008	1128 h	Closed ▼
S10	CPM implementation W2 phase	CPM implementation W2 phase 2 and CPM test prep	28.07.2008	29.08.2008	576 h	Closed ▼
S11	MIT Wave2 - week 1	MIT Wave2 - week 1	01.09.2008	05.09.2008	200 h	Closed ▼
S12	MIT Wave2 - week 2/3/4	MIT Wave2 - week 2/3/4	08.09.2008	26.09.2008	656 h	Closed ▼
S13	CPM W3 spec phase	CPM W3 spec phase	29.09.2008	22.10.2008	580 h	Closed ▼
S14	CPM W3 design phase	CPM W3 design phase	23.10.2008	21.11.2008	808 h	Closed ▼
S15	CPM W3 implementation phase	CPM W3 implementation phase - I	24.11.2008	19.12.2008	720 h	Closed ▼
S16	CPM W3 implementation phase	CPM W3 implementation phase - II	22.12.2008	06.02.2009	720 h	Closed ▼
S17	CPM W3 MIT phase I	CPM W3 MIT phase I	09.02.2009	06.03.2009	584 h	Closed ▼
S18	CPM W3 AT phase	CPM W3 AT phase	30.03.2009	01.05.2009	464 h	Closed ▼
S19	CPM W3 MIT phase II	CPM W3 MIT phase II	09.03.2009	27.03.2009	464 h	Closed ▼

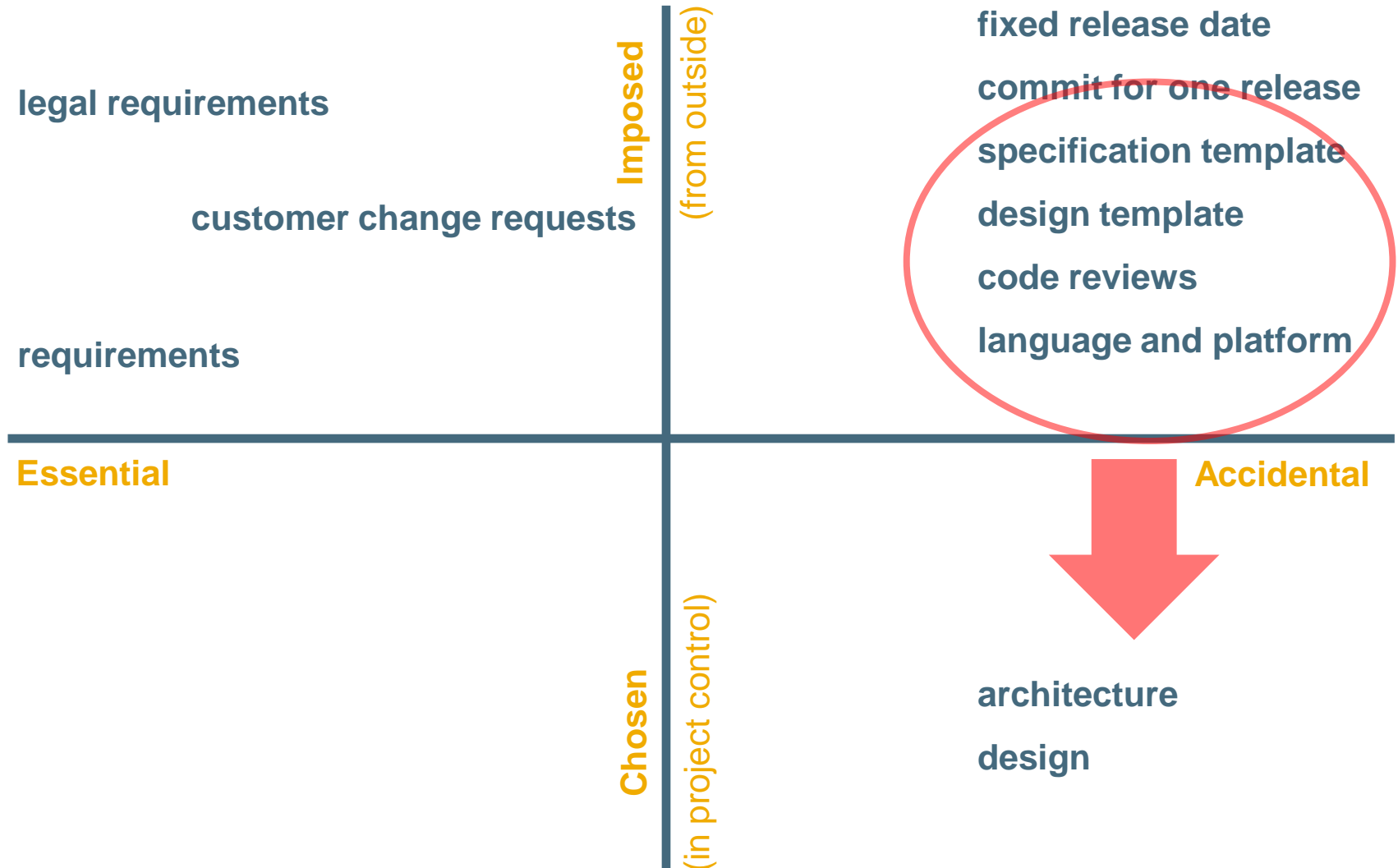
- **fixed release date**
- **commit features for one release**
- **write and review specs and designs first (and use the template)**
- **“Fagan-style” code reviews**
(“but the reviews are discouraged during the customer test phase”)
- **language and platform is fixed**

“

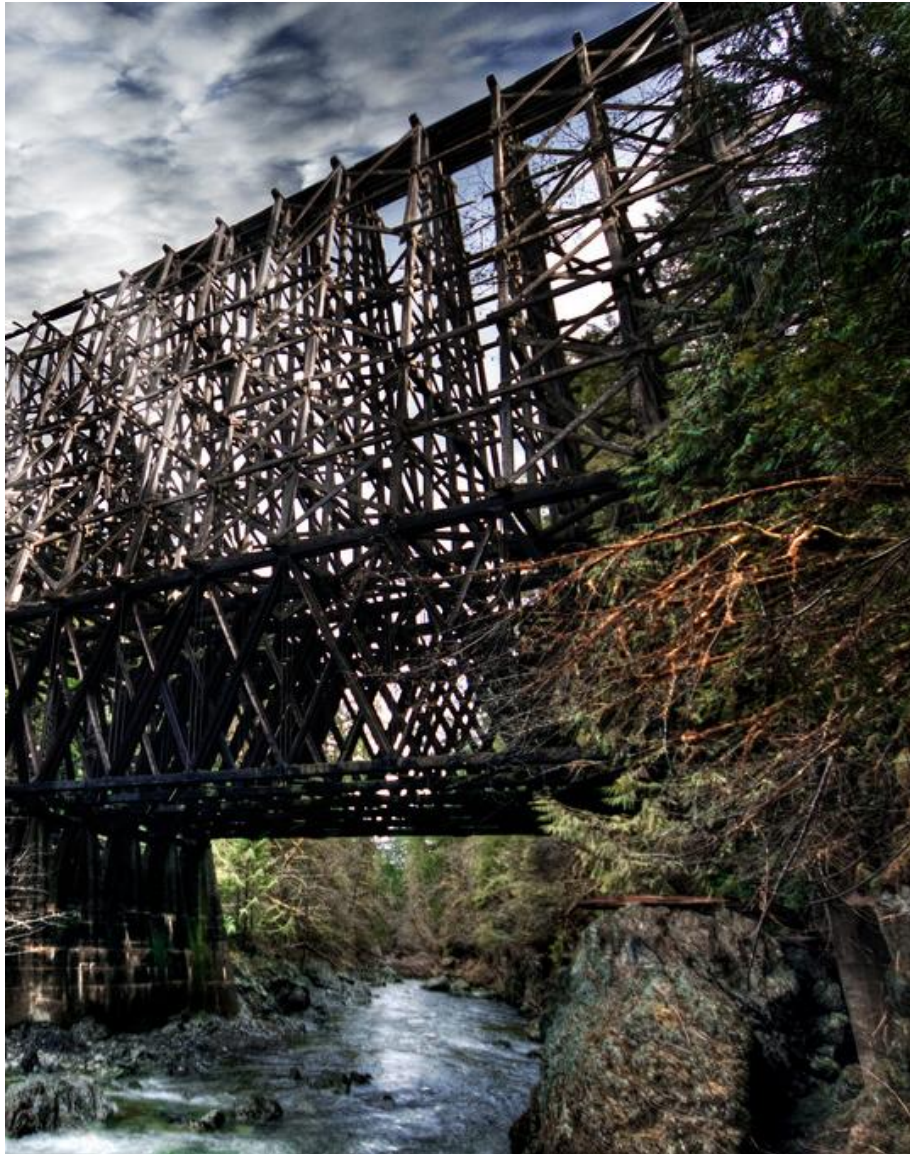
Da es sehr förderlich für die Gesundheit ist, habe ich beschlossen, glücklich zu sein.
J'ai décidé d'être heureux parce que c'est bon pour la *santé*.

Voltaire

Constraints and Complexity



Constraints and Elegance



Who Immediately Understands Agile Practices



time line

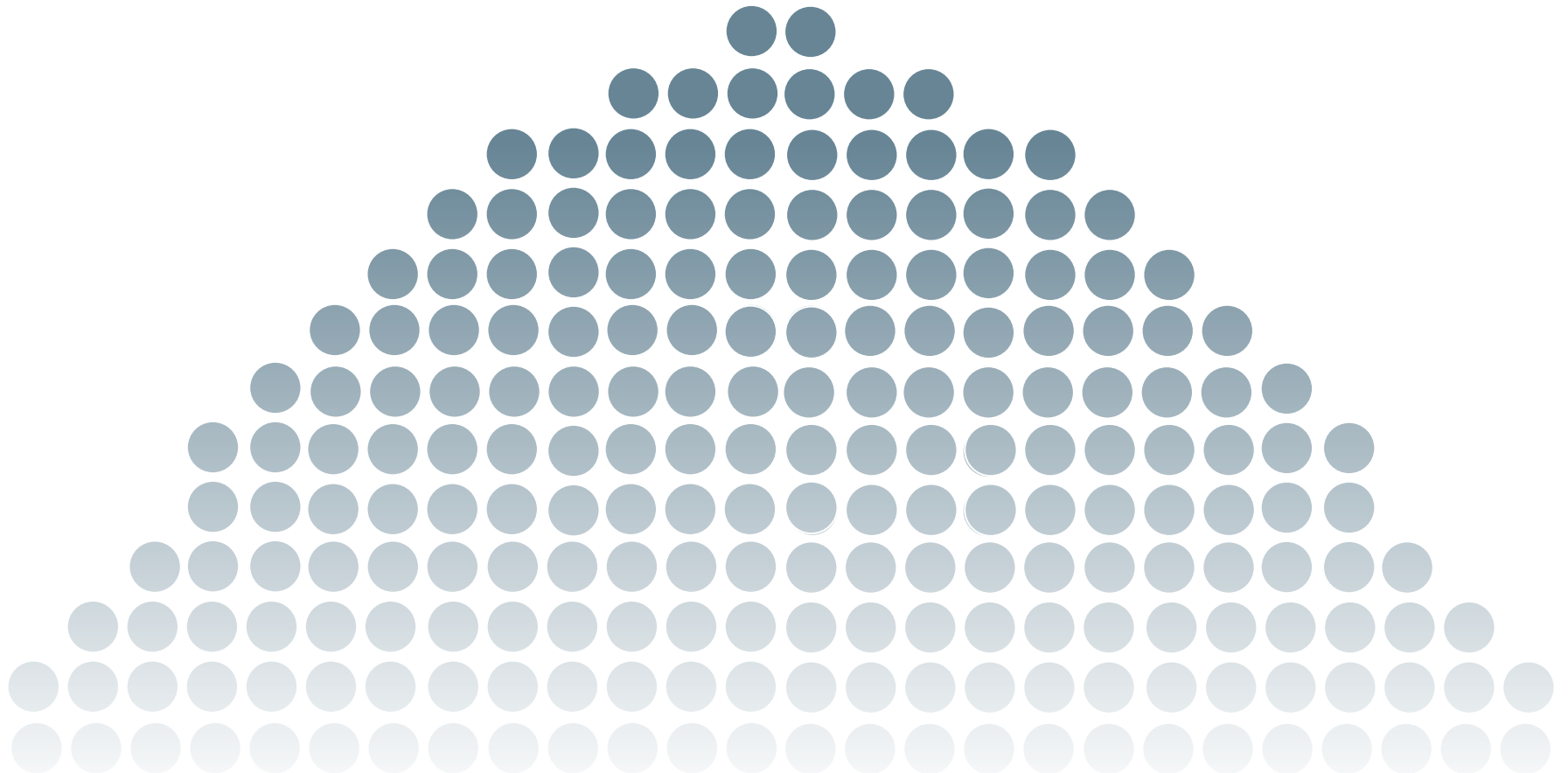
Concept

Cash

Idea

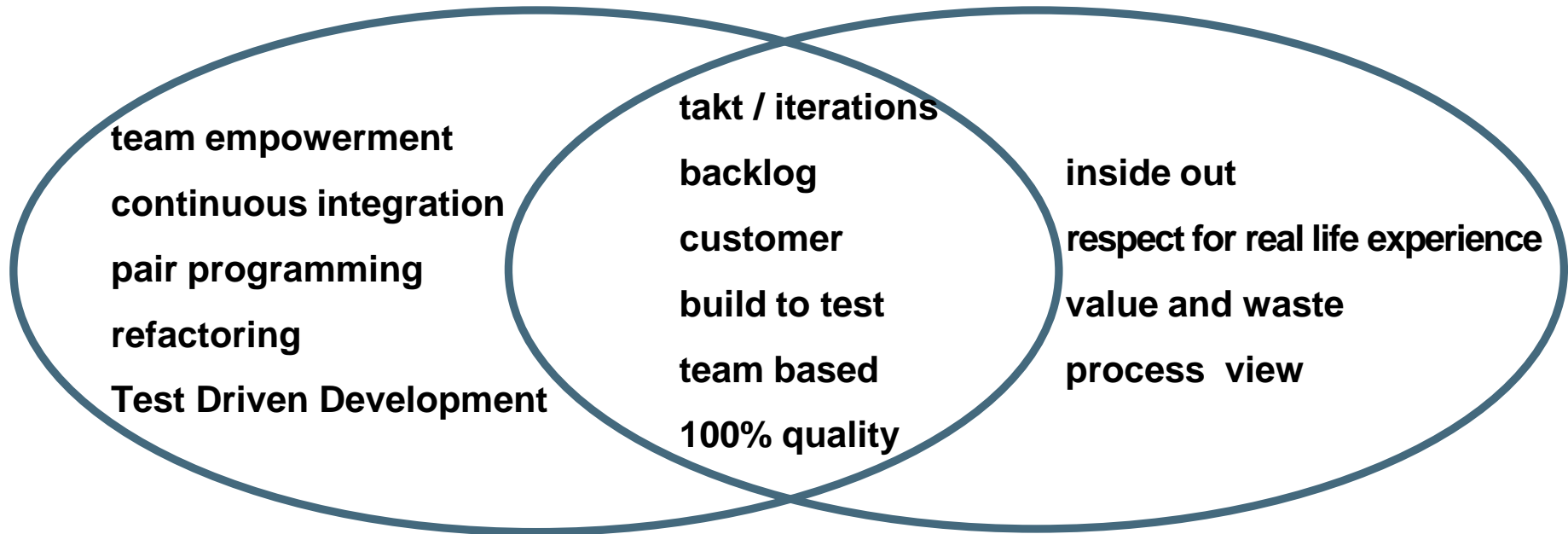
Active Customer

Who Immediately Understands Lean Practices



Agile/Scrum

Lean



Team

Enterprise

Lean Product Development ≠ Lean Manufacturing

Some things just have different names

Example: “Andon Boards”



Cockburn uses a different term: “Information Radiators”

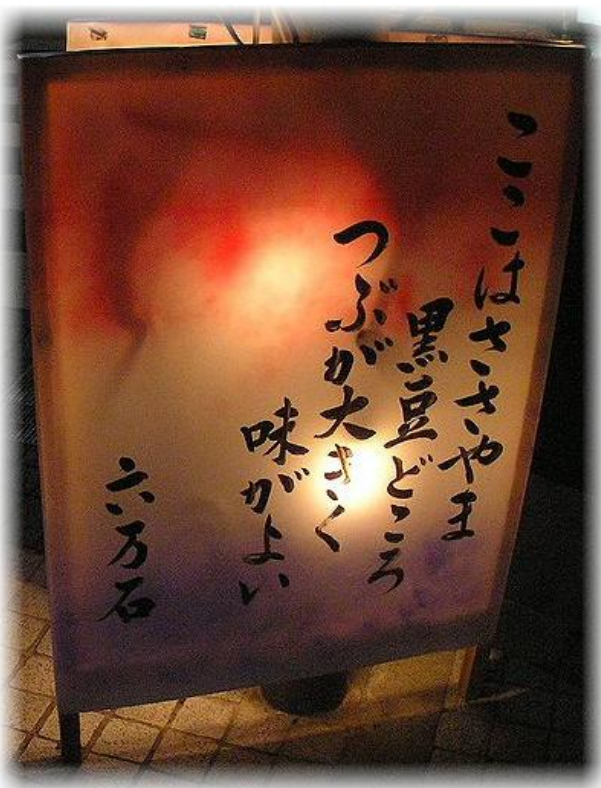
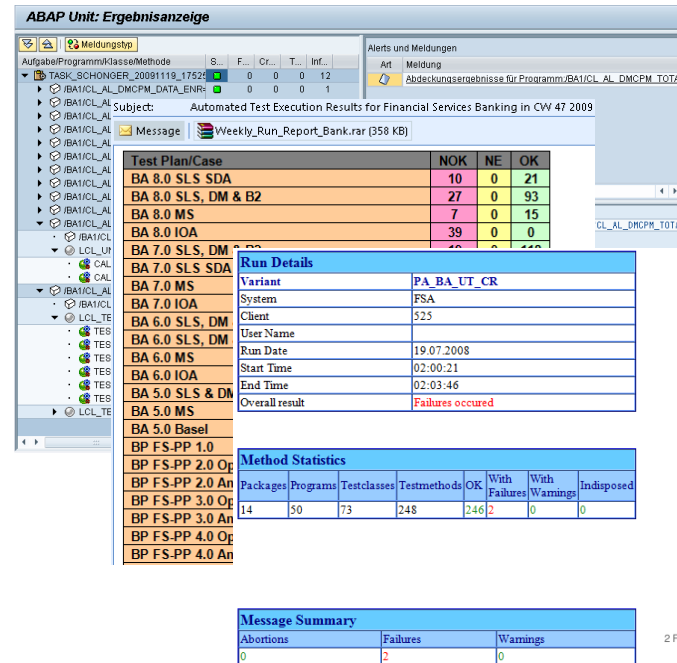
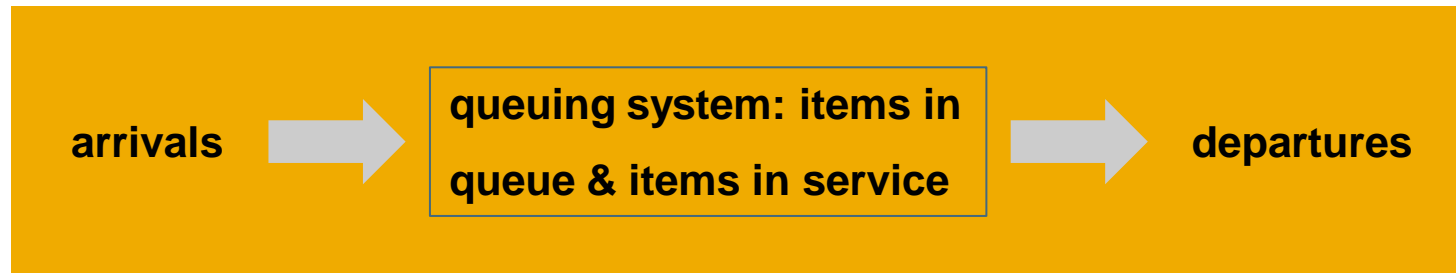


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Pipelines: Order to Cash





Little's law (1961, and actually a theorem)

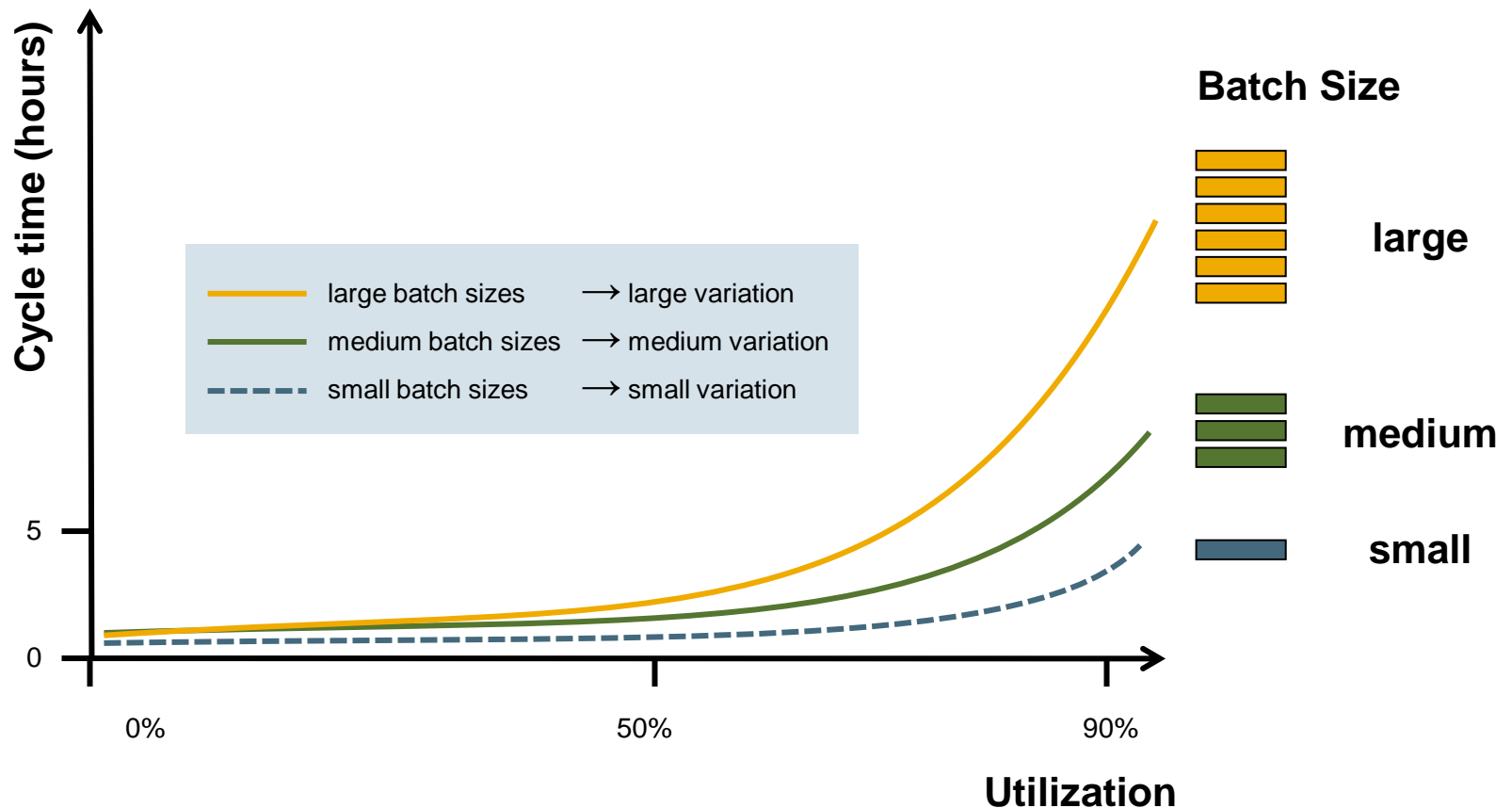
$$\text{Cycle Time} = \frac{\text{Things in Process}}{\text{Average Completion Rate}}$$

- Independent of involved probability distributions, order of service, #servers
- Works for the queue itself, as well as the system or systems of systems
- Under certain assumptions also works if stated in terms of output
- But **only for steady state conditions**



Photo by [Reiner Kraft](#) (i) (s) (=)

- with variations, the system is not in a steady state
- variation is usually correlated with batch size



(inspired by Mary and Tom Poppendieck's "Implementing Lean Software Development")

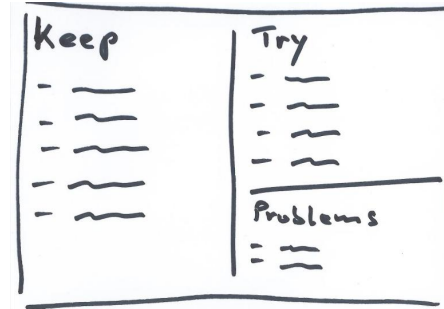
Queuing theory gives us six rules for reducing software development cycle time

- **Limit work to capacity**
- **Even out the arrival of work**
- **Minimize the number of Things-in-Process**
- **Minimize the size of the Things-in-Process**
- **Establish a regular cadence**
- **Use pull scheduling**

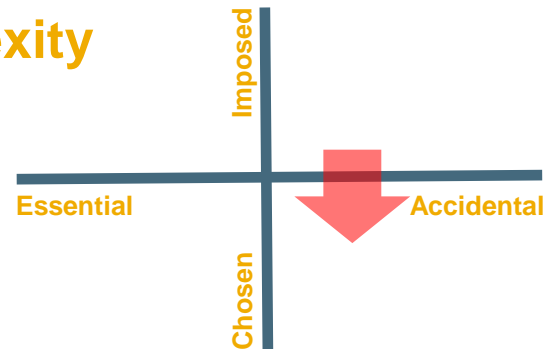
(taken from Mary and Tom Poppendieck's "Implementing Lean Software Development")

Remember

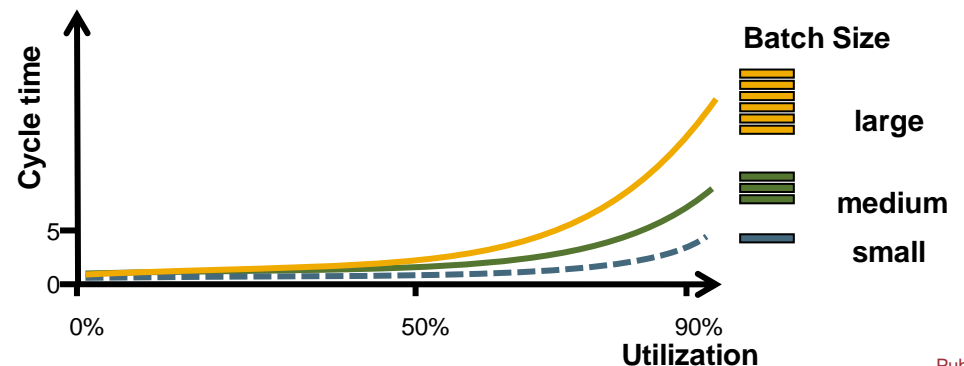
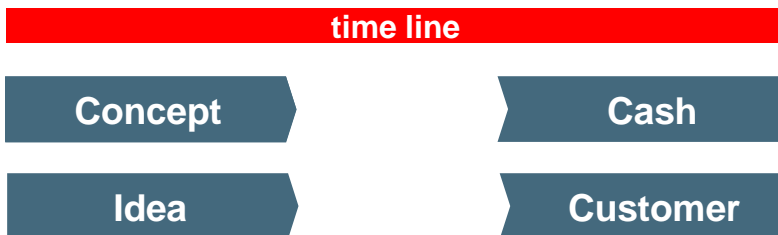
Start with agile practices



Manage Constraints and Complexity



Use Lean to Your Advantage



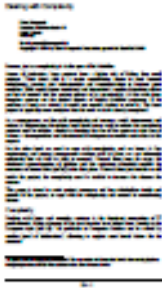


Andreas Fröhlich

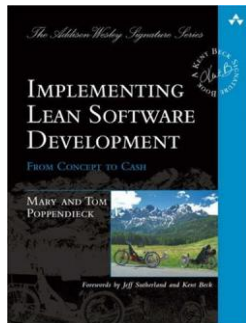
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Klaus Marquardt, Dealing With Complexity




Mary and Tom Poppendieck, Implementing Lean Software Development



Introduction to Little's law

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