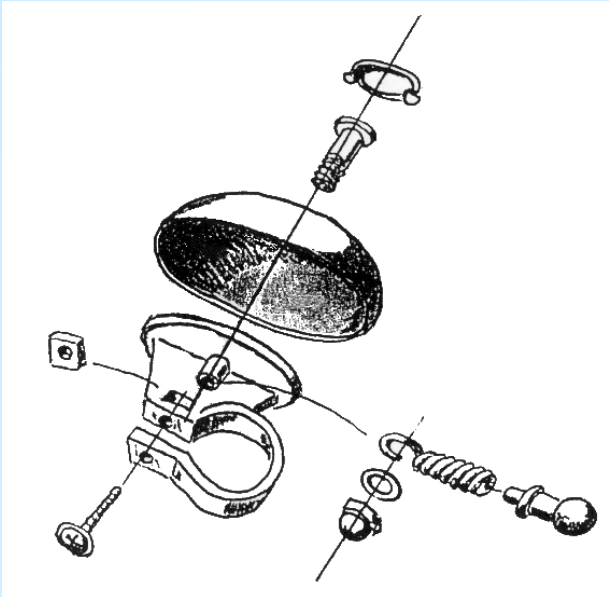
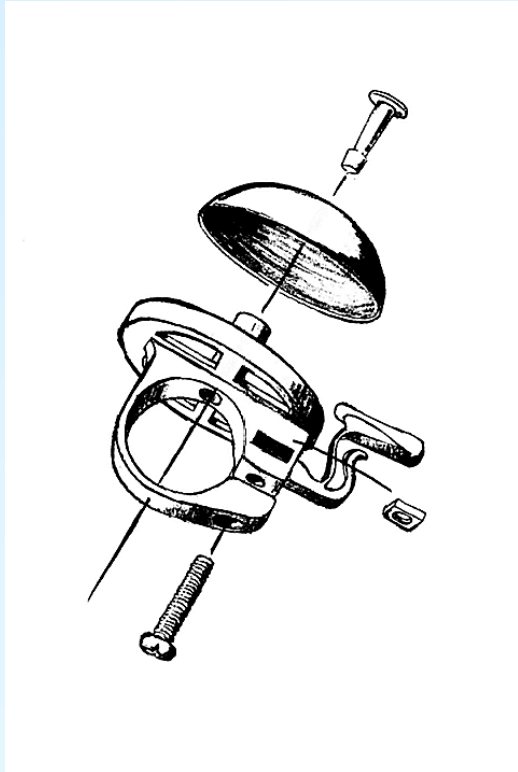
PROLOGIA



DFA2



AVIX - DFX

-THE INDUSTRIAL OFFICE-

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DFX/DFA2 - What, why and how?

- Support tool for product development
  - Assembly process
  - Evaluation and design guidelines
  - Automatic Assembly / Manual assembly
  - Visual result in a matrix
  - Possible to adapt to company specific needs

What is AviX DFX and DFA2

- Support tool for product development
  - Assembly process
  - Evaluation and design guidelines
  - Automatic Assembly / Manual assembly
  - Visual result in a matrix
  - Possible to adapt to company specific needs

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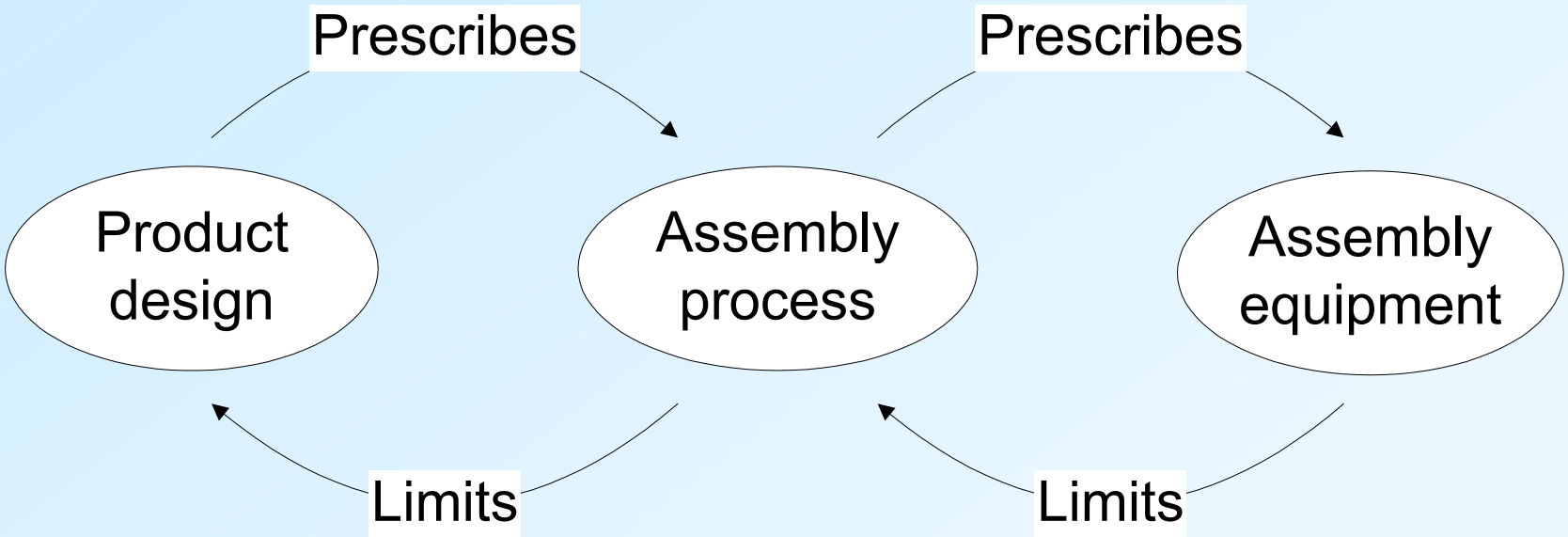
Background

- Results from a research project at IVF/KTH (Royal Inst. of Tech), finished in 2001
- Requirement specification for a DFA tool, based on interviews in several Swedish companies
  - Existing DFA tools were not good enough and therefore not used.
  - Nine requirements
    - Software was the final requirement to fulfil…
- Research group formed with 18 companies
  - Verification and case studies
- The result was DFA2

What is DFA?

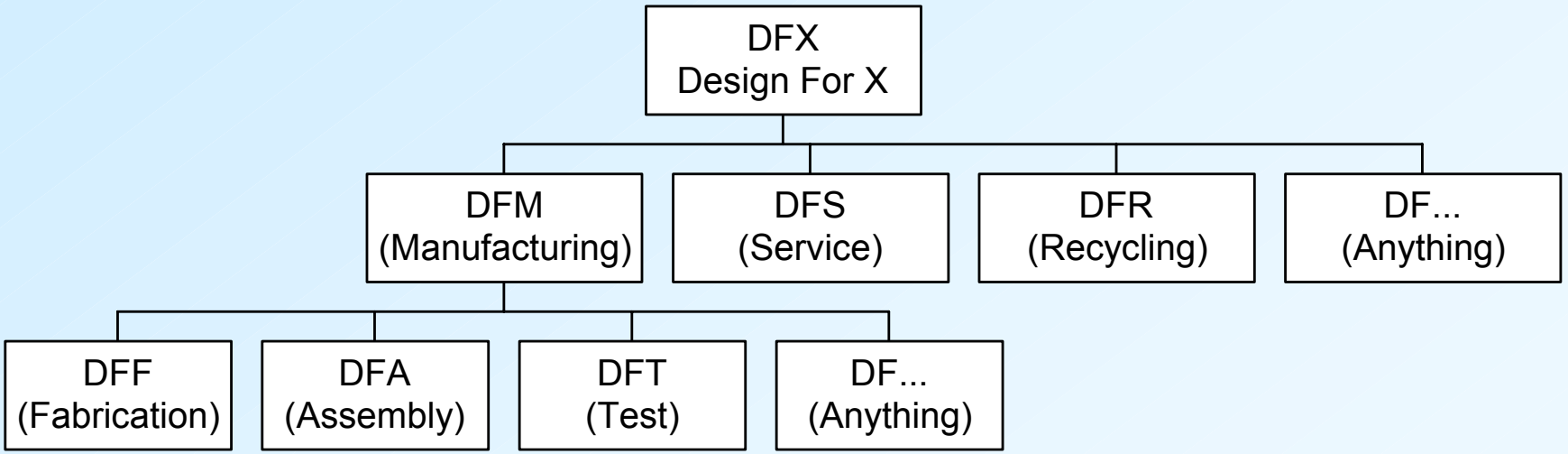
- Design For Assembly
- Design of product and processes for cost effective and reliable manufacturing to achieve customer satisfaction and business success.
- Structured way of working with design, production, quality and cost optimization at the same time.
- Support methods that encourage product development in teams, in order to maximize productivity.

The core in DFA : product and process interaction

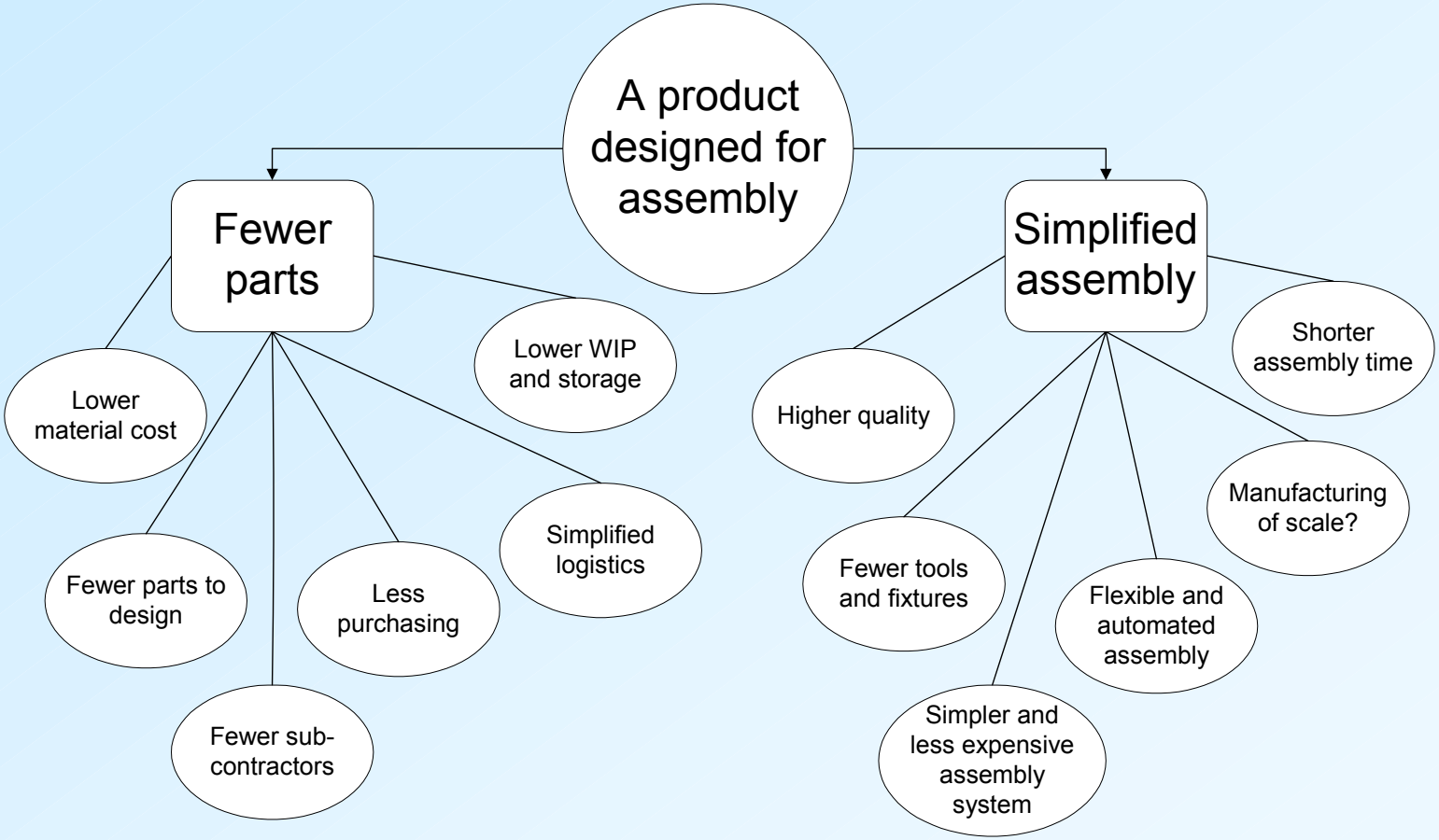


DFX

- A broader perspective.
- DFX includes any focus in the product life cycle (assembly service etc) or a specific property (quality, environment etc).



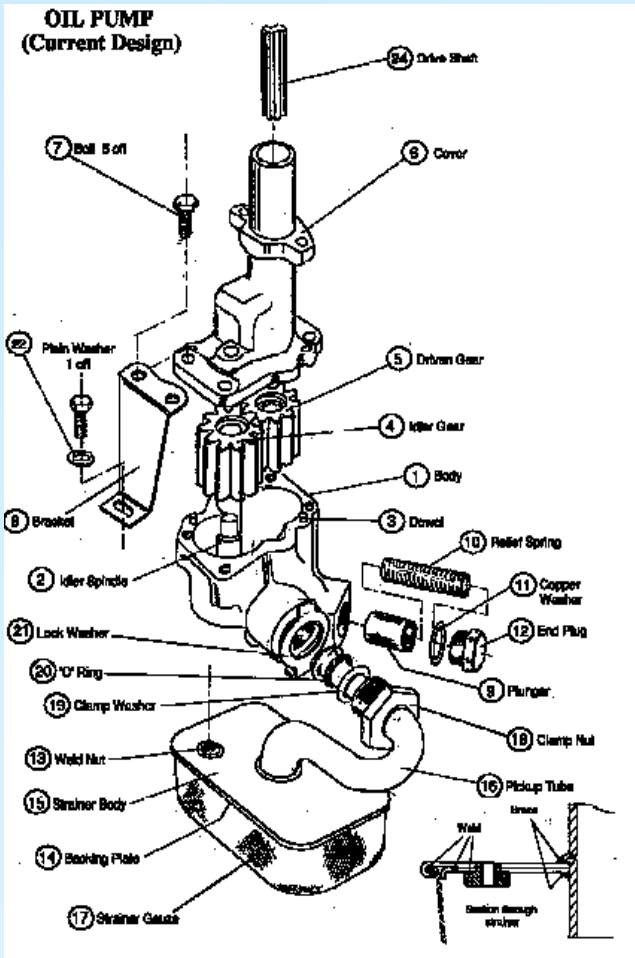
Benefits from working with DFA

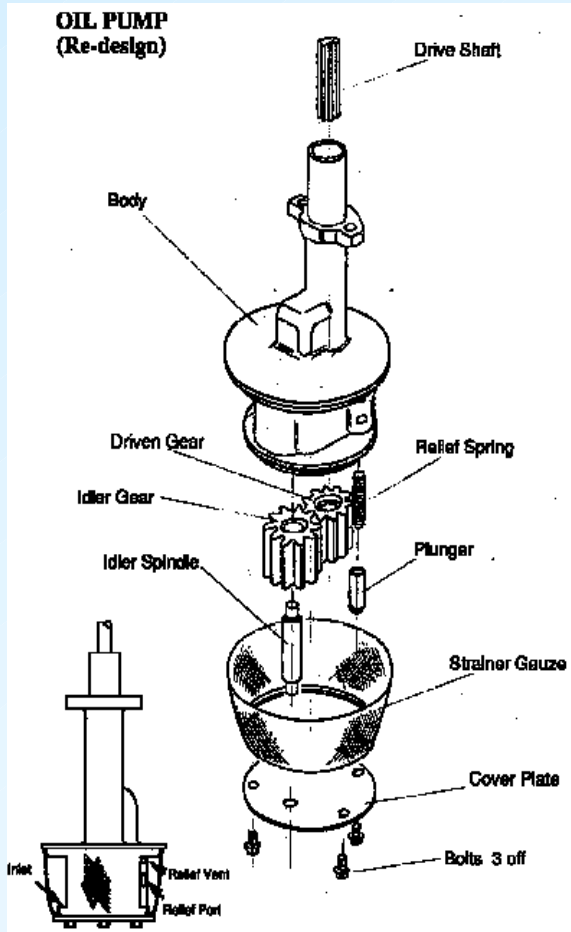


Typical DFA results

- Part reduction: 30-50 %
- Assembly time reduction: 30-60 %
- Product development cycle time reduction: 50-60%
- Whirlpool : Part reduction: 29 %, assembly time reduction: 26 %
- Nortel: Part reduction: 54 %, assembly time reduction: 65 %
- Dell: Part reduction: 32 %, assembly time reduction: 50 %, screw type count reduction: 67 %, screw count reduction: 55 %, average service time reduction: 44 %

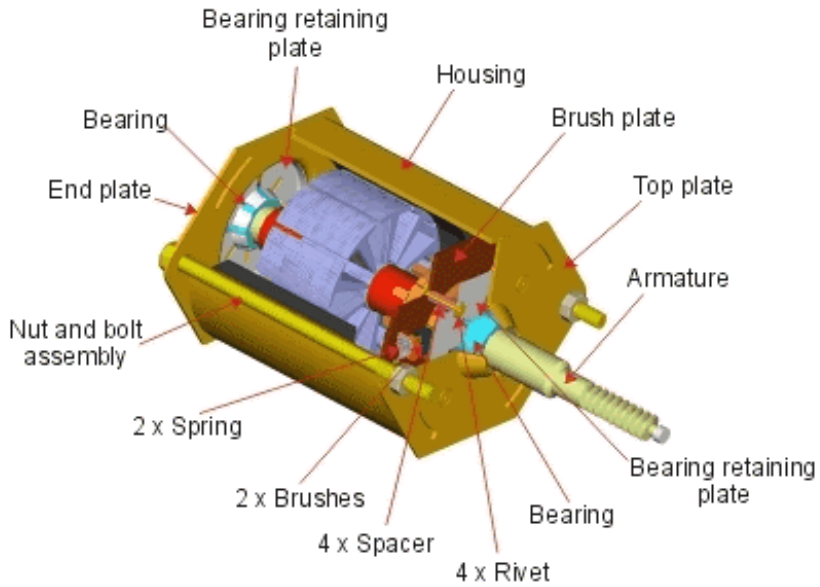
More DFA examples



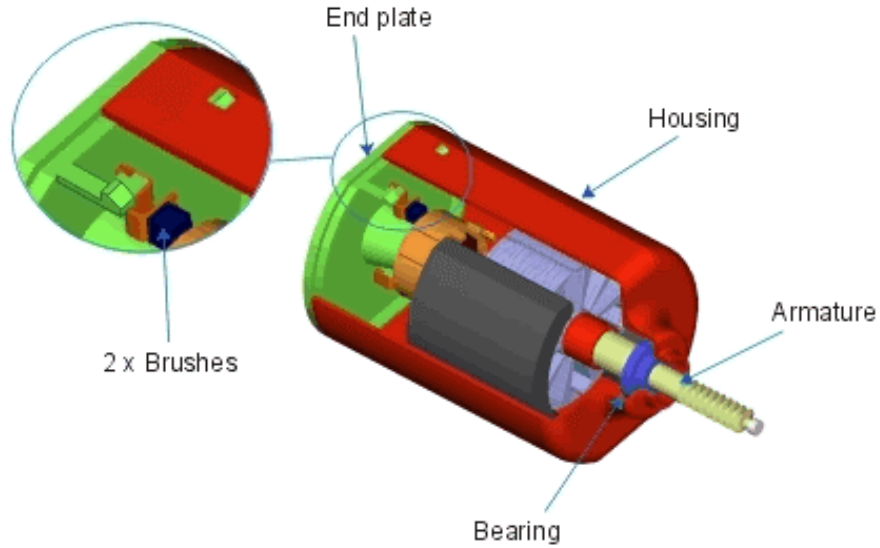


More examples... (Windscreen wiper motor)

Original Motor Design



Proposed Motor Re-design



DFA methods

- Boothroyd & Dewhurst DFMA, manual assembly, estimated assembly time.
- Lucas Engineering, same origin as B&D.
- Hitachi AEM (Assembly Evaluation Method), automatic assembly.
- Sony DAC (Design For assembly Cost effectiveness), automatic assembly, process driven method.
- DFA2, Automatic assembly (later development also includes manual assembly), process focused method.
- Several cousins to the B&D DFMA

Basic DFA working procedure

- Analyze each part during assembly.
- Identify potential assembly difficulties, evaluate the design.
- Suggest re-designs.
- Carry out improvements.
- Repeat depending on available time and resources.

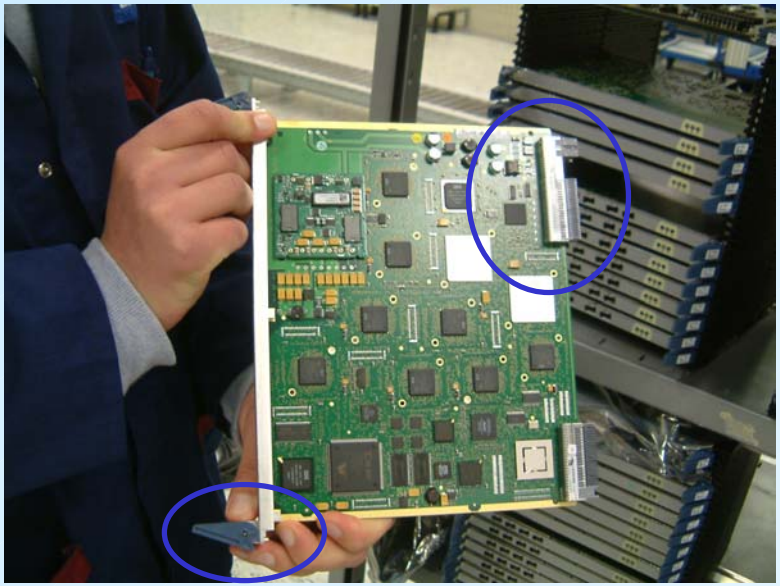
- The best results are achieved if DFA is performed in teams consisting of about 4-6 people with backgrounds in design, production, quality, purchasing, logistics, marketing etc.

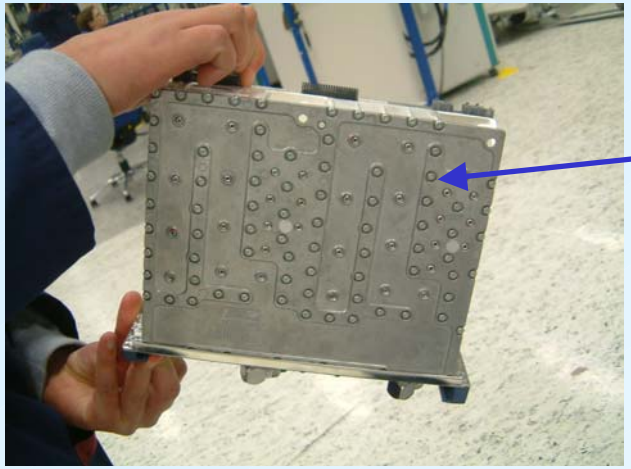
DFA2, what is the characteristics?

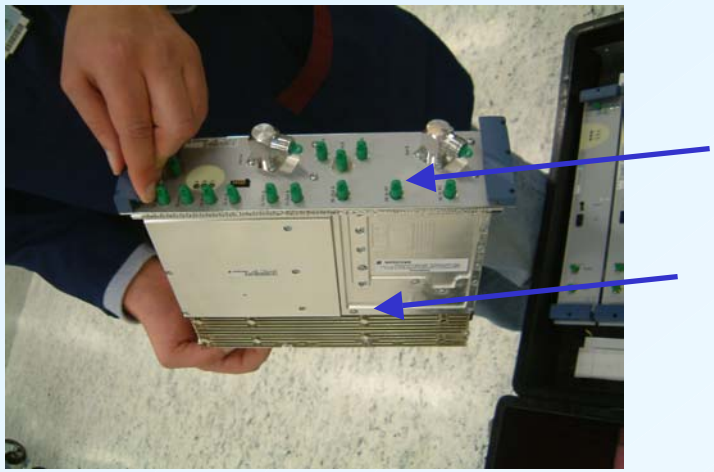
- Product level
  - Product/module overview
  - Early analyses
  - Building practices
  - Towards modularisation
- Part level
  - Each individual part
  - Follows an assembly process
  - Identify and highlight potential problems early
  - Measurement index
  - Estimated assembly times
  - Colorful matrix
  - Easy to interpret
  - Report with action points for each part

Productivity issues

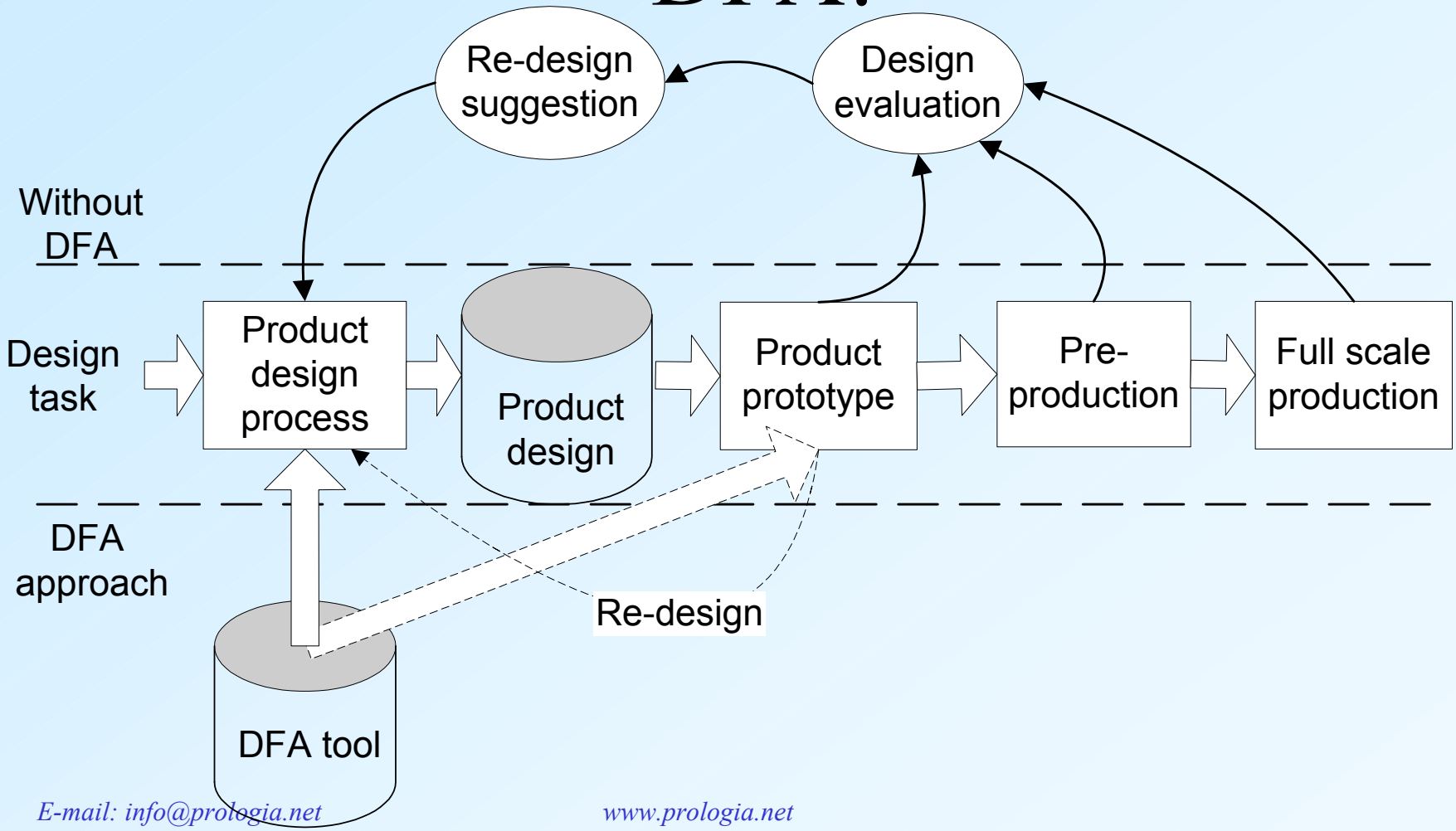
Standardization issues







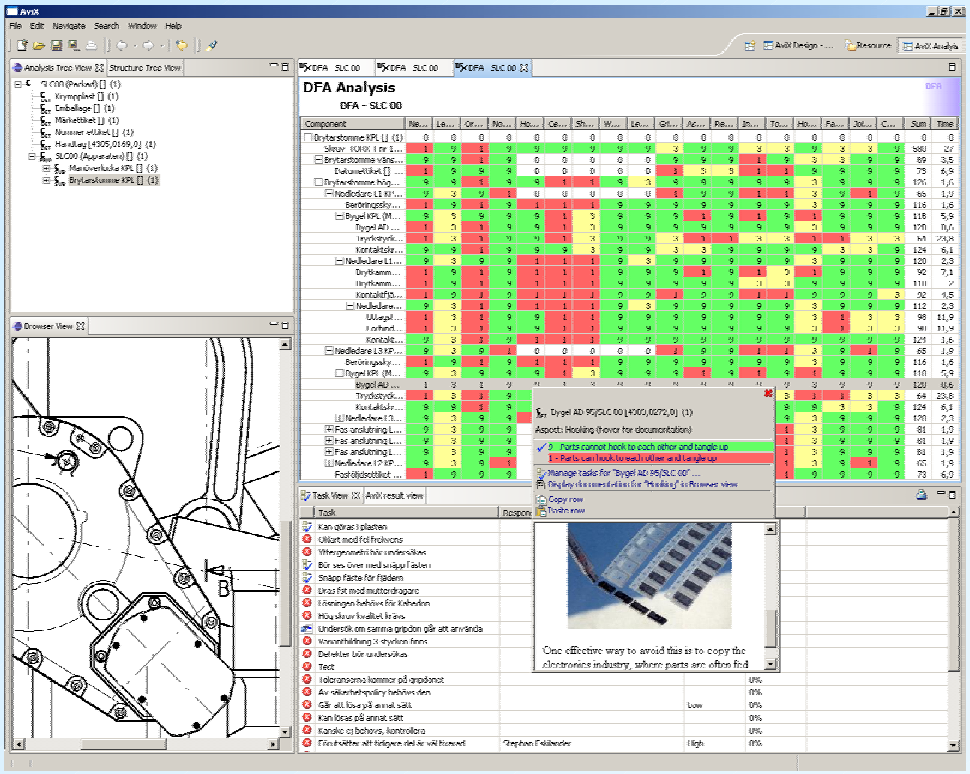
Work organization changes with DFA!



What changes are required?

- Management, designers and project leaders must understand and accept that production have design requirements that have to be considered.
  - DFA requires (encourages) a multifunctional product development team in order to provide good results.
  - DFA focuses assembly aspects early in product development, which increases the awareness of production problems.
- We need to work with measurable goals regarding ability to produce throughout development projects.
  - Production problems may be discussed, analyzed and documented with DFA in a way that they may be avoided the next time.

The AviX DFX / DFA2 software



Fields of application:
- All types of design
- Design for assembly
- Benchmarking
- New design
- Re-design

Benefits:
- Standardize working methods
- Using video technique
- Report system easy to customize
- Close connected to the process

-- Integration of productivity, quality and improvement activities.

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