

Introduction to Systems Administration

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Key concepts, responsibilities, and best practices for managing modern IT environments.

1. What Is Systems Administration?

Aspect	Description
Definition	The discipline of installing, configuring, maintaining, and troubleshooting computer systems and services.
Goal	Ensure that hardware, software, and networks operate reliably, securely, and efficiently to support business objectives.
Scope	Servers, workstations, virtual machines, cloud resources, storage, networking, security controls, and automation tools.

2. Core Responsibilities

Area	Typical Tasks
Provisioning	• Deploy physical/virtual servers • Install operating systems and base packages
Configuration Management	• Apply consistent settings (e.g., users, services, firewall rules) • Use tools like Ansible, Puppet, Chef, Salt
Monitoring & Alerting	• Set up metrics collection (CPU, memory, I/O, latency) • Configure alerts via Prometheus, Zabbix, Nagios, Grafana
Backup & Recovery	• Schedule regular backups (file?level, snapshot, database) • Test restore procedures and define RPO/RTO
Security	• Patch management • Hardening OS and applications • Manage firewalls, SELinux/AppArmor, IDS/IPS
User & Access Management	• Create/modify/delete accounts • Implement role?based access control (RBAC) and LDAP/AD integration

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Area	Typical Tasks
Performance Tuning	• Identify bottlenecks • Optimize kernel parameters, services, and storage
Documentation & Change Management	• Keep accurate runbooks, diagrams, and change logs • Follow ITIL/Change Advisory Board (CAB) processes
Automation & Scripting	• Write Bash, PowerShell, Python scripts • Build CI/CD pipelines for infrastructure (IaC)

3. Typical Toolset

Category	Examples
Operating Systems	Linux (RHEL, Ubuntu, CentOS), Windows Server, BSD
Configuration Management	Ansible, Puppet, Chef, SaltStack
Infrastructure as Code (IaC)	Terraform, CloudFormation, Pulumi
Monitoring & Logging	Prometheus, Grafana, ELK Stack (Elasticsearch, Logstash, Kibana), Splunk
Backup	Veeam, Bacula, Restic, AWS Backup, Azure Backup
Security	OpenSCAP, Nessus, OSSEC, Fail2Ban, SELinux/AppArmor
Virtualization / Containers	VMware ESXi, HyperV, KVM, Docker, Kubernetes
Remote Management	SSH, PowerShell Remoting, RDP, Ansible?pull, Salt SSH
Ticketing & Documentation	Jira Service Management, ServiceNow, Confluence, Git (for docs)

4. Lifecycle of a System

1. **Planning** – Capacity sizing, OS selection, security baseline.
2. **Provisioning** – Hardware/VM creation, OS install, network configuration.
3. **Hardening** – Apply security policies, disable unnecessary services.
4. **Configuration** – Deploy applications, services, and required packages.
5. **Monitoring** – Enable metrics, logs, and alerting.

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6. **Maintenance** – Patch updates, performance tuning, backup verification.
 7. **Decommission** – Secure data erasure, resource reclamation, documentation update.
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