Enterprise Systems Management

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Enterprise System Management

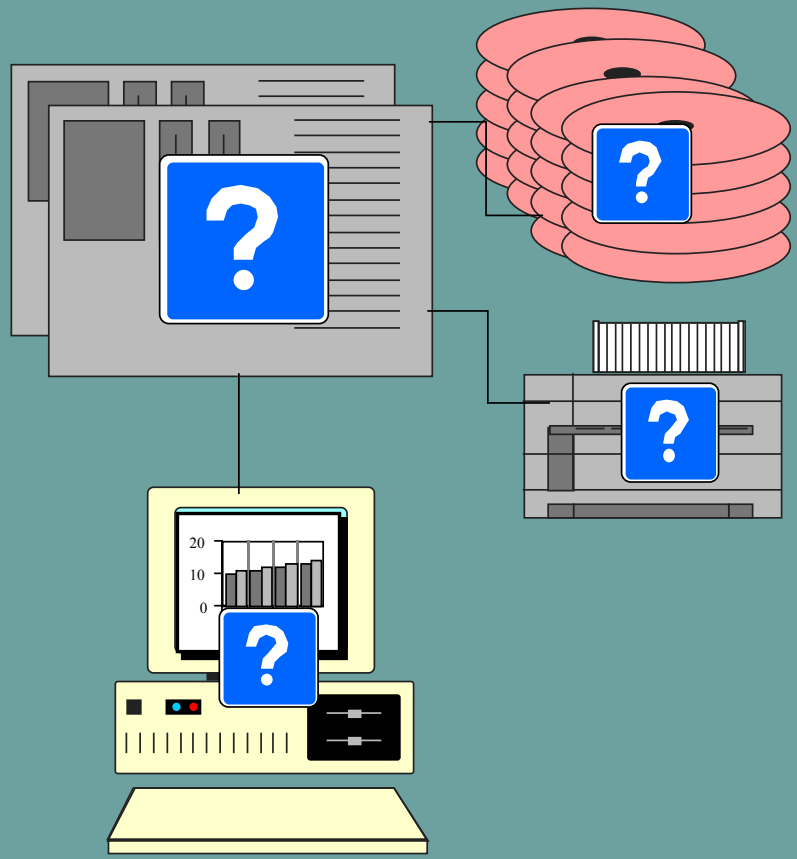
- Integrated approach to managing complex computing environment
- Consolidated view of enterprise systems
- Business process view of data and networking systems
- Scalable, Modular, Expandable

Why Enterprise System Management?

- Applications no longer monolithic
- Point solutions are inefficient and ineffective
- Need to adapt to rapidly changing environment
- Distribute knowledge and support
- Provide proactive, preemptive support

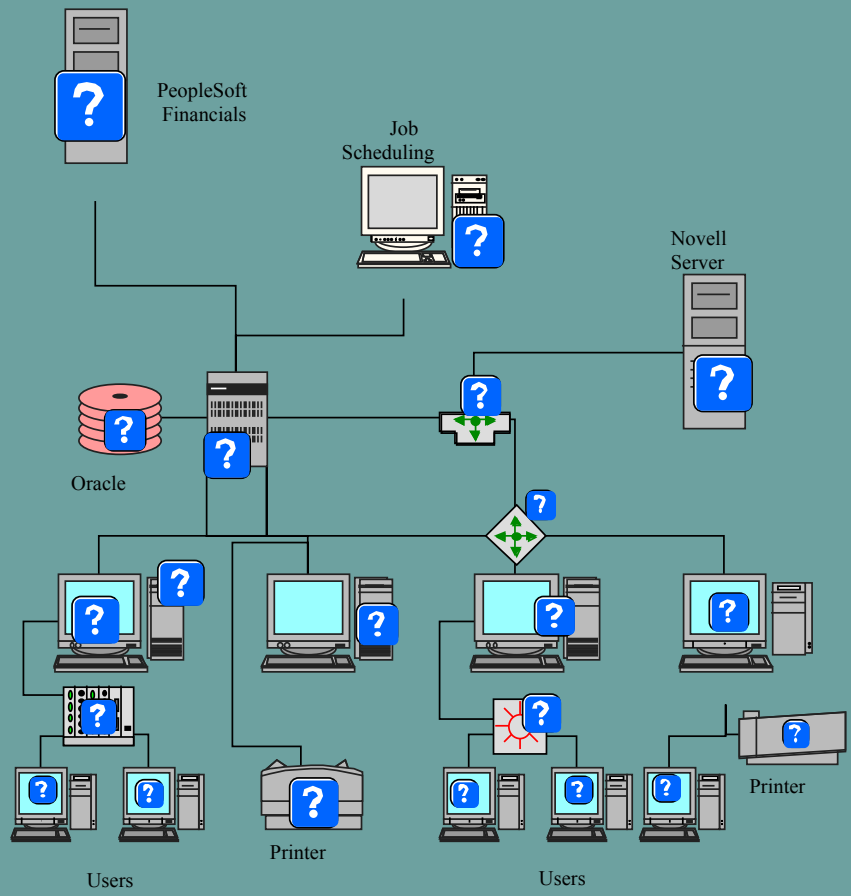
Mainframe World

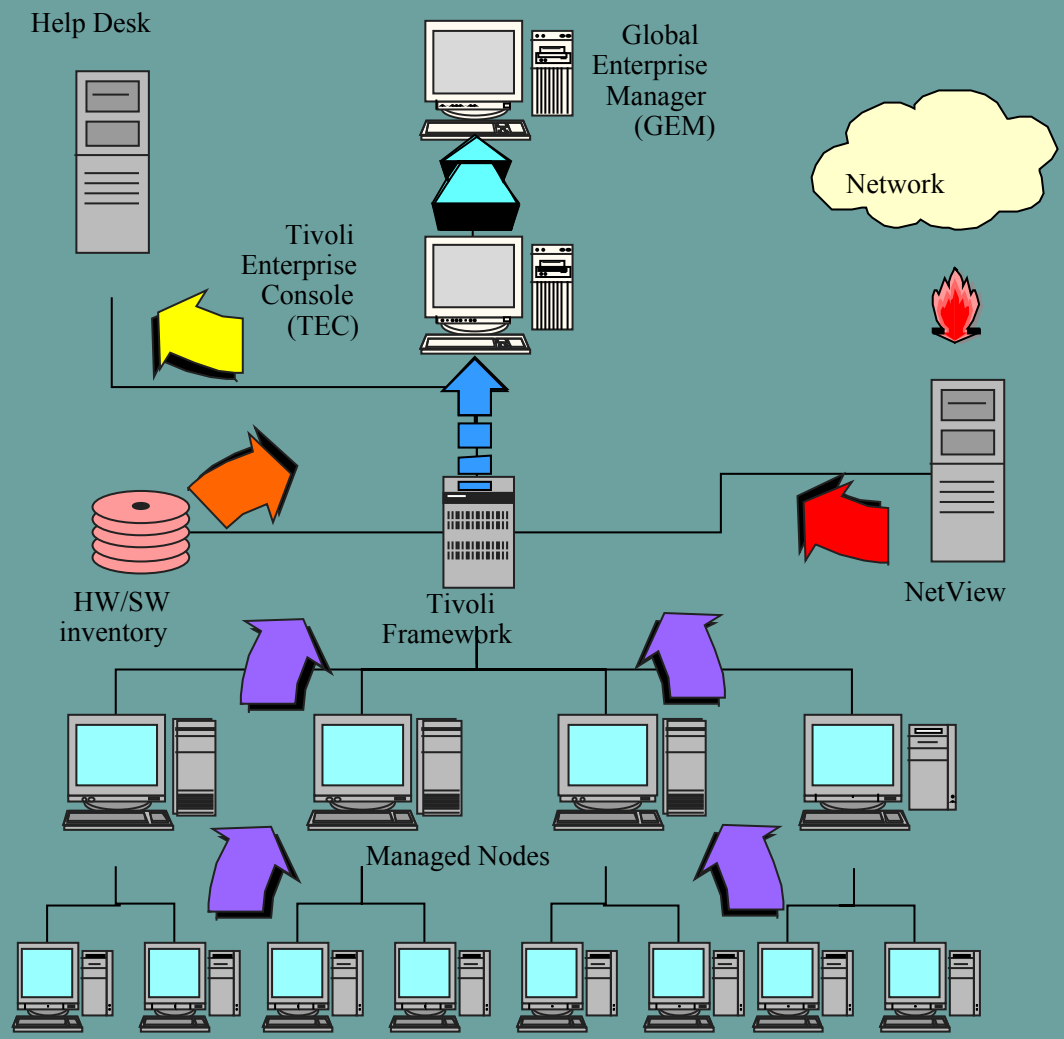
Is the Purchasing System Running?



Distributed World

Is the Purchasing System Running?





Availability:
- Unix
- NT/Novell
- Oracle
- Mail
- Peoplesoft

Job Scheduling
- Maestro

Output Management
- Destiny

Issues for Higher Education

- Economic justification is difficult
- Different time constraints than business
- Few colleges or universities use ESM systems
- Many locally developed tools

Perceived Benefits

- Distributed, Object-Oriented Design
  - Robust - Data and programs distributed
    - CORBA-based
  - Modular - Simplifies adding components
  - Efficient - Minimizes network traffic
  - Cross-platform - Runs on multiple Unix, NT

Perceived Benefits (cont.)

- Availability/Distributed Monitoring
  - Alerts from network, servers, applications centrally monitored
  - Modules for Oracle, mail, web
  - Thresholds & correlations for preventative maintenance
  - Statistical analysis and capacity planning

Bringing Tivoli to Princeton

- Princeton Partnership 2000 project
  - Convert applications to distributed platforms
  - Provide infrastructure comparable to mainframe
- Tivoli/Princeton partnership
  - Broad range of products
  - Evaluate applicability in higher education

Implementation Timeline

- June 1998 – Purchased Tivoli suite
- December 1998 – TWS (Maestro) in production
- Sept-Dec. 1998 – Framework/DM/TEC architecture planning and initial implementation
- April 1999 – Permanent ESM group formed
- Sept. 2000 – All production systems monitored

Reality Check

- Hard to do “in the background”
  - Job Scheduling & Output Management First
- Prix Fix Menu *AND* À La Carte
  - Inhouse Help Desk
  - Dazel Output Management
  - Inhouse monitoring plus Netview/Tivoli
- Hard sell to systems staff (NIH)

Tivoli at Princeton

- **Monitoring**
  - Distributed Monitoring
  - Enterprise Console
  - Manager for Oracle
  - Application Performance Monitoring
  - Web Services Manager
  - Netview
- **Job Scheduling**
  - Workload Scheduler
- **Backup**
  - Storage Manager

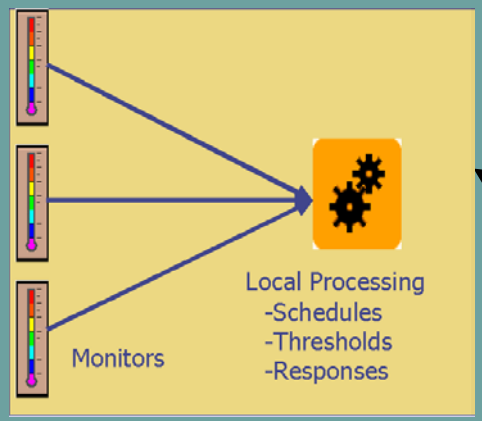
Tivoli at Princeton [cont.]

- **Monitoring**
  - 130 Unix and NT hosts
  - 11 applications
- **Job Scheduling**
  - Schedule on 28 Unix and NT hosts
  - Run 3500 jobs per week
- **Backup**
  - 7000 clients (servers and desktop systems)
  - Hundreds of terabytes of storage

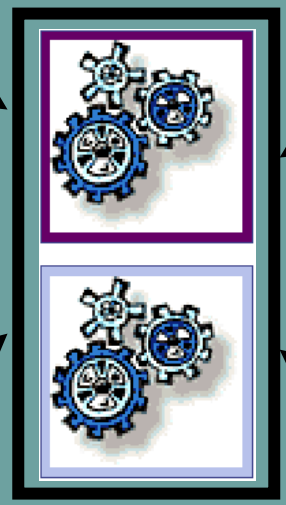
Tivoli Monitoring Architecture

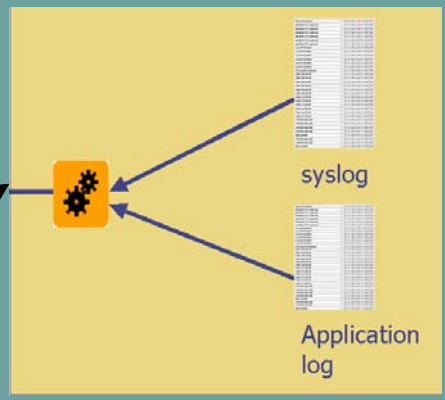
- Central configuration management
- Distributed monitoring agents
- Central event processing and correlation
- Adapters for events from other applications
- Easy to add locally developed monitors

Tivoli Monitoring Architecture

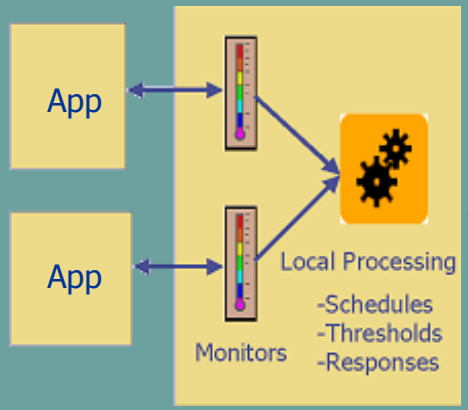


Distributed Monitoring





Logfile monitoring



Application performance

Configuration mgmt.
and event processing

Custom
monitoring

Implementation Process

- Identify users and requirements
- Plan what to monitor
- Select from supplied monitors
- Create custom monitors as needed
- Develop rules to process events
- Develop central notification process

Lessons Learned

- Do not underestimate time and staffing needs
  - Dedicate staff, at least initially
- Do not try to replace existing tools
  - Pick your battles: no Alaskan iceboxes
  - Find your niche: (e.g. NT vs. Unix)
- Focus on application availability
  - Top-down instead of bottom-up strategy

Why Did We Underestimate Effort?

- Tivoli is a toolkit, not a turnkey application
- Old habits are hard to change
- Tivoli has a steep learning curve
- After initial rollout, operation competes with development

Tivoli Monitoring Toolkit

- Distributed Monitoring infrastructure
  - Basic set of OS level monitors
  - Handful of application monitoring package
  - Tools for creating custom monitors
- Event processing engine
  - Minimal event processing rules
- Consider Tivoli Rapid Deployment Program

Development Strategies
Top Down vs. Bottom Up

- Top down
  - Applications first
  - Analyze problems
  - Application owners
  - Integrate existing monitors
- Bottom up
  - Infrastructure first
  - Synthesize state
  - Sys admins are users
  - Replace existing tools

Development Strategies
Pros and Cons

- Top down
  - Models end user experience
  - Adds value immediately
  - More complex monitors
  - Less sophisticated users
- Bottom up
  - Models application dependencies
  - Requires high reliability
  - Needs admin buy-in
  - Replaces existing tools

Next Steps at Princeton

- Monitor all Oracle databases
- Application response monitoring
- Feed events to the help desk
- Better filtering of transient errors
- Automated pager response

For More Information

- Princeton ESM web site
  - http://www.princeton.edu/~esm
- E-mail to
  - oberst@princeton.edu
  - augustin@princeton.edu
- Tivoli web site
  - http://www.tivoli.com/

Questions ?