Course System Architecture february 2000

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1 Introduction

This article describes the course System Architecture to be held 31 january-4 february 2000 by the Center for Technical Training CTT[2]. Trainer is the author of this article Gerrit Muller. The course will be repeated on a later date. At this moment this course is only accessible for Philips Employees.

The course is set up to make the art of system architecting more accessible. The course will address a wide spectrum of issues in relation with system architecture, such as: Processes, Business, Role and task of the system architect (team), Roadmapping, System Architect toolkit, Technical, Skills, and Psycho Social

It is hoped that giving this wide overview will enable system architects to mature faster. For non system architects the objective is to improve the cooperation between the system architect and other roles, such as project leader, marketing manager and technology manager.

2 Program

The program purposefully alternates process, business and technology views. The timing of the program can be adapted to the amount of information and interaction that is needed per subject. However the alterations of subjects will be followed more strictly, because the change in viewpoint is essential for understanding the whole picture.

time	subject
Monday Morning	Positioning the System Architecture Process, Product Creation Process
Monday Afternoon	Role and Task of the System Architect
Tuesday Morning	Roadmapping
Tuesday Afternoon	System Architect Toolkit
Wednesday Morning	Requirements Capturing
Wednesday Afternoon	Product Families, generic developments
Thursday Morning	Documentation, reviewing and other supportive processes
Thursday Afternoon	The role of Software in complex products
Friday Morning	Psycho Social side
Friday Afternoon	Wrap up, Expectations, How to continue, Evaluation

The structure of the course is shown in figure 1. In other words the theory of the course is that theory, illustration and interaction will alternate.

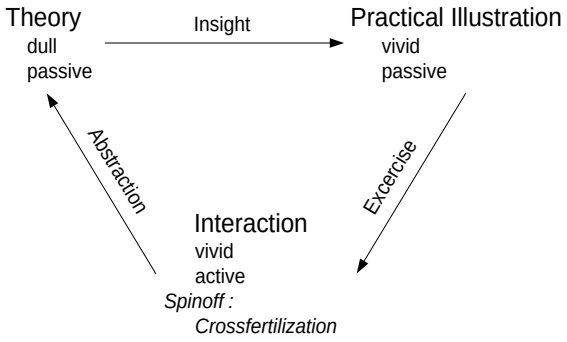

Figure 1: Alternation of theory, illustration and interaction will be used to maximize the educational effect

This alternation follows the general timing as presented in figure 2.

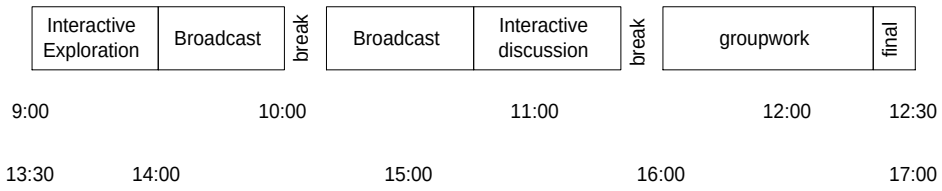

Figure 2: Timing per subject of the alternating theory, illustration and interaction

The first step is an interactive exploration of the subject. This exploration is followed by a "broadcast" lecture in which theory and illustration are given. The amount of illustration is "experimental", due to the Philips wide target group; Examples will be based on experience of the trainer, while it is hoped that during the interaction the attendants will bring forward illustrations from their own environment

The interaction is done in 2 steps: an interactive discussion with the entire class and a work session in smaller groups. The instruction for the group work is given during the interactive discussion.

The entire subject is closed by a short collective session with conclusions and evaluation.

3 Exercises

3.1 Exercise Product Creation Process

1. Map operational organization
2. Report on 1 flip the best case
3. Identify the relationships of the core team geographical, organizational, psychological, etcetera
4. Report the result of 3 on 1 flip

3.2 Exercise Role and Task of the System Architect

Role play with 3 roles and optional observer:

- 1 operational leader (project leader)
- 1 system architect
- 1 marketing manager
- 1 observer (optional)

Discuss the definition (=business relevance, specification and planning) of a travel e-mail mate

Present (max 2 flips) the result and the process (the relation and interaction of the 3 roles)

3.3 Exercise Roadmapping

Make a roadmap on the basis of what you know at this moment, or what you perceive as the "shared expectation".

Try to fill in as many views (market, products, technology, people and process) as possible.

Present an overview by minimizing the contents to the most essential data.

3.4 Exercise System Architect Toolkit

Internet telephony

Useability of internet telephony is determined by latency, reliability and quality of service. A tradeoff is needed between compression algorithm, protocol overheads and reliability.

Provide a model and a budget for internet telephony.

3.5 Exercise Requirements Capturing

- Determine the key-drivers for 1 product family
- Translate these drivers into application drivers and derive from them the requirements

3.6 Exercise Generic Developments

What are the top 3 benefits for your product family of generic development, what are the top 3 disadvantages.

3.7 Exercise Documentation

Assess the documentation status of 1 product (family) with respect to the requirements defined in [8].

Present (max 1 flip) the strong aspects of the documentation and the potential improvements.

3.8 Exercise Role of Software in a complex product

Describe the SW in a complex product, from different viewpoints for instance:

- Give an indication of the size/complexity
- Outline the SW architecture
- Identify the top 3 critical characteristics
- Identify potential improvements
- Process
- Development environment

3.9 Exercise Psycho Social Side

Make a (critical and honest) profile of your self and of the operational or the line manager, who thinks he is managing you.

Select 2 characteristics which you find difficult to assess or where you expect that other people will have a totally different perception. Discuss these 2 characteristics in the group.

Present (max 1 flip) the highlights.

3.10 Exercise Wrap up

Make a personal improvement roadmap.

Identify needed improvements, which can be influenced by yourself. Determine what you need to do to trigger the improvement and whom needs to be involved. Try to link your improvements to the rest of the business, for instance to planned products, conferences, platform releases or whatever recognizable anchor is available.

4 Rules during the course

The rules of the broadcast part are:

- Please write your questions/remarks/statements on yellow stickers and attach them at the end on the P-flip.

  These will be used in the interactive section for discussion and to increase insight.

- Short clarification questions are welcome,

  discussion will take place in the interactive part.

- Stupid questions don't exist. Learning is based on **safe** and **open** interaction.

  Very individual oriented questions can be referred to a break or after the session.

The rules of the interactive and the practice part are:

- Your contribution is essential.
- Don't monopolize the time, everyone also the quiet people should have the opportunity to contribute;

  The facilitator will intervene if the contribution is limited to a small group of participants.
- Respect the contribution of others;

  Opinions can't be wrong, difference of opinion is normal and called pluriformity.
- The course format is highly experimental and based on improvisation, constructive proposals are welcome;

  it is your course! Regular evaluations will give the opportunity to influence the rest of the course.

5 Evaluations

Basic part of learning is the evaluation of what has been done. The course will use 3 types of evaluations:

- Personal expectations
- Benefit and Concerns on a regular base
- The CTT evaluation form

The personal expectations are recorded at the very beginning of the course. At the end we look back at these initial expectations. This has a two-way evaluation effect:

Personal Did you start with the right expectation level? Was it realistic? Did you achieve the learning goals formulated in this expectation?

Trainer and CTT Did we communicate the right information to enable people to select this course? Do we apply the right selection criteria?

The benefit and concern evaluation method is based on the basic feedback method, which prescribes to start with formulating the strong points, before addressing the weaker issues. The idea is that improvement is based on building on the strong points and to change with respect to the weaker issues. A side effect is that everyone is forced to think also about the positive aspects, not only about the negative.

The benefit and concern evaluation is done regular, in the beginning with a high frequency, to be able to adapt the course directly.

The benefits and concerns are collected by a brainstorm or on yellow stickers. The rule is that one should always start with a benefit before mentioning a concern.

The benefit and concern method is widely used by CAP Gemini employees, often called B&C or Beer&Chips.

The CTT evaluation form is the "standard" CTT evaluation form which evaluates the different aspects of the course.

References

[1] Frederick P. Brooks. *The Mythical Man-Month*. Addison Wesley, 1975, ca. 1995.

[2] CTT. Announcement: System architecture, nov 22-26 1999. URL: http://pww.shared.philips.com/ctt/ctt_it/new_it.htm#sarch, 1999.

[3] J. C. DeFoe (Editor). An identification of pragmatic principles. URL: http://www.incose.org/workgrps/practice/pragprin.html, 1999.

[4] Incose. International council of system engineering. URL: http://www.incose.org/toc.html, 1999. INCOSE publishes many interesting articles about system engineering.

[5] James N. Martin. *Systems Engineering Guidebook*. CRC Press, Boca Raton, Florida, 1996.

[6] Gerrit Muller. Archipelago: Architecture = building bridges. URL: http://www.extra.research.philips.com/natlab/sysarch/index.html, 1999.

[7] Gerrit Muller. The arisal of the system architect. URL: http://www.extra.research.philips.com/natlab/sysarch/index.html, 1999.

[8] Gerrit Muller. Granularity of documentation. URL:http://www.extra.research.philips.com/natlab/sysarch/index.html, 1999.

[9] Gerrit Muller. Positioning the system architecture process. URL: http://www.extra.research.philips.com/natlab/sysarch/index.html, 1999.

[10] Gerrit Muller. The product creation process. URL: http://www.extra.research.philips.com/natlab/sysarch/index.html, 1999.

[11] Gerrit Muller. Requirements capturing by the system architect. URL: http://www.extra.research.philips.com/natlab/sysarch/index.html, 1999.

[12] Gerrit Muller. Roadmapping. URL: http://www.extra.research.philips.com/natlab/sysarch/index.html, 1999.

[13] Gerrit Muller. The system architecture homepage. URL: http://www.extra.research.philips.com/natlab/sysarch/index.html, 1999.

[14] Eberhardt Rechtin and Mark W. Maier. *The Art of Systems Architecting*. CRC Press, Boca Raton, Florida, 1997.

[15] Richard Stevens, Ken Jackson, Peter Brook, and Stuart Arnold. *Systems Engineering; Coping With Complexity*. Prentice Hall, HertfordShire UK, 1998.

[16] Richard Stevens, Ken Jackson, Peter Brook, and Stuart Arnold. Course material belonging to: Systems engineering coping with complexity. URL:http://www.complexsystems.com/course_materials_library.html, 1999.

History

Version: 1, date: january12 2000 changed by: Gerrit Muller

- changed the course dates to february 2000
- shifted the "Product Creation Process" to monday morning
- shifted "roadmapping" to tuesday morning
- added exercises
- removed empty subsections
- references added

Version: 0, date: november 2 1999 changed by: Gerrit Muller

- Created, no changelog yet