The SysAdmin Group

Maturing Systems Administration
LISA'99 Invited Talk

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A Brief History

❖ **Mainframes - System support team of 30+**

❖ **Minis - Smaller (<10) support team**

❖ **PCs - One administrator per machine!**

❖ **UNIX - 1:1 to 1:150?**

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The Role of System Administrator

- ❖ The Troubleshooter
- ❖ The Walking Encyclopaedia
- ❖ The Tool Smith
- ❖ The Researcher and Student
- ❖ The Technical Writer
- ❖ The Strategist and Tactician
- ❖ Doctor and Counsellor

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The Workplace Problems

- ❖ Lack of management understanding
- ❖ Lack of reporting standards
- ❖ Lack of workplace standards
- ❖ Lack of time for research and problem prevention
- ❖ Sysadmin is a 24-hour concern
- ❖ Exactly where is the boundary?

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Problem: Management

- ❖ What is it that we do?
- ❖ How much effort is required to do it well?
- ❖ What's so difficult about running a few systems anyway?
- ❖ We're invisible when everything is ok
  - – First against the wall when it hits the fan.

Problem: Programmers

- ❖ Programs are generally written as though they will be the only thing present in the target environment.
- ❖ This is rarely true
  - – Even when it is, the system is continually changing
- ❖ SysAdmin is the point of integration
  - – Tens of applications
  - – Hundreds of users
  - – Thousands of commands

Problem: Availability

- ❖ Whatever we're doing, we stop the moment the system breaks
  - – There is an inherently reactive workload element which overrides other aspects of the role
- ❖ That doesn't mean we get funding or permission to prevent things breaking

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Problem: Standards

- ❖ The existing standards efforts have all either attempted to grab "low hanging fruit" or just not understood what was needed
  - – POSIX.1: Removable Media
  - – POSIX.1h: Services for Reliable, Available and Serviceable Systems (SRASS)
  - – X/Open Distributed Systems Management
- ❖ They've failed, for the most part
  - – They lack direction and context
  - – They lack understanding of the problem space

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The Nature of the Job

- ❖ Principle Investigator - for *any* problem
- ❖ Innate Intricacy of Environments
- ❖ Highly Individualised Environments
- ❖ Systems Undergoing Continual Change
- ❖ Continuing New Technology Introductions

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The Programmer's Stone

- ❖ Packers and Mappers
  - – Packers are the people who pack things into neat little boxes and execute procedures learned by rote
  - – Mappers are the people who seek to understand the underlying concepts and map those concepts to the problem space
- ❖ There is a significant push to attempt to address the shortage of sysadmins by reducing the role to procedures for Packers
  - – This is inherently flawed

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The SysAdmin and TQM

- TQM is what we know as "Root Cause Analysis"
  - TQM is a SysAdmin's *modus operandi*
- Fighting the god of entropy!
  - Such a battle mandates a systemic view
  - We must seek to solve the class of problems
- Always more problems
  - We'll never be out of a job

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Where Nature Meets Engineering

- An Organic System Grows
  - We fight entropy - the advance of decay
  - We attempt to retro-fit "order"
- An Engineered System is Built
  - We implement new systems
  - We replace old systems (technology turnover)
- We can Choose the Balance

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The Hidden Cost

- Too many sysadmins re-invent each site in their own image
- Huge cost of staff turnover
- Huge cost of lost productivity
- Different $\neq$ Bad
- Time for the ego-less sysadmin?

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Technology Turnover

- We are our own worst enemies
- It continues to become cheaper to replace technology than to maintain it properly
  - The cost of implementing fresh technology is far cheaper than the cost of maintaining entropy-laden legacy environments.
- We never actually bother to solve the real problems - just mutate them a bit!

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We need to grow up!

- ❖ How does a Profession Develop?
  - Go it alone
  - Discovery of peers (networking)
  - Formation of local support groups
  - Conferences and newsletters
  - Standardisation of practices
  - Introspection and Formalisation

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Standardisation of Practices

- ❖ Why bother
  - People change jobs every 18-36 months
  - Mappers need shared mental models
    - ◆ This is how we exchange ideas
  - Accelerated Development of the Industry

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Benefits of a Common Understanding

- **Organisational Maturity**
  - Independent benchmark for evaluation
  - Ability to plan proactive improvement projects
- **Consulting Consistency**
- **Personal Development**
  - Certification
  - Degree level courses

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So How do we Get There?

- In order to progress towards the provision of mature IT services, we must first understand the nature of that problem space.
  - We need to break the problem down into bite sized chunks, so we can plan how to address shortfalls.
  - In order to decide on what the pieces are, we must understand the nature of systems administration.

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What's Already Out There?

- ❖ ISACA COBIT
  - – High-Level Process-Oriented Controls
- ❖ SEI CMM
  - – Organisational Maturity for Software Development
- ❖ PM-BOK
  - – Responsibilities based Controls

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Professional Development

| Key Areas of Responsibility |
| Tasks |
| Skills |
| Knowledge |

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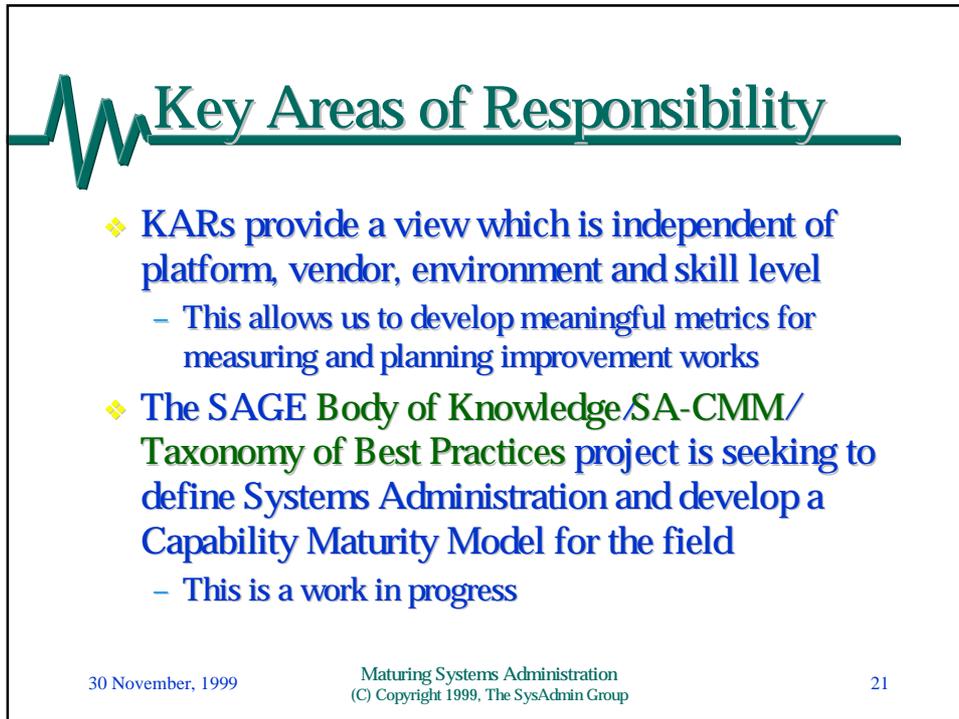
Key Areas of Responsibility

- ❖ KARs provide a view which is independent of platform, vendor, environment and skill level
  - This allows us to develop meaningful metrics for measuring and planning improvement works
- ❖ The SAGE Body of Knowledge/SA-CMM/ Taxonomy of Best Practices project is seeking to define Systems Administration and develop a Capability Maturity Model for the field
  - This is a work in progress

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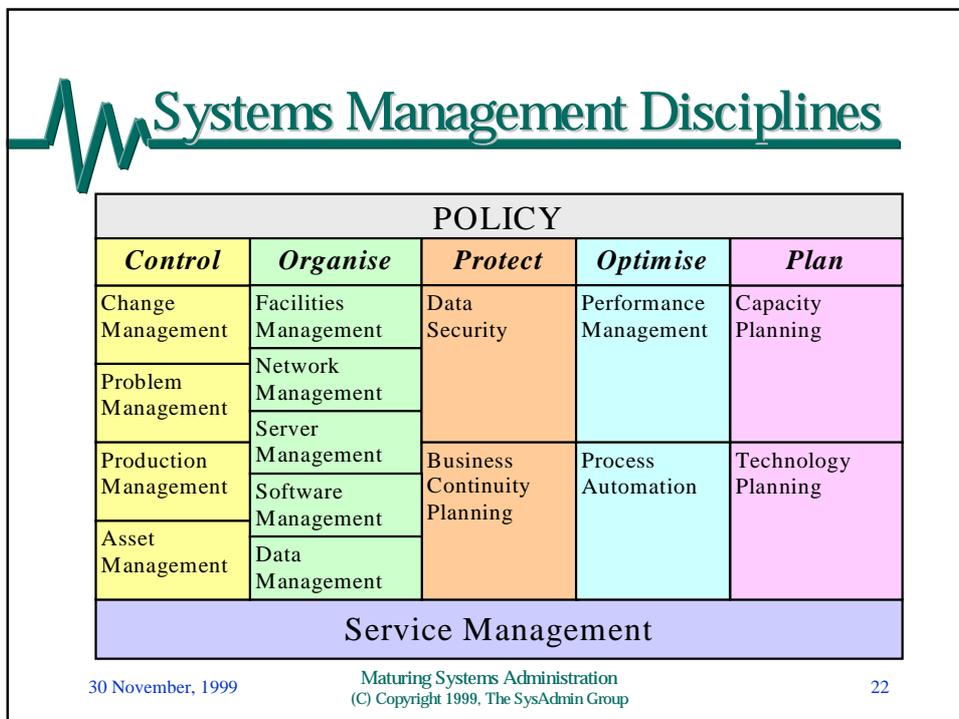
Systems Management Disciplines

POLICY				
Control	*Organise*	*Protect*	*Optimise*	*Plan*
Change Management	Facilities Management	Data Security	Performance Management	Capacity Planning
Problem Management	Network Management			
	Server Management			
Production Management	Software Management	Business Continuity Planning	Process Automation	Technology Planning
Asset Management	Data Management			
Service Management				

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Change Management

- ❖ **Change Management Process**
  - Flexibility, QA, Risk Mgmt, User Acceptance
- ❖ **Production Control**
  - Responsibility, CCB, Cause and Effect, Impact Matrix, Notification
- ❖ **Certification Process**
- ❖ **Change Support Automation**
- ❖ **Software Change Management Plan**

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Problem Management

- ❖ **Help Desk**
- ❖ **Trouble-Ticketing System**
- ❖ **Workflow Management**
- ❖ **Problem Resolution and Causal Analysis**
- ❖ **Service Management**
- ❖ **Event Management**

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Facilities Management

- ❖ Data Centre
  - Equipment labelling, environmental controls, physical security, computer room environment, planning
- ❖ Equipment Management
  - Maintenance contracts, console management
- ❖ System Documentation
  - Physical maps, logical maps, key support docs, document management, access and use

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Network Management

- ❖ Network Strategy
- ❖ Network Management
- ❖ Network Operations
- ❖ Network Gateways
- ❖ Network Security

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Server Management

- ❖ Host Management Standards
- ❖ Host Installation and Configuration Standards
- ❖ Centralised Configuration Management
- ❖ Centralised Host Administration
- ❖ Automated Housekeeping
- ❖ Automated Administration
- ❖ Information Flow Management
- ❖ Continuing Review of Practices

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Software Management

- ❖ Software Distribution and Management
- ❖ Production Acceptance Process
- ❖ Application and Service Monitoring
- ❖ Application Distribution and Synchronisation
- ❖ License Management

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Data Management

- ❖ **Data Management Policy**
- ❖ **Backup and Restore**
- ❖ **Storage Management**
- ❖ **Data Availability**
- ❖ **Database Management**

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Backup and Restore

- ❖ **Media Selection**
- ❖ **Scope and Schedule**
- ❖ **Coverage Verification**
- ❖ **Media Verification**
- ❖ **Volume Management**
- ❖ **Failure Management**
- ❖ **Off-site Backups**
- ❖ **Service Guarantees**

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The SA-BOK Project

- **The Goal:**
    - To define a reference framework defining systems administration
    - To capture "Industry Best Practices"
    - To identify the core skills, knowledge and disciplines required, such that people can be more effectively trained in the field

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Project Interlocks

- **SAGE is presently undertaking several projects which all dove-tail into each other:**
    - The Taxonomy Project
    - The Certification Project
    - The Education Project
    - The Updated Job Descriptions Booklet
- **All of these share a need for a common understanding of the role**

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Phase 1 - SA-BOK

❖ Define the Domains and Sub-Domains of Responsibility
❖ Define the Concepts, Knowledge and Tasks for each Domain
❖ Benefits:
  – Shared Mental Models
  – Improved Training Programs
  – Definition of "System Administration" Skills
  – Dictionary of Systems Administration

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Phase 2 - SA-CMM

❖ Define levels of maturity with respect to each of the Domains
  – Using objective criteria, similar to CMM
❖ Define evaluation criteria for each Domain
❖ Benefits:
  – Commence industry benchmark program
  – Provide impetus for organisational recognition
  – Promote the proactive improvement of practices

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Phase 3 - SA-IBP

- ❖ Capture Industry Best Practice into Web site
  - – Lots of contributors
  - – Lots of beneficiaries
- ❖ Benefits:
  - – Learn from your peers

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THE END

- ❖ Taxonomy BOF - Thursday @ 7pm

- ❖ Questions?
- ❖ Comments?

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