Legacy System Excorsism
by Pareto's Principle

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telenor   RADAR   Objectnet

Et generisk mobilnett

External Services
- Service Provider

Internet

Service Network
- Operator Hosted Services
- Integration Layer (i.e. CPA)
- Parlay GW
- SMSC
- MMSC
- WAP-GW
- POS

Core Network
- IN
- GGSN

Business Support Systems
- Web-interface
- Kunde-support
- COS
- Order
- Billing

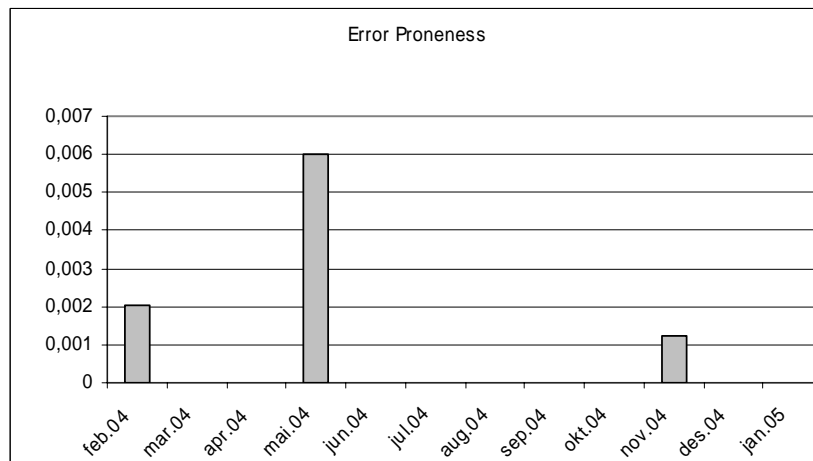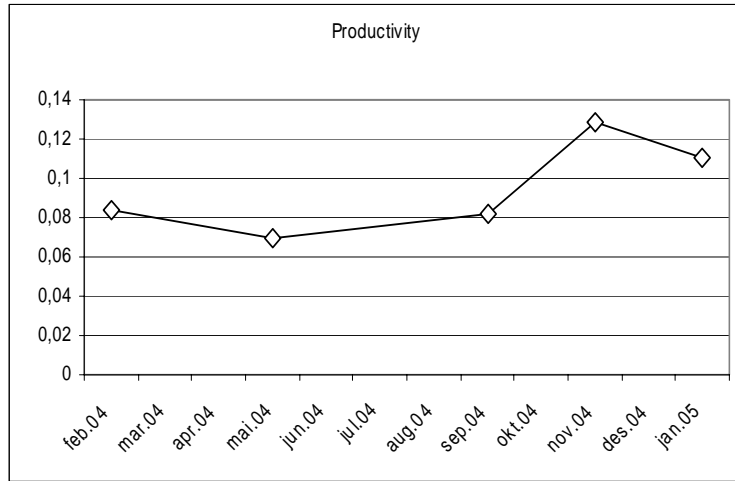**Operational Support Systems**
- Activation
- Management
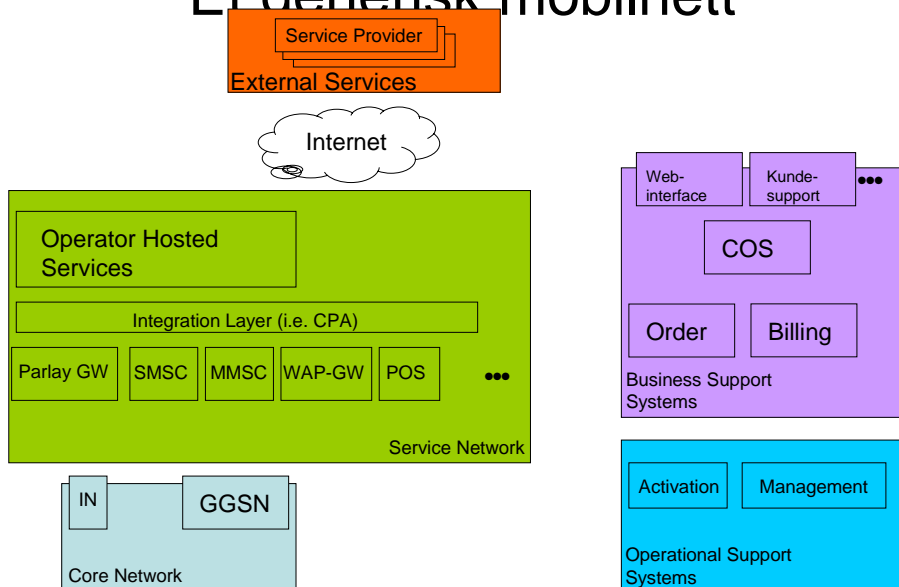
COS

- <u>Telenor Mobile Norway's</u> component based middleware system for:
  - Integration
  - Common Business Logic

- 350.000.000 calls a month

- Developed by 30-40 resources over the course of 8 years

- Integrates with about 30 back end systems (Ordre, Billing, Nettverksaktivering, Datavarehus, osv)

COS – Technical

- Large Java-based system
  - Weblogic application servers
  - Sybase og Oracle databases
  - Over 8.000 classes
  - 2-300 database-tables
  - 1500 services
  - 2000 stored procedures
  - Non-Generated 160K NCSS

- Integration Technolgy
  - Message Queues
  - Data bases
  - Web services
  - CORBA
  - Screen Scraping Cobol-systemer
  - Batch-solution
  - And more.

Productivity

0,14	
0,12	
0,1	
0,08	
0,06	
0,04	
0,02	
0	

feb.04 mar.04 apr.04 mai.04 jun.04 jul.04 aug.04 sep.04 okt.04 nov.04 des.04 jan.05

Error Proneness

0,007	
0,006	
0,005	
0,004	
0,003	
0,002	
0,001	
0	

feb.04 mar.04 apr.04 mai.04 jun.04 jul.04 aug.04 sep.04 okt.04 nov.04 des.04 jan.05

Agenda – Pareto Excorsism

- The Principle

- The Project

- The Results

The Pareto Principle

80 / 20 Rule:
Twenty percent of the people own eighty percent of the wealth

"The vital few and trivial many"

Vilfredo Pareto
(1848-1923)

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The Pareto Project

Business Case:
Increase the productivity in the
development organization by 25%
without lowering the quality.

Task:
We needed to find the 20 percent most
pressing system problems that would
create this effect

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Measurement Program

- Productivity

    = Change Requests per
        (Day * Resource)

- Error Proneness

    = Critical Defects per
        (Day * Resource)

- Internal Quality

    = 0.35 * Architectural Quality +
       0.30 * Code Quality +
       0.35 * Test Quality

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Monitor for Quality: XRadar

- Analysis of all Java-systems

- Open source under a BSD licence

- Current Build and System History

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Pareto Hypothesises I

<u>Arcitecture</u>

– 20 percent of the system functionality constitutes 80 percent of the system value ⟹ Do not rewrite

– 20 percent of the system architecture problems causes 80 percent of the observed system problems ⟹ Modularize

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Pareto Hypothesises II

Code and Tests

– 20 percent of the code is given 80 percent of the maintenance

– 20 percent of the maintained code produces 80 percent of system defects

Monitor and detect bad code

Remove and deprecate code ruthlessly

Deliver an automatic Unit test framework

Deliver an automatic acceptance test framework

Introduce test first!

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Pareto Hypothesises III

Culture and Process

– 20 percent of the developers' possess 80 percent of the system knowledge

– 20 percent of the formal process elements cause 80 percent process inefficiencies.

New configuration management
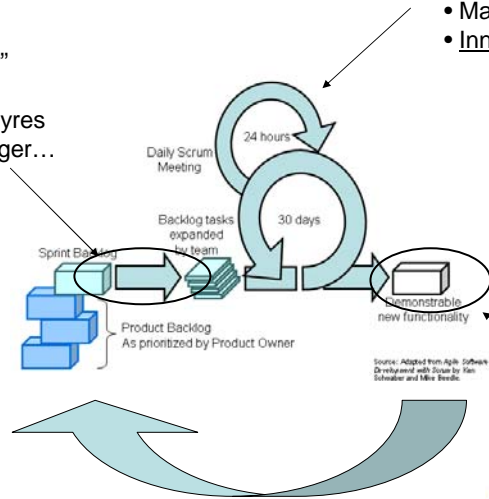
Interview program for new consultants

Introduce an agile iterative process (Scrum) instead of waterfall

Remove inspections and introduce pair programming

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Scrum Prosesser

Sprint Planning:
• Alle roller deltar
• Team "committer" seg til leveranse
• Team kan <u>ikke</u> styres igjen før om 30 dager…
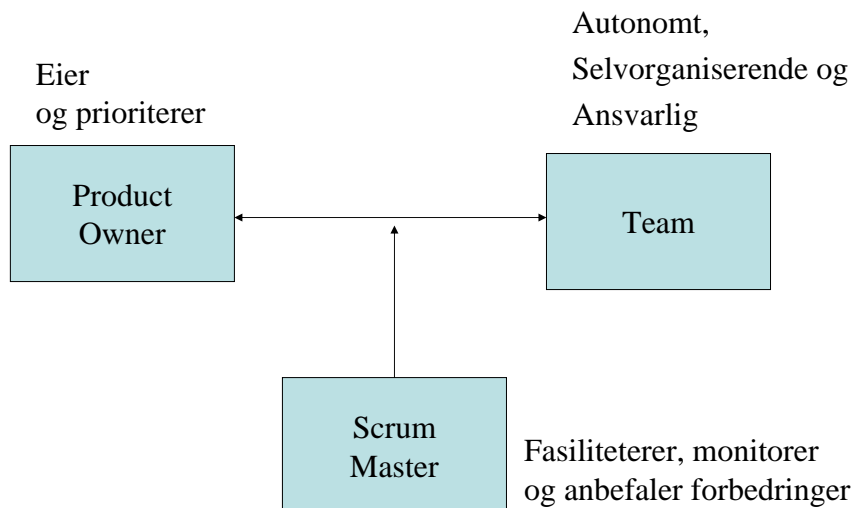
Daily Scrum (Standup):
• Kun Team og Scrummaster får snakke
• Maks 15 min
• <u>Innhold:</u>
  • Hva har du gjort siden sist?
  • Har du hatt noen problemer
  • Hva skal du gjøre til neste møte?

Sprint review:
• Overlevering av ferdig funksjonalitet
• Evaluering og prosessforbedring

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Roller

Eier
og prioriterer

Autonomt,
Selvorganiserende og
Ansvarlig

Product Owner

Team

Scrum Master

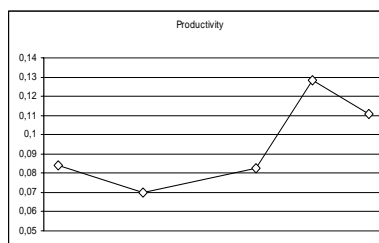Fasiliteterer, monitorer
og anbefaler forbedringer

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Teamdynamikk

- 5-8 medlemmer for å skape ansvarlighet, lagånd og synlige medlemmer

- Bred sammensetning for å sikre autonomitet

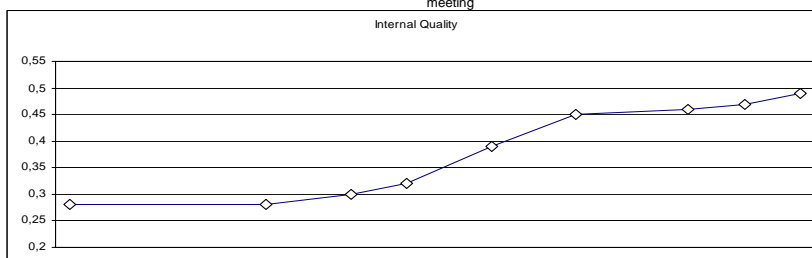- Gjennomtenkt sosial/kulturell sammensetning for å sikre effektiv teamdynamikk

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Productivity

0,14
0,13
0,12
0,11
0,1
0,09
0,08
0,07
0,06
0,05

Nov 2002	May 2003	Nov 2003		May 2004	Sep 2004	Nov 2003
	- **Pareto Project Initiated**	- New Config Man. System	- Massive modularization	- **Pareto Project ends**	- Test driven dev. required	- Scrum
	- Unit Test Framework	- Interview program for consultants	and test writing	- Acceptance test framework		- Pair Programming
			- Knowledge share meeting			

Internal Quality

0,55
0,5
0,45
0,4
0,35
0,3
0,25
0,2

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Conclusion

- Massive productivity increase by:
  - Agile process (Scrum) instead of a phased plan-driven process
  - Pair development instead of formal inspections

- Reengineering to quality and cultural change was probable necessary prerequsites for the change

- Weakly : Modularization and test driven development reduced error proneness in our system

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The Future

Simula Research and Telenor:
- … will publish a paper soon on the results on the introduction of pair programming

- … is conducting a regression analysis on internal quality and error proneness

Norwegian Computing Central (NR)
- ..is using the COS System for some groundbreaking tool support research

XRadar:
- Watch out for new cool updates SOON on: http://xradar.sourceforge.net
- Get involved

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