**JCOMSS:** Manuscript preparation: GUIDELINES

Please prepare your the text taking into account the following details:

**Paper size:** A4

**Page numbering:** yes!

**Margins:**
1. **first page:**
   - left - 1.4 cm
   - right - 1.4 cm
   - top - 3.5 cm
   - bottom - 2.5 cm

2. **other pages:**
   - left - 1.4 cm
   - right - 1.4 cm
   - top - 3.5 cm
   - bottom - 1.7 cm

**Format:** two-column format

**Column width:** 8.9 cm

**Spaces between columns:** 0.4 cm

**Text font:** Times Roman or equivalent,

**Font size:** see sample pages below!

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**IMPORTANT:**

1. Please fit font size, style, and other things according the enclosed sample pages.

2. Please set resolution of 600dpi for graphics when printing PDF file!

3. If the paper accepted for publication, the blue coloured texts will be completed in the final paper.
Abstract: The evolution of software architecture, including operating systems and applications, spans from batch systems on big iron to today’s hand-held devices, and is now reaching into ubiquitous computing objects as evident in efforts such as JINI and Bluetooth. In digital telecommunication, the origins came from PCM and Ethernet, via OSI's X.25 to fast packet-switching realized in Frame Relay and ATM and now culminate in the exploding Internet environment.

Index terms: software architecture, operating systems, distributed systems

I. INTRODUCTION

This paper is an essay that tries to identify and explain the overarching concepts, principles, and approaches in the field of software architecture as it evolved during the first half century of its lifetime. It is inspired by the approach taken by eighteen’s century historians and philosophers (Dilthey, Hegel) called “history of ideas” (Ideen geschichte).

We start out by giving our definition of architecture which leads to the first basic concept of the operating system as a metaphor of an interface transformation between hardware and software.

II. ARCHITECTURE

What do we mean by software architecture? We actually give two complementary meanings. In analogy to the approach of the architect involved in construction of buildings, we separate the architecture into exo-architecture which looks at the system from the “outer” side, i.e. the appearance of the system to their users, and into endo-architecture which looks at the “inner” side, i.e. the internal structure as seen by the builders [1].

The most important distinction in our view is the network’s necessity to deal with change, with change being a mandatory phenomenon in networks, but not necessarily in distributed systems.

TABLE I

<table>
<thead>
<tr>
<th>Impact of Number of Nodes</th>
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</table>

It follows from (1)

\[ L(\hat{x}) = L_f(y_f) + L(x) + L_i(\hat{x}) \] (2)

The most important distinction in our view is the network’s necessity to deal with change, with change being a mandatory phenomenon in networks, but not necessarily in distributed systems.
From the point of view of system optimization, media coding/decoding scheme should be considered in the similar way as channel coding/decoding scheme in telecommunications. However, there is a very significant difference between the restrictions imposed on the two systems. Indeed, in telecommunication systems an important design issue which restricts channel coding efficiency is a trade-off between embedded redundancy needed for error control and the required channel capacity (bandwidth and/or power) due to the increased signaling rate. In public communications, the amount of the embedded redundancy is not commonly a restricting factor which makes the media MAP decoding even more powerful. It could be said that in human communications the embedded redundancy is “gratis” since people use to repeat sentences, data, photos etc. Generally, in public communications embedded redundancy is “gratis” since different printed and electronic media are practically competing in publishing information interesting for people (users).

In addition, since media decoder works with symbols from the same alphabet as used by the source, media decoder may entirely exploit the source redundancy to minimize error probability.

V. CONCLUDING REMARKS

Finally, if over the first fifty years of its life the computing/communication environment merely reflected the culture in which it grew, the next fifty years may very well see a development where the converging electronic technologies will dominate the culture; in that sense the new millennium we are about to begin could become the era of electronic culture or in current parlance of “e-culture”.

REFERENCES