ACCA
A networking view

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On Distributed Communications Networks

P. Baran, 1965

INTRODUCTION

Let us consider the opposite of a centralised network, one which allows several hundred stations to communicate amongst themselves. Such a network would be a significant step towards the realisation of the telecommunication network of the future. We shall call such a network a distributed network.

A distributed network is obviously vulnerable to the addition of new nodes, which can be connected to the network at any time, and to the removal of nodes, which can be disconnected from the network at any time. Each node in the network is connected to all other nodes, and each node can communicate directly with any other node. This allows for efficient routing of messages through the network, as messages can be转发ed through intermediate nodes to reach their destination.

The efficiency of a distributed network is determined by the number of nodes in the network, and by the number of links between nodes. Each node in the network is connected to a fixed number of other nodes, and each link has a fixed capacity. The overall efficiency of the network is determined by the number of links and the capacity of each link.

In a distributed network, the number of nodes and links is not fixed, but can increase or decrease over time. This allows for the dynamic expansion or contraction of the network, to accommodate changes in demand.

The distributed nature of the network also allows for the introduction of new services, such as data sharing and video conferencing, without the need for a complete overhaul of the network infrastructure. This makes distributed networks well suited for the needs of modern society.

Fig. 5: Some important features of distributed networks:

- Reliable delivery of messages
- Flexible routing of messages
- Efficient use of bandwidth
- Robustness against failures
- Scalability to accommodate growth

In conclusion, distributed networks are a promising technology for the future of telecommunication, offering many advantages over traditional centralised networks. As the technology continues to evolve, we can expect to see many new applications and services emerge, driven by the flexibility and efficiency of distributed networks.
The R&D « Learning » Curve

Inspired from Hluchuj’01 & Kurose’03

Autonomic Communications

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Autonomic Communications

- Throw “Ants” at the problem!
- Networking focus
- Not a single solution
- Basic principles and architecture
- Fundamentals
- Testbeds...
- Standards ...

AC Networking Issues

- The Autonomic Communication (AC) paradigm proposes a very ambitious future for communications
- Self-*
- Naming/addressing (multiple IDs)? Autonomic entity?
- Data gathering and Knowledge Management? Interactions with envt?
- Soft-Layering (time-dependant architecture)? Internal Intercations?
- Interoperability, multiple context? Multiple (re)-actions vs artefacts?
- Behavior modeling, Composition? System Overall Evolution/Integrity?
- Service management, replication? Service adaptation?