Where Does Architecture End and Technology Begin?

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Outline

- What does the title of the talk mean?
- Picking on CORBA - Common Object Request Broker Architecture
- Architecture evaluation - questions that need to be answered
- Summary

In The Beginning :-)

The Problem

CORBA

Architecture Evaluation

Summary

“We’ve had problems in the past in building software systems, but new advances have been made in the field. [Ada, Object Oriented SW, CORBA, Java, XML, …] will allow us to build the software cheaper, make it reusable and achieve interoperability that could not be achieved in the past”

The Reality :-|

The Problem

CORBA

Architecture Evaluation

Summary

“Although we know that [Ada, Object Oriented SW, CORBA, Java, XML, …] is the right way to go, we don’t have a lot of experience building systems in this *style*, so our people need to be trained in the new way of thinking”

More Reality :-o

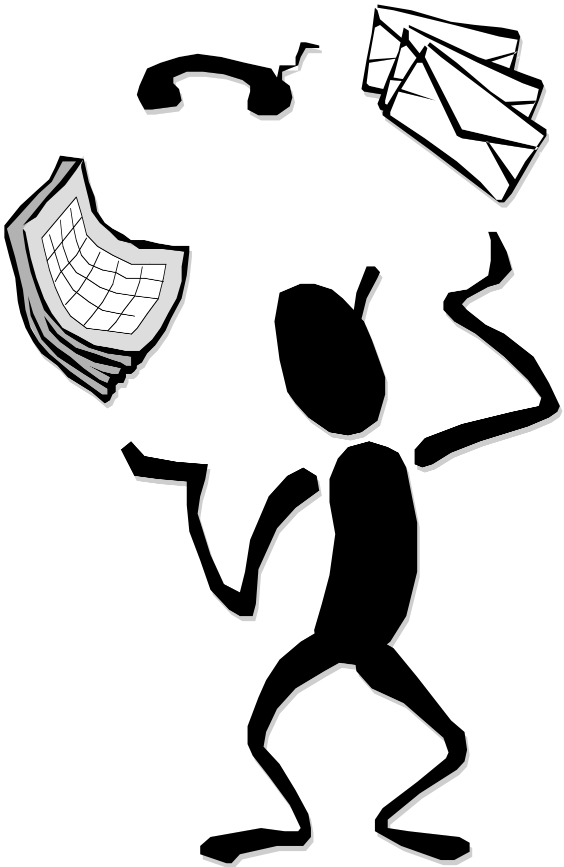
The Problem

CORBA

Architecture Evaluation

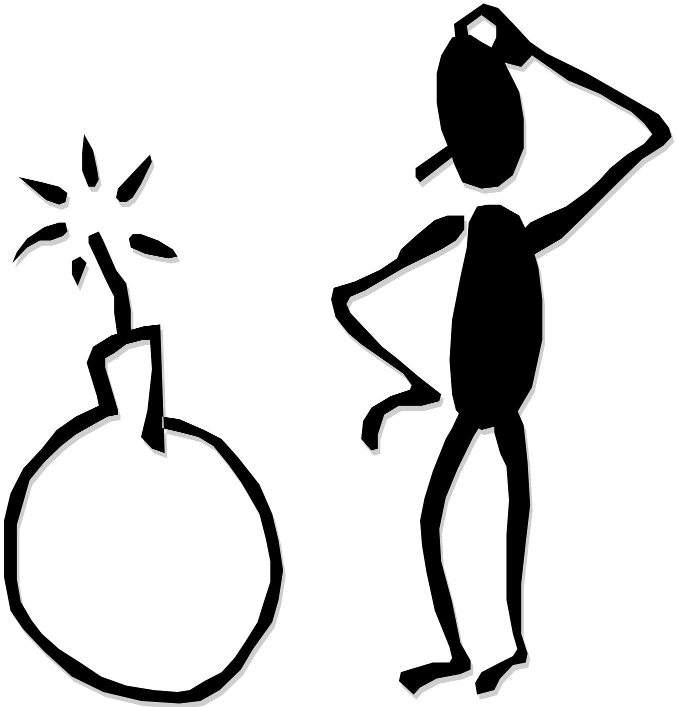
Summary

“To take full advantage of [Ada, Object Oriented SW, CORBA, Java, XML, …] we need to ***architect it*** appropriately. Otherwise the cost will be greater, and performance and interoperability will suffer.”



More Reality :-(

“The [Ada, Object Oriented SW, CORBA, Java, XML, …] ***technology*** for [tasking, inheritance, security, remote method invocation, …] is simply not adequate for what we need. We’ll have to come up with a workaround”



More Reality >:-(

The Problem

CORBA

Architecture Evaluation

Summary

- **"The [Ada, Object Oriented SW, CORBA, Java, XML, …] *tools/products* are immature and break all the time. The vendors are somewhat unreliable. Our schedule is slipping.**

In The End

“We should never use [Ada, Object Oriented SW, CORBA, Java, XML, …] because the resulting system never worked properly, exhibited poor performance, never gave us the benefits we expected, and and was late.

We should have stuck with Fortran, functional decomposition, Berkeley sockets, C++, html. *We knew how to build systems with them.*”

The Problem

CORBA

Architecture Evaluation

Summary

The Challenge

- Each great idea has elements of
  - Architectural style
  - Architecture
  - Technology
  - And Product
- The challenge is to correctly attribute success and failures to each of these views
- Each view requires different evaluation and risk mitigation approaches

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The Problem

CORBA

Architecture Evaluation

Summary

Is This Problem Unique to Computer Science?

- What about bridge-building?
  - Do we mix bridge architectural style (e.g. suspension bridge)
  - With its actual architecture (in the form of blue-prints) ?
  - With the technologies involved (steel cabling) ?
  - With the product as supplied by a vendor (the actual steel cables) ?

Picking on CORBA

The Problem

CORBA

Architecture Evaluation

Summary

This is neither an endorsement nor a condemnation of CORBA. CORBA is being successfully used in many many programs. It is being used here as an illustration of the issues. Feel free to substitute your favorite or most disliked buzzword wherever CORBA appears in the remainder of the presentation.

Picking on CORBA

The Problem

CORBA

Architecture Evaluation

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CORBA - the Architectural Style

The Problem

CORBA

Architecture Evaluation

Summary

- Distributed-Object architecture style
- The style is still not widely understood
- Difficulty in understanding the architecture style is similar to that of “getting” object-oriented software
- Development team needs experience with the style
- Experience with the style is often gained by using specific technologies and tools

The Problem

CORBA

Architecture Evaluation

Summary

CORBA - the Architecture

- Common Object Request Broker ARCHITECTURE
- Consists of numerous components and services - naming, lifecycle, event, security, persistence, etc.
- Services form a coherent whole
- There are subtle inter-dependencies that need to be understood - mixing and matching CORBA services with non-CORBA services is not easy

The Problem

CORBA

Architecture Evaluation

Summary

CORBA - the Technology

- CORBA is comprised of many technologies that are behind the services - e.g. Kerberos for security, IIOP for inter-operability, …
- One can understand the architecture but be clueless about the technologies and vice versa
- Systems are not built in isolation - the technologies can have a profound impact on the system architecture

CORBA - the Product

The Problem

CORBA

Architecture Evaluation

Summary

- ORB vendors offer a wide variety of products some more/less capable than others
- Products implement different portions of CORBA
- Products anticipate the evolution of CORBA
- Vendors themselves differ significantly in stability, reliability, or just plain ability

Architecture Evaluation

- **What does all that have to do with architecture evaluation?**
  - **Each view needs a different type of evaluation**
  - **Confusing the views results in ineffective (and misleading) evaluation**
  - **Some evaluations have to do with the architecture, and some don't - that should help bound what architecture evaluation means**

Evaluating Architectural Style

The Problem

CORBA

Architecture Evaluation

Summary

- Does the architectural style fit the problem? Is the architectural style mis-applied?
- Does the architectural style provide the needed “ilities”?
- How can we evaluate a development team’s knowledge and understanding of an architectural style?

Evaluating Architectures

The Problem

CORBA

Architecture Evaluation

Summary

- Does the architecture provide the needed “ilities”?
- How complex/simple is the architecture?
- Do the components/services of the architecture fit together well?
- How can we evaluate a development team’s knowledge and understanding of an architecture?

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Evaluating Technology

The Problem

CORBA

Architecture Evaluation

Summary

- Does the technology meet project requirements?
- How mature/immature is the technology?
- Does the technology inter-operate with other technologies needed to build the system?
- How can we evaluate a team’s experience with the technology?

Evaluating The Products

The Problem

CORBA

Architecture Evaluation

Summary

- Does the product provide the needed functionality and performance?
- Is the product immature, mature or out-of-date?
- Is the vendor stable?
- What are the short-term and long-term cost implications of adopting a product?
- How experienced is the team with the product?

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Summary

The Problem

CORBA

Architecture Evaluation

Summary

- Technologies sometimes masquerade as architectures
- Architectures sometimes masquerade as technology
- All involve the use of commercial-off-the-shelf products
- Architecture evaluation methods should try to help distinguish between architectural concerns and technology adoption concerns