The System Anatomy

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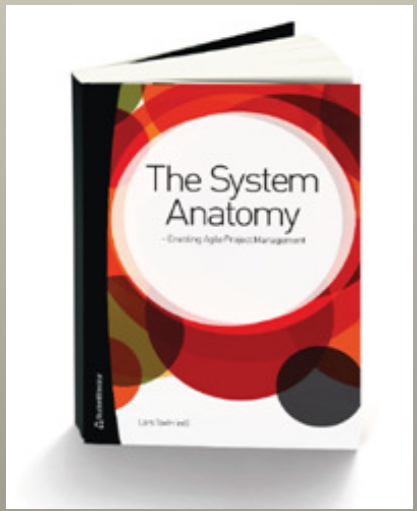
www.neana.se



Who am I?

ERICSSON 34 yrs

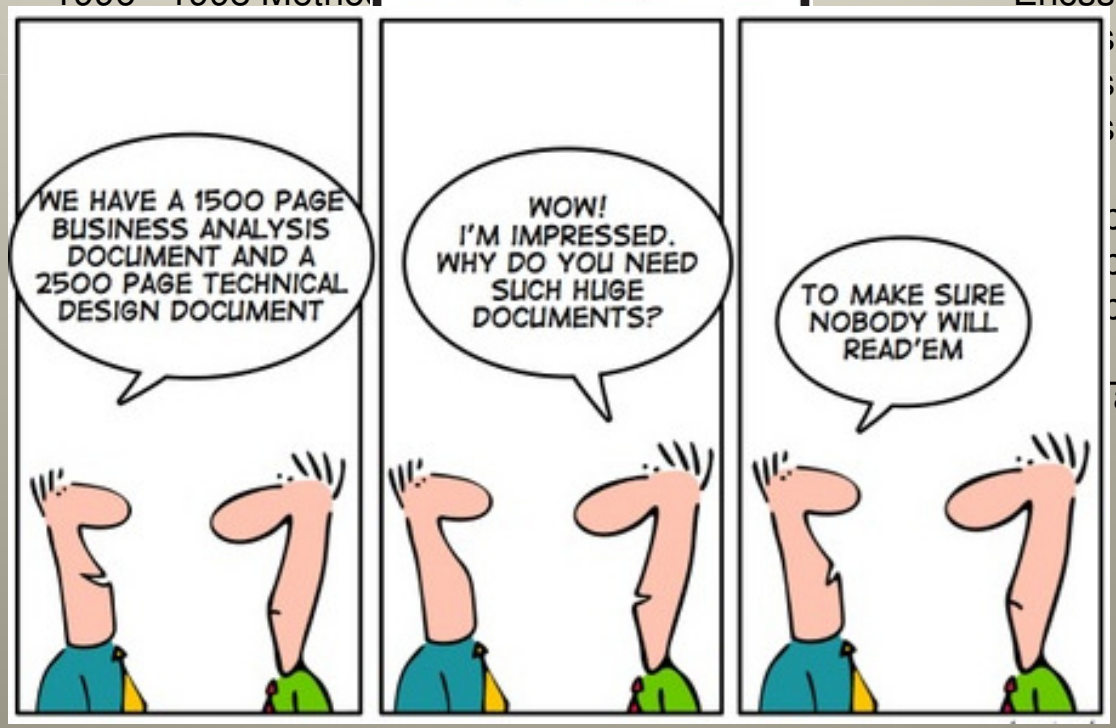
1968 - 1983 Developer Methods and Tools Ericsson AB
1983 - 1989 Line manager CAD Transmission Ericsson AB
1989 - 1990 Depart sion Ericsson AB
1990 - 1990 Projec ect Ericsson AB
1990 - 1994 Proces Ellemtel AB
1994 - 1995 Techni Ellemtel AB
1995 - 1996 Proces Ellemtel AB
1996 - 1998 Metho Ericsson AB
son AB
son AB
son AB

13 yrs

bing University
bing University
bing University

8 yrs

Taxén Consulting AB



Motivation for the System Anatomy

Project failures

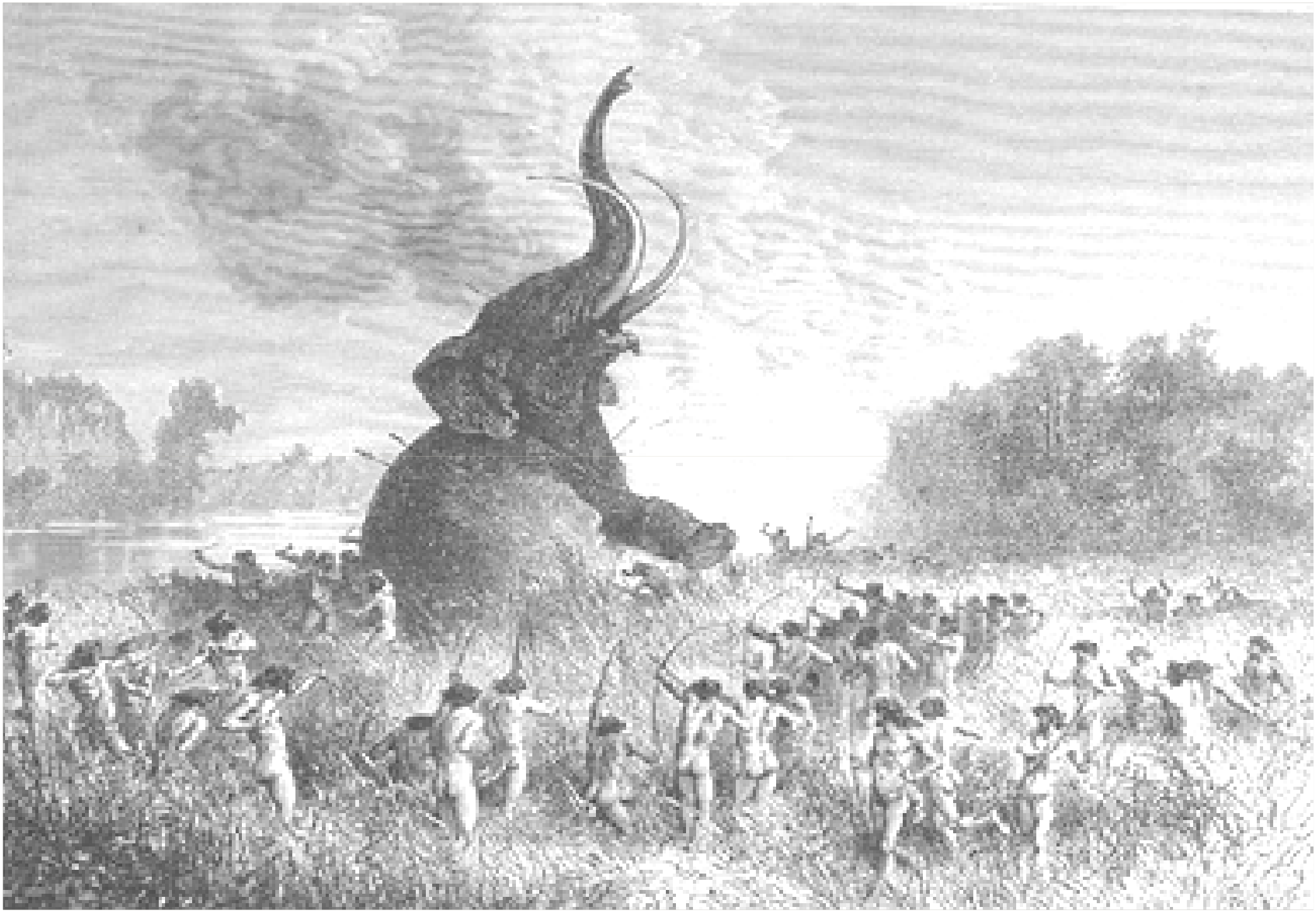
"About 20 percent of IT projects are canceled before completion and less than a third are finished on time and within budget with expected functionality" (Standish Group,2004)

"If failure teaches more than success, then the IT profession must be developing an army of brilliant project managers" (Nelson, 2007)

"Insanity: doing the same thing over and over again and expecting different results." —Albert Einstein

Outline No.	Title	Start Date	Projected	Completed
	Apollo Beyond	**6/13/2005 8:00 AM**	**6/18/2006**	**100%**
1	**Research/Investigate AR Tech**	**6/14/2005 8:00 AM**	**7/28/2005**	**100%**
1.1	**Investigate ARToolkit**	**6/14/2005 8:00 AM**	**6/29/2005**	**100%**
1.1.1	Buy webcam	6/14/2005 8:00 AM	6/14/2005	100%
1.1.2	Download ARToolkit and Tutorials	6/14/2005 8:00 AM	6/14/2005	100%
1.1.3	**Learn XCode IDE**	**6/15/2005 8:00 AM**	**6/21/2005**	**100%**
1.1.3.1	Download/Install XCode and Developer's Tools for Mac	6/15/2005 8:00 AM	6/15/2005	100%
1.1.3.2	Work through XCode/GLUT tutorial	6/21/2005 8:00 AM	6/21/2005	100%
1.1.4	Install ARToolkit	6/15/2005 12:00 PM	6/15/2005	100%
1.1.5	Install Camera and drivers	6/15/2005 1:00 PM	6/15/2005	100%
1.1.6	Print Markers	6/16/2005 8:00 AM	6/16/2005	100%
1.1.7	Download & Intall GLUT 3.8	6/16/2005 8:00 AM	6/16/2005	
1.1.8	Compile, run, and mod ARToolkit example code	6/16/2005 12:00 PM	6/29/2005	
1.2	**Investigate MXR Toolkit**	6/27/2005 8:00 AM	7/25/2005	
1.2.1	Download MXR Toolkit and Documentation		6/27/2005	
1.2.2	Install MXR Toolkit			
1.2.3	Analyze MXR Toolkit Benefits, and Problems			
1.3	**Investigate DART**			
1.3.1	Download/Install DART			
1.3.2	Run and Mod DART			
2	**Implement Project Website**			
2.1	Design/Build Site			
2.2	Request Webspace from Gavin			
2.3	Upload Site			
2.4	Update/Maintain Site			
3	**Acquire Outside Funding/Partners**			
3.1	Research Grants			
4	Research Networking Options			
5	Research Controller/Sensor/Effector			
6	Research Content/Collect 2D Images			
7	Research Tangible Interface Technologies			
8	Research AR Tracking			
9	Research Display Technologies			
10	Research Projection Technologies			
11	Design Hardware			
12	**Construct Hardware**			
12.1	**Design Hubble Window**			
12.1.1	Design Components			
14.1.3	Research Software for Window Components			
14.2	Integrate Content			
14.3	Program Sensitivity			
15	Investigate 3D Modeling Software			
16	**Develop Content**			
16.1	Build 3D Models & Animations			
16.2	**Develop 2D Images**			
16.2.1	Edit 2D Images			
16.2.2	Edit Video Clips			
16.2.3	Build Working TUI Interface			
16.3	**Develop Sound Effects Content**			
16.3.1	Record/Collect Sound Effects			
16.3.2	Edit Sound Effects			
16.4	**Develop Voice Over/Narration Content**			
16.4.1	Record Voice Overs/Narration			
16.4.2	Edit Voice Overs/Narration	4/26/2006	5/2/2006	100%
16.5	**Develop Music Content**	3/1/2006 8:00 AM	6/6/2006	100%
16.5.1	Write/Collect Music	3/1/2006 8:00 AM	5/13/2006	100%
16.5.2	Record/Edit Music	5/14/2006 8:00 AM	6/6/2006	100%
17	Final Presentation	6/7/2006 8:00 AM	6/7/2006	100%

- ....
- Design/ Build Hubbl
- Construct Hardware
- Design / build Missi
- ....



The System Anatomy

- Visualizing contemporary “mammoths”

Hygiene

Sanitary

Nutrition

Shower/ Bath

WC

Dishes

Protection

Stove

Refrigerator/ freezer

Doors

What capabilities are needed

and how do they depend on each other ?

foundation

Road

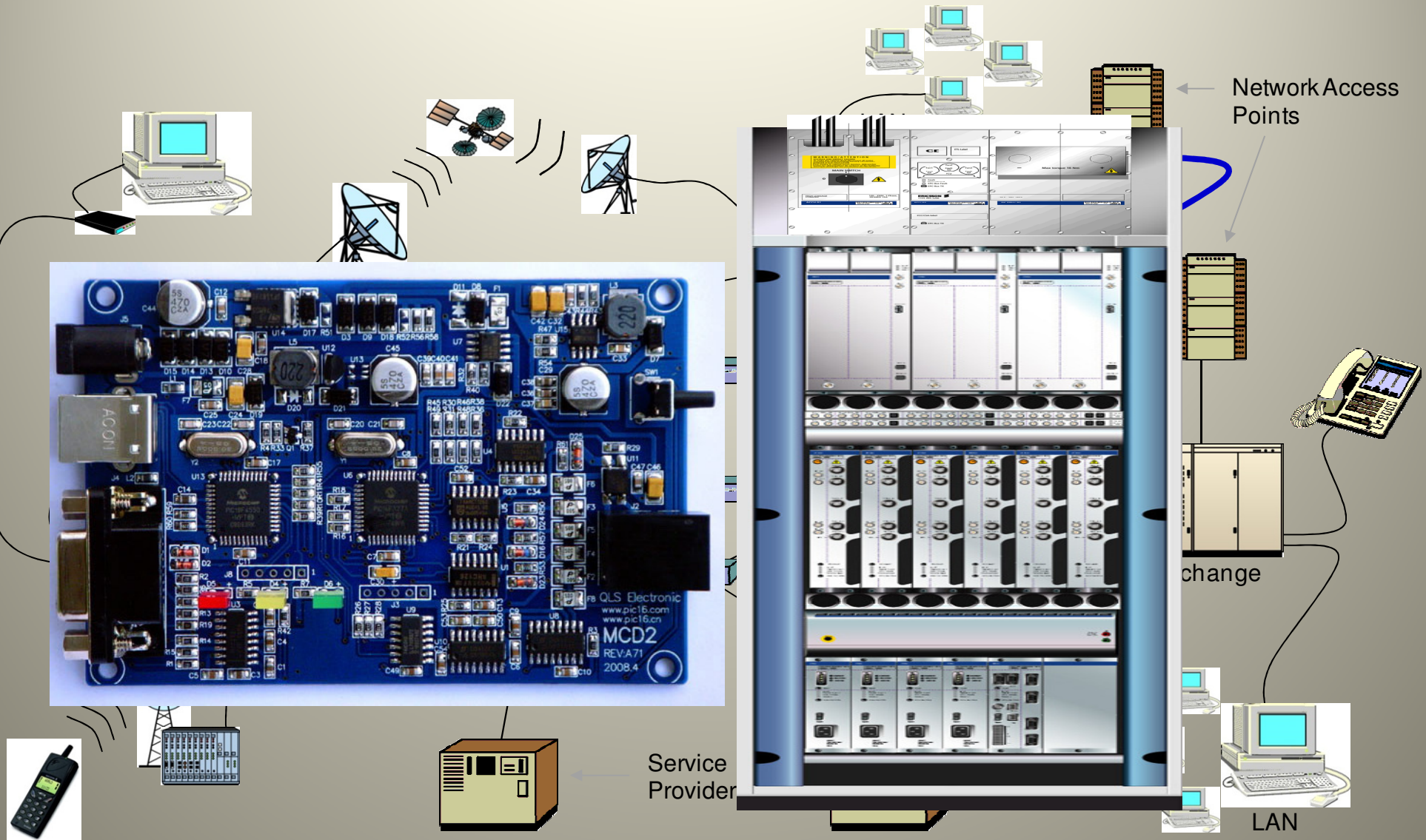
Foundation towards the ground

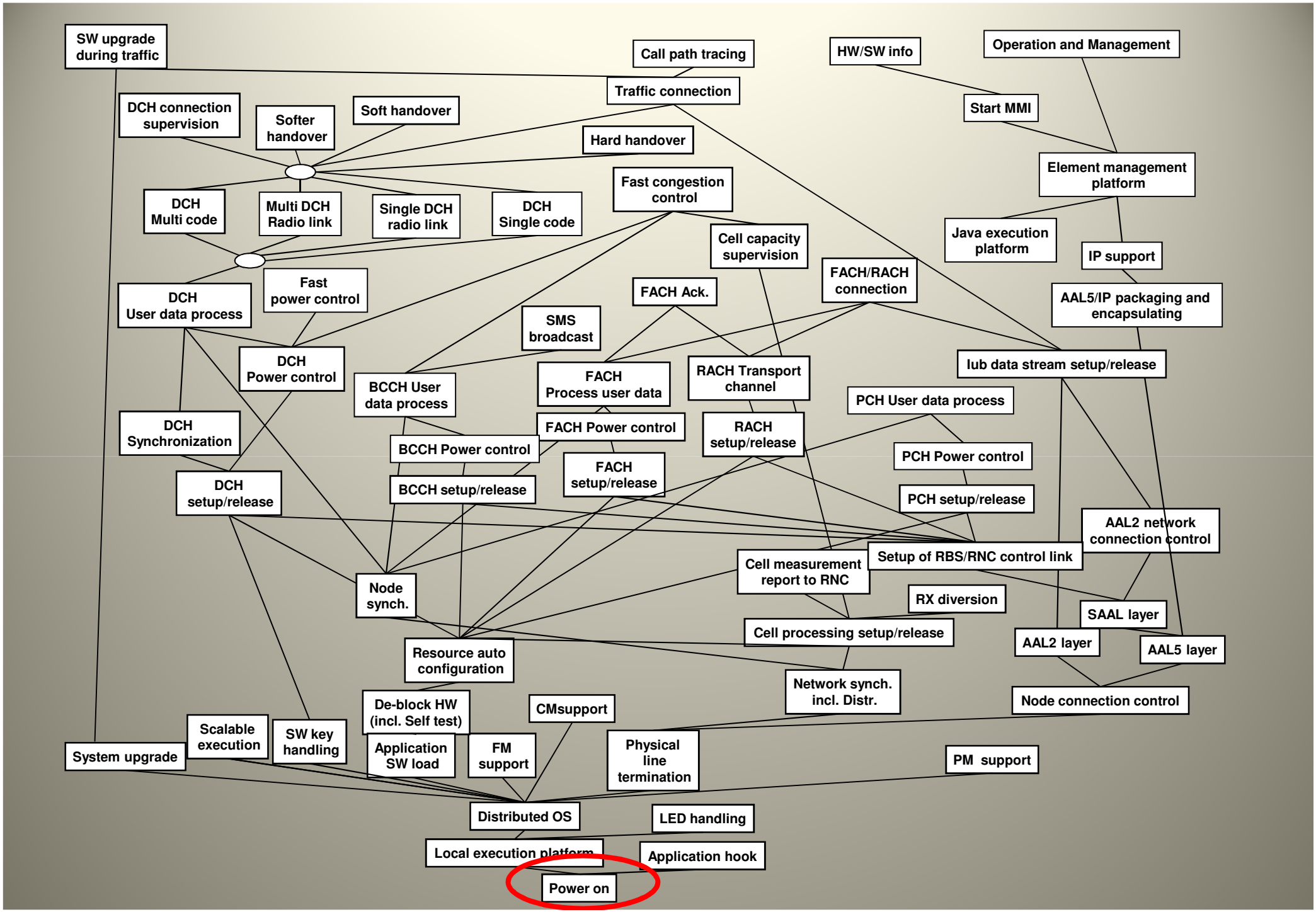
External connections

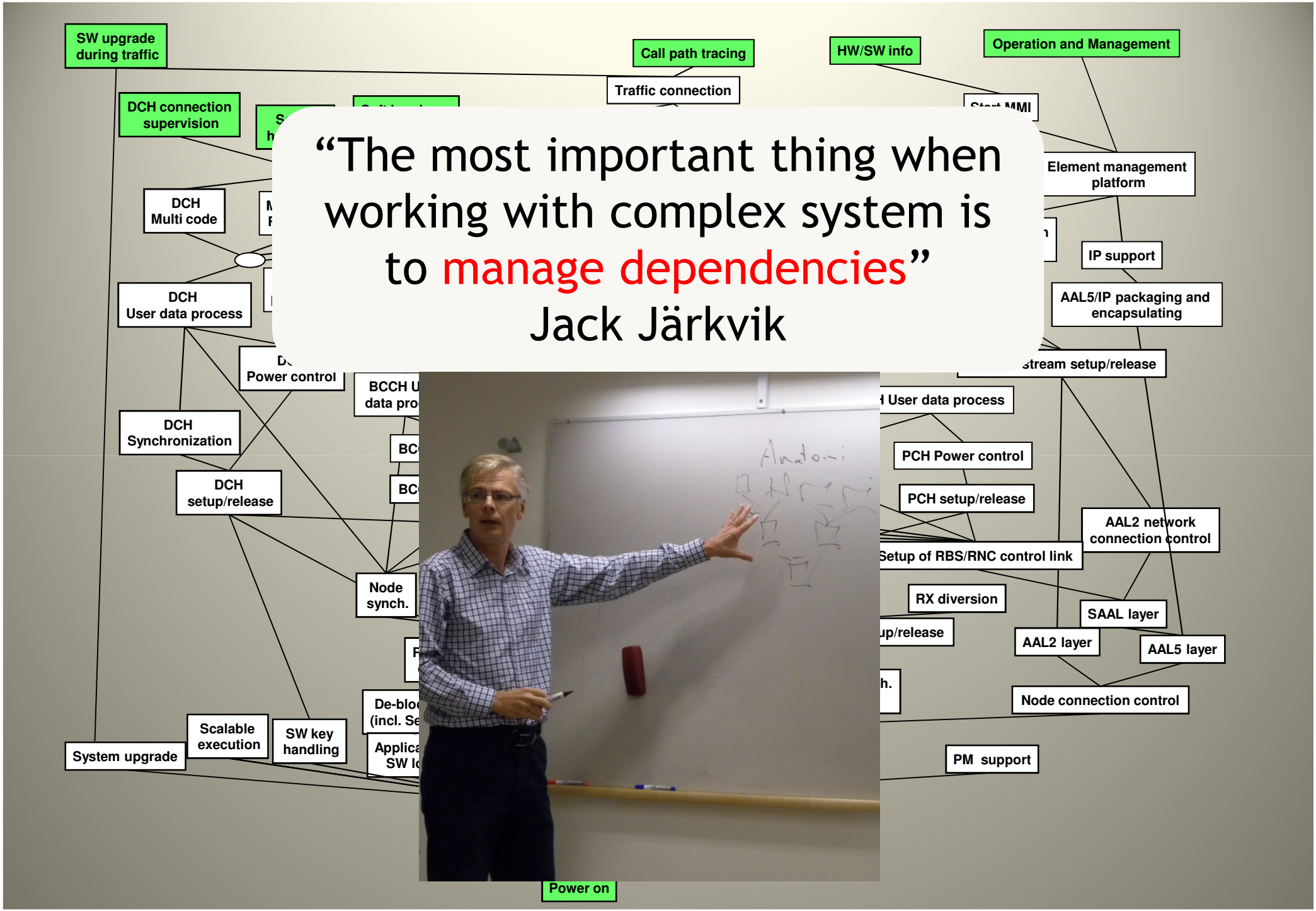
Ground/ Land

Some examples from Ericsson

The telecom network

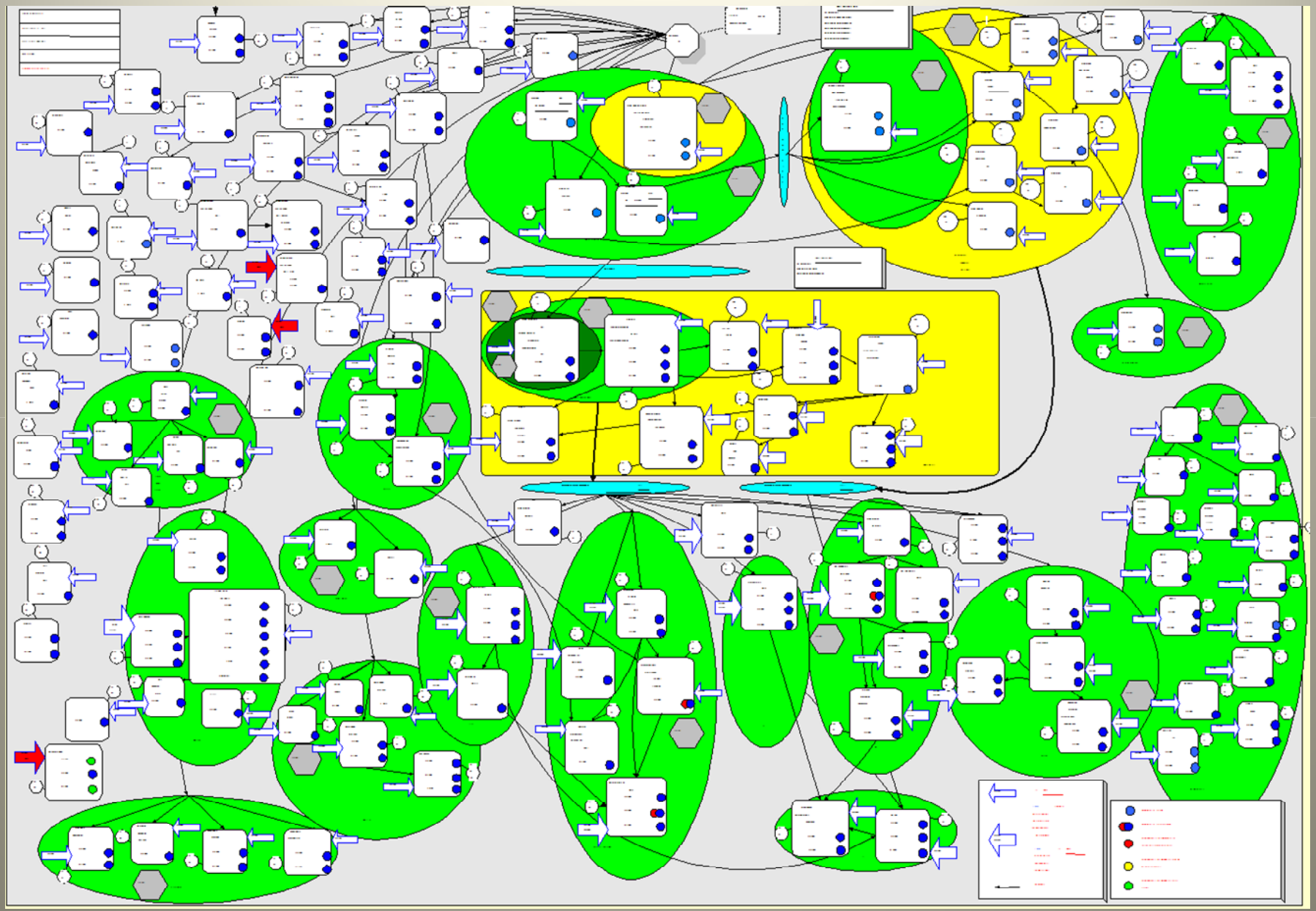



SW upgrade during traffic
Call path tracing
HW/SW info
Operation and Management
Traffic connection
DCH connection supervision
Softer handover
Soft handover
Start MMI
Hard handover
Element management platform
Fast congestion control
DCH Multi code
Multi DCH Radio link
Single DCH radio link
DCH Single code
Java execution platform
Cell capacity supervision
IP support
FACH/RACH connection
Fast power control
DCH User data process
FACH Ack.
AAL5/IP packaging and encapsulating
SMS broadcast
DCH Power control
Iub data stream setup/release
BCCH User data process
FACH Process user data
RACH Transport channel
PCH User data process
DCH Synchronization
FACH Power control
RACH setup/release
BCCH Power control
PCH Power control
FACH setup/release
DCH setup/release
BCCH setup/release
PCH setup/release
AAL2 network connection control
Setup of RBS/RNC control link
Cell measurement report to RNC
Node synch.
RX diversion
SAAL layer
Cell processing setup/release
AAL2 layer
AAL5 layer
Resource auto configuration
Network synch. incl. Distr.
Node connection control
De-block HW (incl. Self test)
CMsupport
Scalable execution
SW key handling
System upgrade
Application SW load
FM support
Physical line termination
PM support
Distributed OS
LED handling
Local execution platform
Application hook
Power on



"The most important thing when working with complex system is to manage dependencies"
Jack Järkvik

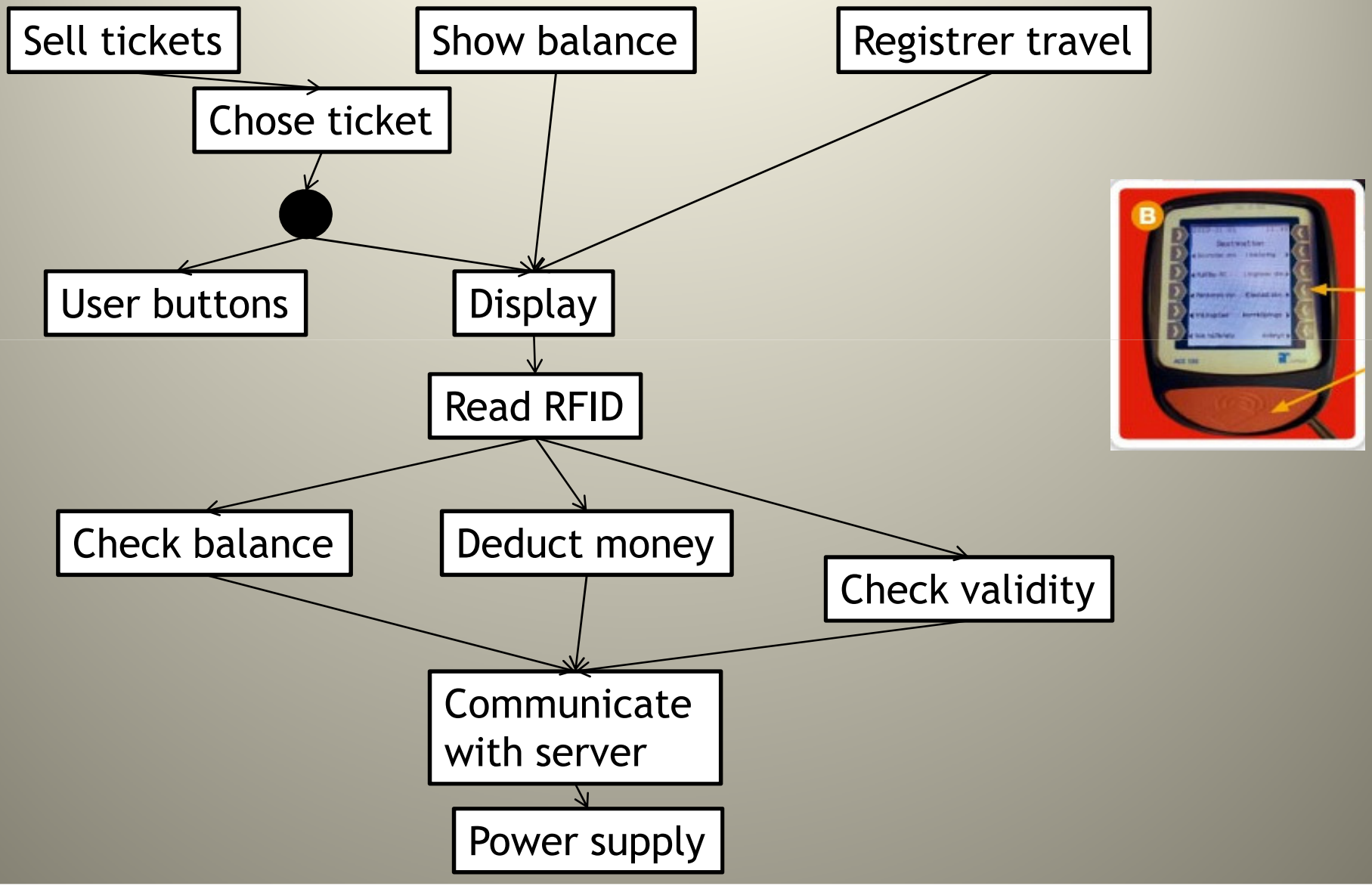
Anatomy for one node in the 3G mobile network



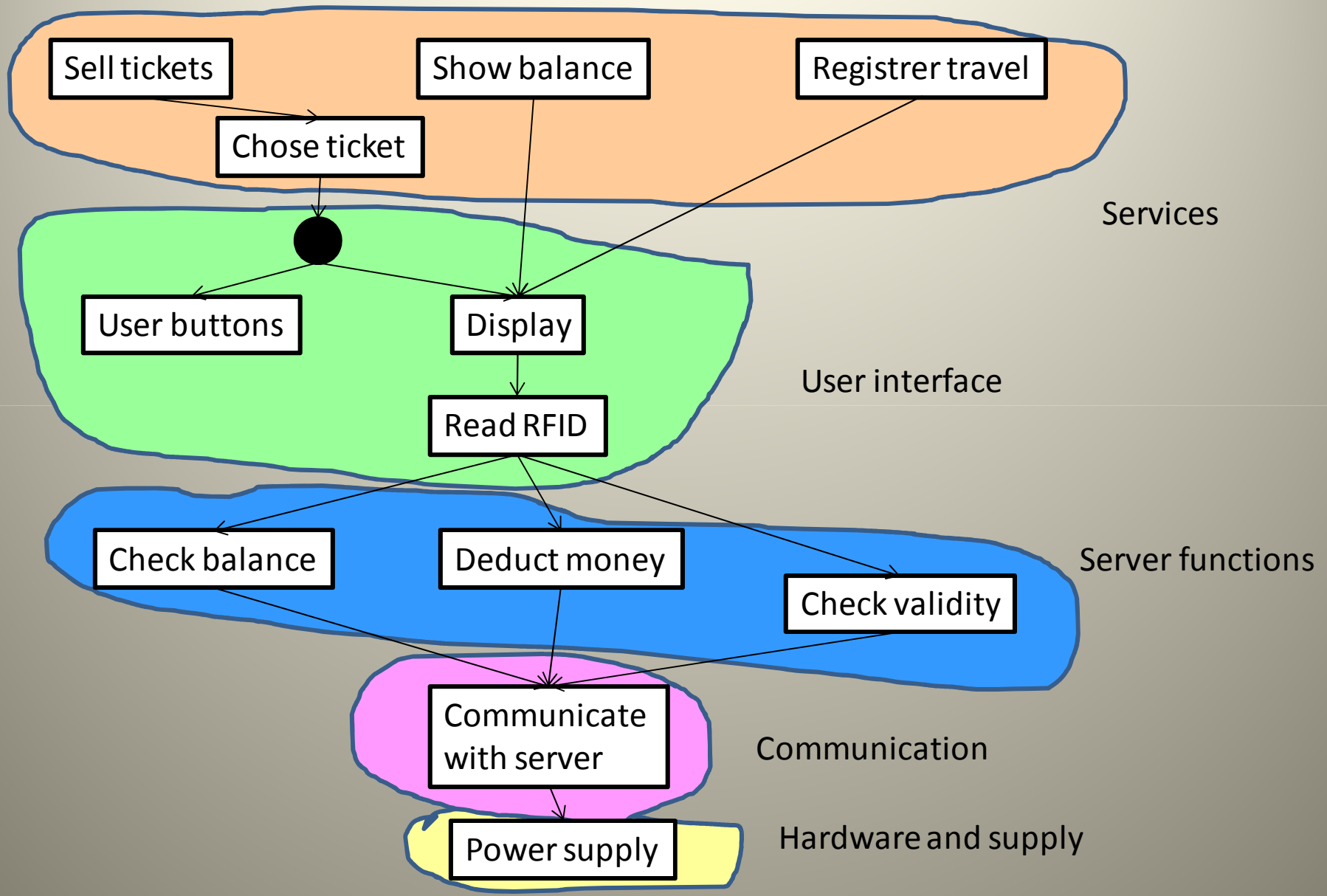
How to use the System Anatomy

Example: Local bus card reader

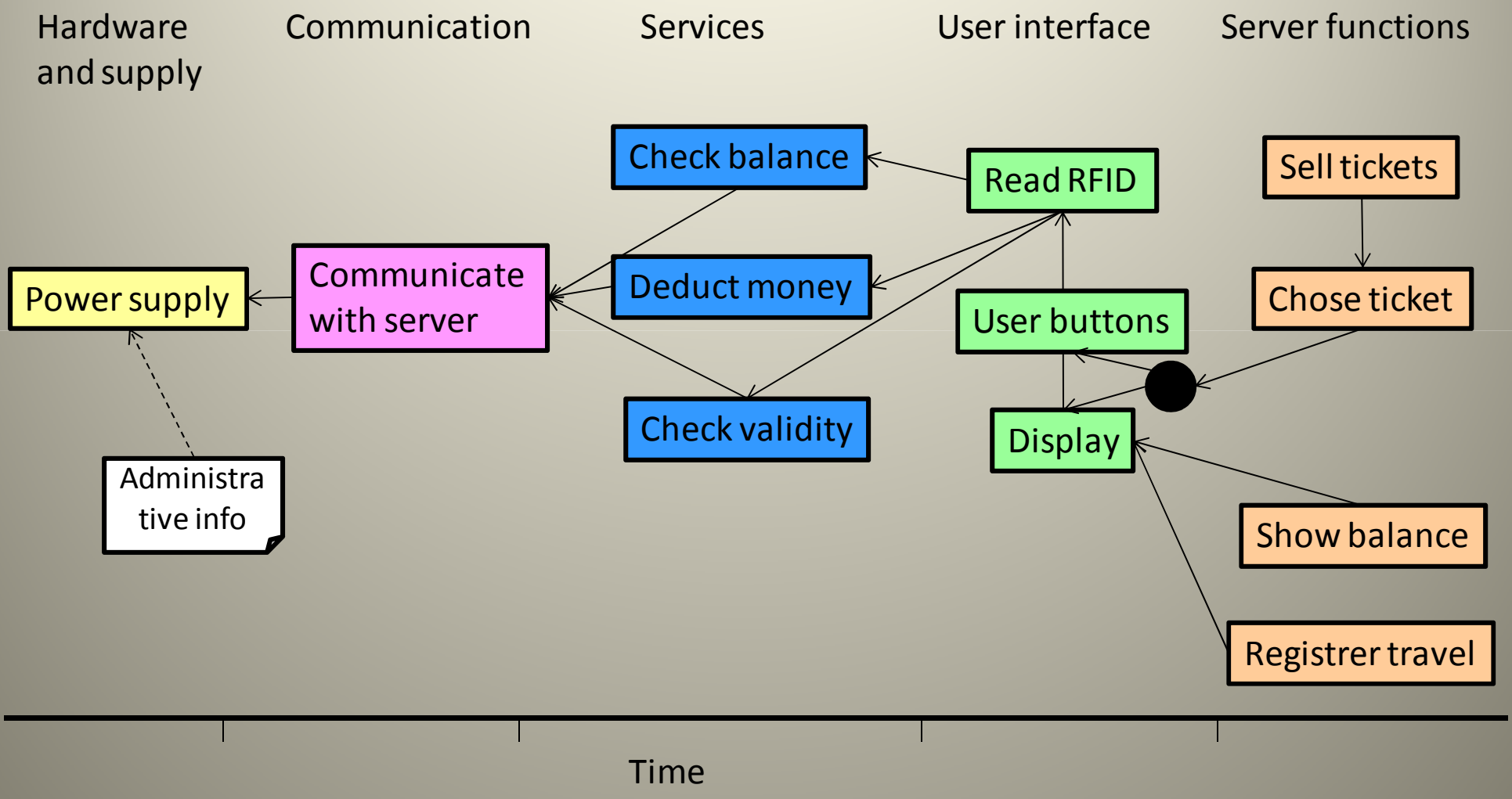
Originator:
Kristian Sandahl, Linköping University



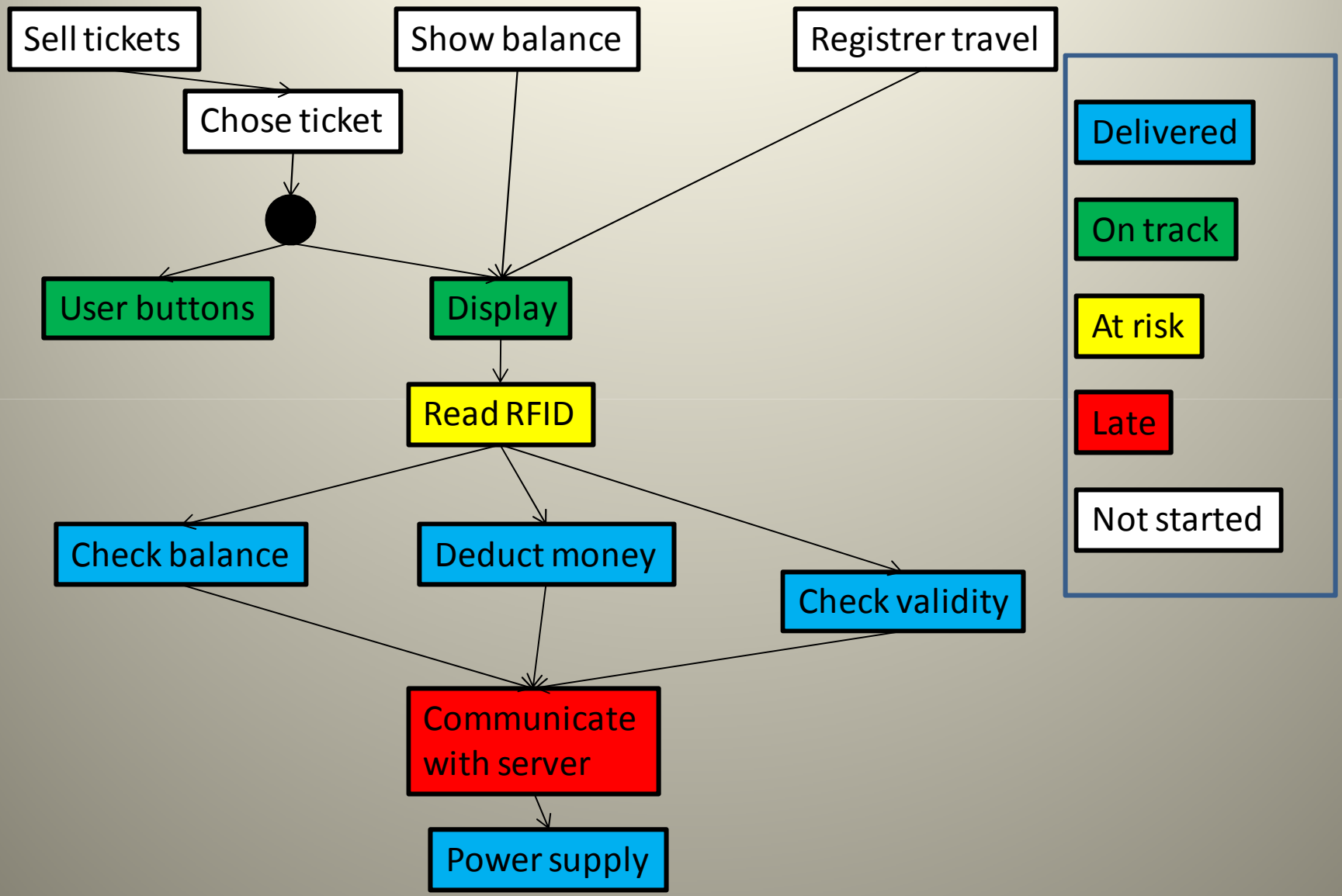
Integration plan



Twist the figure for a development plan



Use color code for progress tracking



How do we create an anatomy?

- All participants bring functional requriement material
- Work in teams of max 12 people, compare and negotiate results periodically
- Identify function groups as capabilities
- Brainstorm with yellow stickers
- One sheet-of-paper => 30-60 anatoms
- Check soundness

Originators:
Joachim Pilborg, KnowIT
Erik Lundh, Compelcon AB

So, what is a system anatomy?

- **An image of a system**
- **A common understanding of a large and complex product**
  - Aligns the co-workers' inner pictures of the system
  - A means for communication
  - A means for decision making
- **A basis for integration planning**
- **A basis for project planning**
- **A social accomplishment**
  - It is not an exact, unique, formal description
- **Works in both agile and stage-gate project models**

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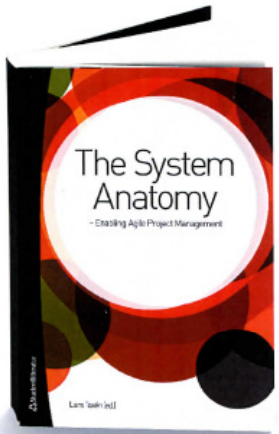
The System Anatomy

Enabling Agile Project Management



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TAXÉN, LARS (ED.)

This book takes an alternative approach to project management and the development of complex systems. Technology, methods and tools are still important, but human-centric aspects like common understanding, coordination, visualization, and reduction of complexity, needs to be brought to the forefront. The core of the alternative approach is the system anatomy, a means that was conceived in the early 1990s at Ericsson, a world-leading supplier of telecommunication solutions. The anatomy has ever since been extensively used at Ericsson for managing extremely complex system development tasks.

The anatomy is a simple but powerful image showing the dependencies between capabilities in the system; from the most basic ones to "money-making"; thus representing a novel way of describing and discussing what a system is.

The book is a collection of chapters from authors that in one way or another have been working with the anatomy concept. The inteded audience is both practitioners facing complex development tasks, and researchers who are interested in exploring new perspectives and theoretical frameworks for managing complexity in areas such as information system development, organizational sciences, project management and more.

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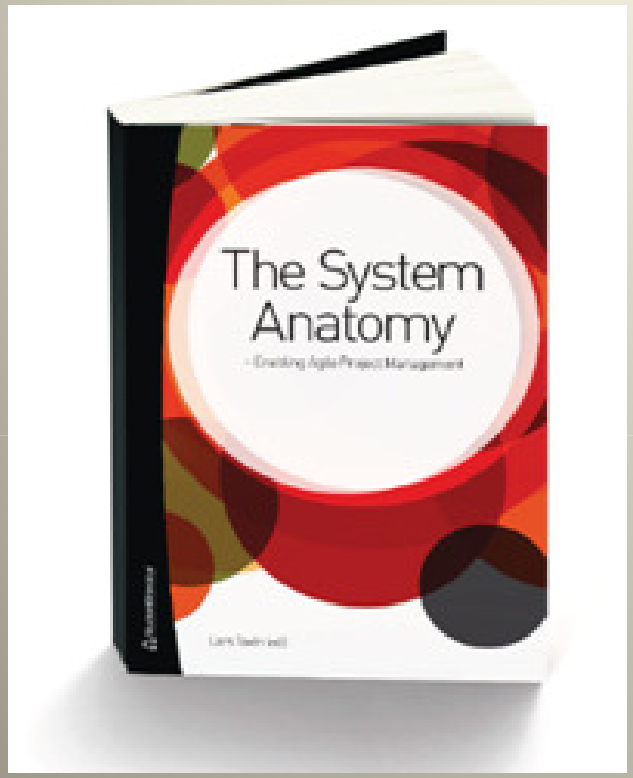

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More info to come at http://www.incose.se/

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