EduCom

Scalable System Management

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‘‘A workstation should be as easy to manage as a PC.’’

Overview

Characteristics of systems

Management problems

Strategies for management

Designing management as part of the system

Systems are:

Networked

- Locally
- Over a wide area

Distributed computationally

Distributed administratively

Managed by users

Systems are also:

Heterogeneous

- **Hardware (*e.g.*, VAX, RT/PC, Sun, HP,Symbolics, NeXT, Cray, ...)**
- **Software (*e.g.*, UNIX, VMS, OS/2, MS-DOS, ...)**

Reliant on other systems

Large scale

Basic to Any System

Hardware

Operating system software

Software distribution media and methods

Low-level network management

Configuration management

User account space and administration

Disk (storage) and Print (output) management

Fundamental Network Services

Authentication

Authorization

Accounting

Naming and locating objects

Service management

Handling Exceptional Conditions

Remote diagnostics

Remote error logging

Remote error notification

Remote monitoring

Other Issues

Backup (also by users!)

Licensing of distributed software

Electronic messaging

Printing and other output cost allocation

Netiquette, citizenship, enforcement, ...

Why are Workstation Operating Systems Hard to Manage?

Management databases are not fault tolerant

Interfaces are varied

Assume ‘‘wizard-level’’ knowledge

Generality vs. Complexity

Management Strategies

Assume management is distributed

- **Computationally**
- **Administratively**

Divide responsibilities

- **Workstation owner (user)**
- **Site manager**

Build consistent user interfaces

Build consistent callable interfaces

Think big!

Design Objectives

Permit islands of administrative control

Manage systems in their native mode

Provide both control *and* reporting

Reserve staff time for exception handling
(no linearity with any basic unit of service)

Smooth transition from provider of services
to coordinator of services

Design Constraints

In order of importance:

- Reliable
- Consistent
- Flexible
- Time Efficient
- Space Efficient

Designing Management into the System

Fundamental issue

Imposes additional constraints/requirements

Requires defined interfaces

Allows review of complete system

NOT an afterthought

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