INTEGRATION WITH SYSTEMS ENGINEERING

P HUGHES

Rapporteur: J Reed

Abstract

Integration with Systems Engineering

Mr. P. H. Hughes

STC Technology Ltd
Copthall House, Nelson Place
Newcastle Under Lyme, ST5 1EZ

The improved capabilities in model construction and experimentation should reduce the mystique of the subject and clear the way to a closer integration with the computer systems engineering as a whole, including both hardware and software aspects. The prerequisites for integration will be examined and current developments will be assessed in this light. Emphasis will be placed on the establishment of a unifying conceptual framework for performance modelling and the specification of system structure. Within such a framework quantitative analysis can be applied using appropriate engineering approximations.

DISCUSSION

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Dr. Sorensen started the discussion by commenting how similar conclusions had been reached when they had started to unify performance simulations. Although the procedure was only carried out on communication networks a need for predetermined data was identified. As it was too much work to start from scratch, statistics on a standard system were provided which could then be changed if and when required.

Professor Randell asked whether Dr. Hughes had considered applying the approach to reliability applications, to which Dr. Hughes replied that he had not, although he was aware of the possibility.

Mr. Langridge asked how practical is the approach as he could see problems with the binding between various levels of abstraction for different configurations. Dr. Hughes answered by saying that the method was applied with a particular system in mind, that the application was system specific. He acknowledged that there were still fundamental problems to which solutions had not yet been engineered, but expressed that, after all, we are talking methodology here.

Professor Henderson asked whether the structure should incorporate accounting since it may be a way of thinking about performance ? He indicated that an accounting structure is essentially an hierarchical graph with the task activities at the bottom being measured in pounds and pence, and that it may be an interesting way of bringing out details. However it was added that a system performance graph is generally not a tree structure since cross dependencies and inter dependencies provide very few indivisible units. System performance graphs are complex. A single execution may contain cycles, multiple resources, and lots of inter dependencies, which makes it very difficult for accounting. Dr. Hughes disagreed explaining that most computer work is budgeted on those operations that are carried out. He added that the established target is only a representation and not an accurate figure, and that the whole point of a target break down is to provide a means of coping. Also, when breaking down the work within a coherent framework it enables us to build up knowledge about a system.

Professor Randell asked how, for example, the problem of locality of references was taken care of ? Dr. Hughes said it was a matter of using suitable complexity components with the correct parameters.

Professor Henderson asked whether the procedure to obtain information such as nearest curve graphs, etc., would be the same as doing sensitive analysis, setting up complexity functions, doing 'what - if' statements and iterating ? Dr. Hughes agreed and added that again it is a matter of providing suitable complexity parameters.

Professor Girault asked what can be rescued when a system changes granularity. Dr. Hughes replied that it was simply, all that was reusable, however localizing should help.

Professor Ibbett finished the discussion by saying that the proceedings showed just how hard it was to acquire information, both intrinsically and

from manufacturers, who are usually in a position to withhold what information they have anyway.