



Introduction to Change Management

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Discussion topics

- ▶ Why change management and its significance
- ▶ Types of changes in production environment
- ▶ Change management controls
- ▶ Impact of weak change management control
- ▶ Integrity management
- ▶ Change management leading practices
- ▶ Software Development Life Cycle (SDLC)

Why change management and its significance?

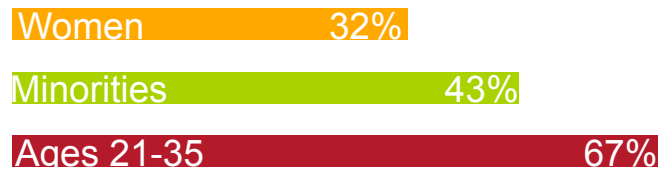
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7	Software Development Life Cycle



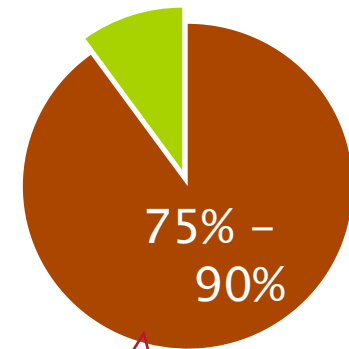
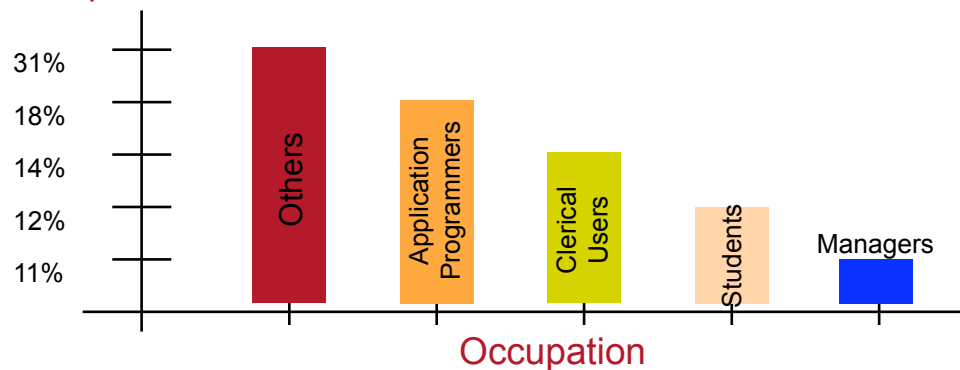
Why change management and its significance?

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- ▶ The total fraud losses in the United States to be \$660 billion a year
- ▶ Off all the computer crimes reported



Computer fraud



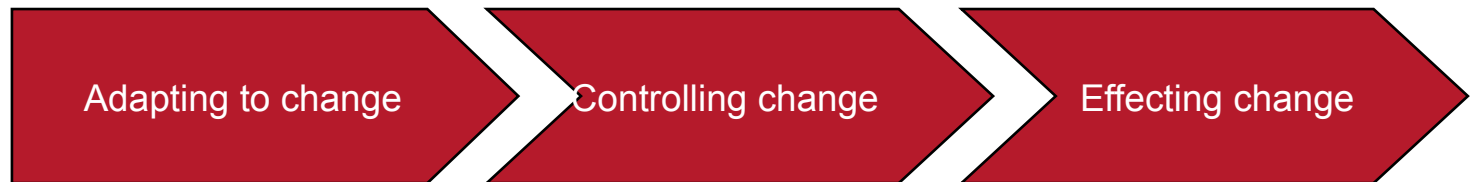
computer crime committed by former or current employees (knowledgeable insiders)

Source: Association of Certified Fraud Examiners and National Center For Computer Crime

Why Change Management and its significance?

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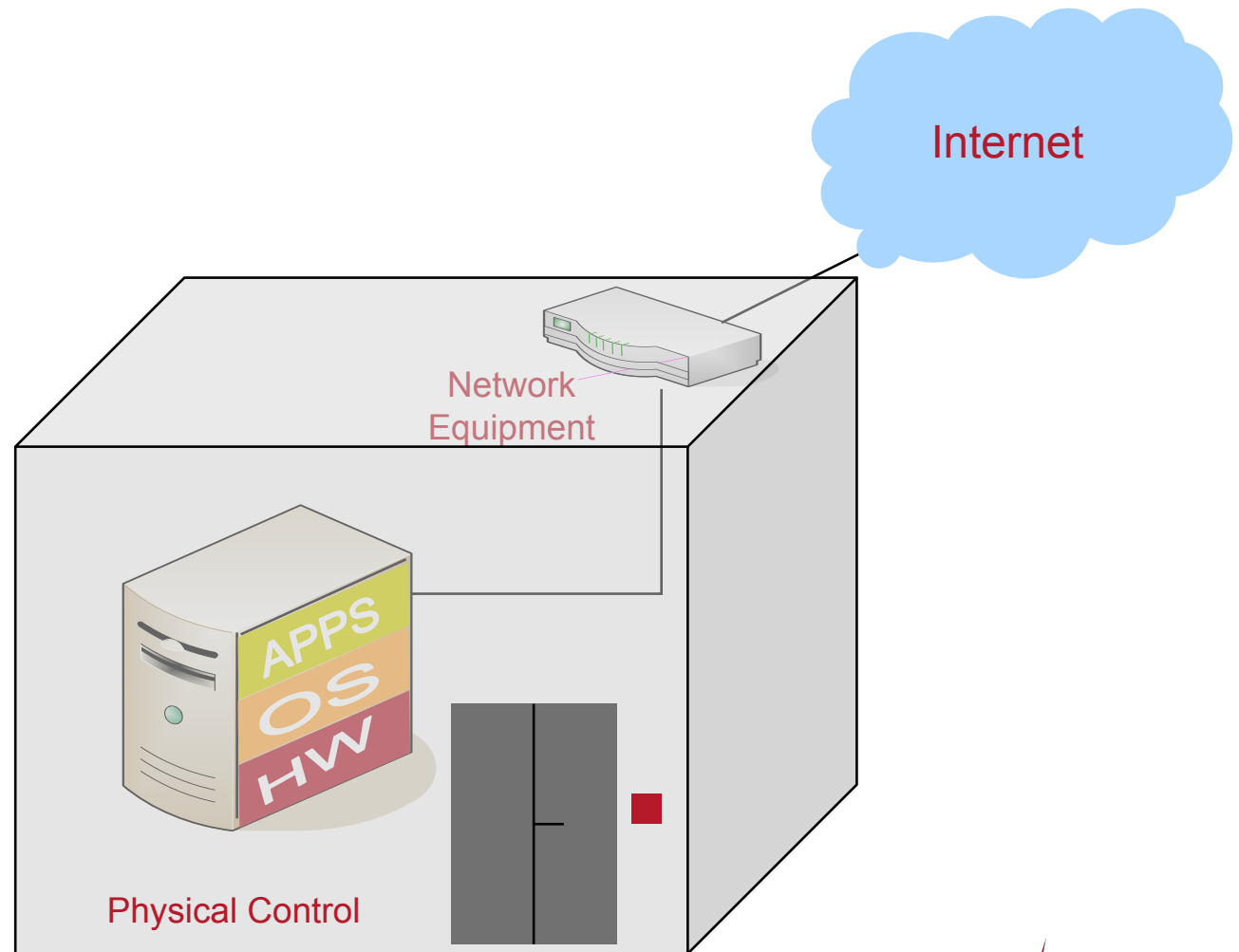
- ▶ Change management – it is significant because it helps an organization to be efficient



Types of changes

Changes in production environment

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Types of changes

OS changes (Host)

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- ▶ **Applying OS patches**
 - OS vendor recommendation
 - Opening/closing OS services
- ▶ **Re-imaging**
 - As a backup plan when an OS update didn't go as planned
 - As part of major/minor/emergency application changes

Types of changes

Network changes

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- ▶ **Software changes**
 - Deploying OS
 - Patching OS
- ▶ **Configuration Changes**
 - Updating firewall, router, switch configuration
- ▶ **Hardware changes**
 - Adding/removing of network equipment

Types of changes

Application changes

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- ▶ **Company specific application change**
 - Major, minor and emergency changes
- ▶ **Database changes**
 - Schema changes
 - Database upgrades (version upgrade)

Types of changes

Physical access change

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- ▶ **Physical access to datacenter**
 - Preventing root level access through a system console
 - Deactivating terminated employee's physical access
 - Deactivating temporary physical access

Types of changes

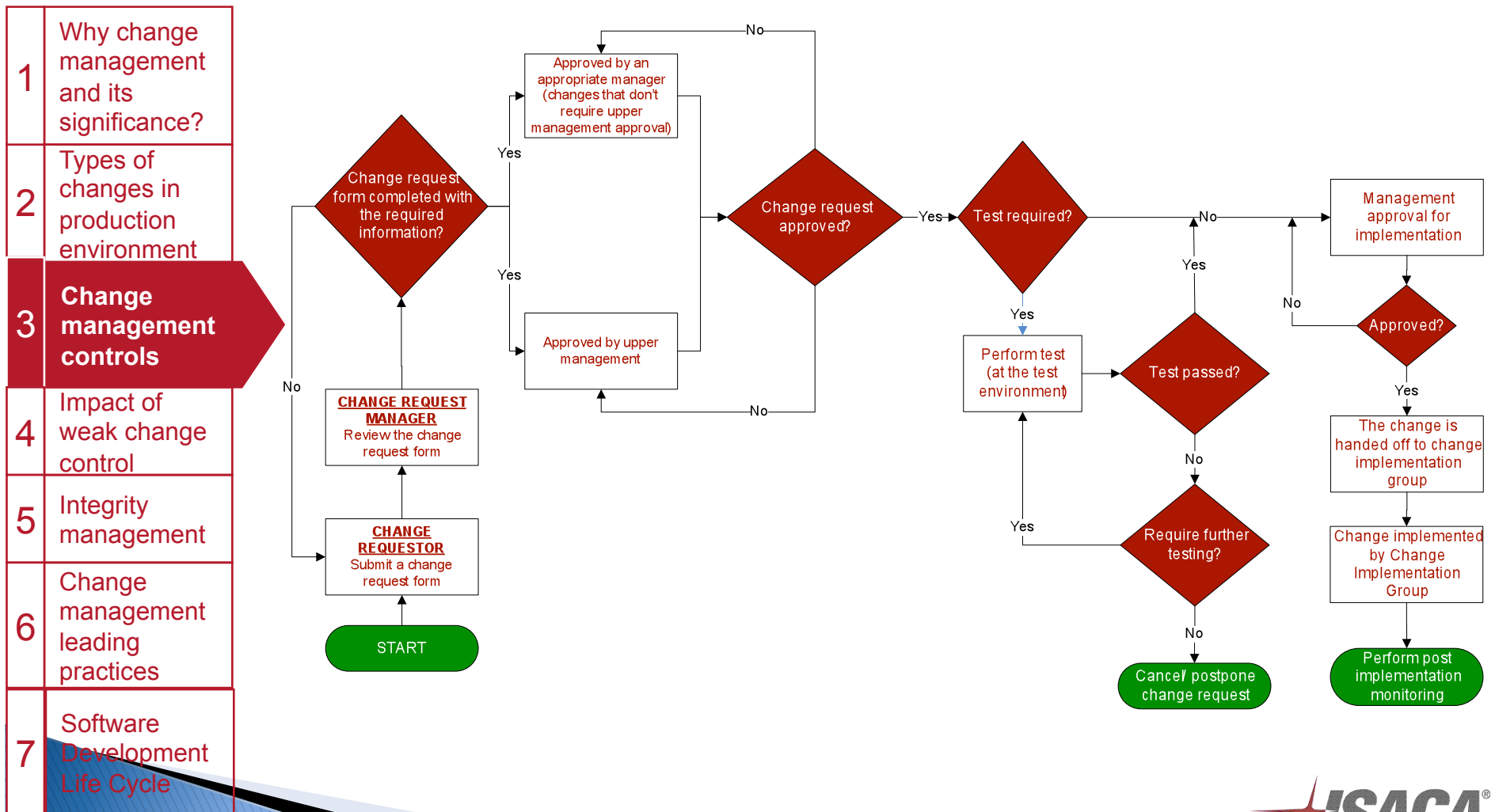
Logical access change

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- ▶ **OS Access Change**
 - privileged access to production/mission critical server
- ▶ **Application Access Change**
 - privileged access to production/mission critical application
- ▶ **Network Access Change**
 - privileged access to network equipment

Change management controls

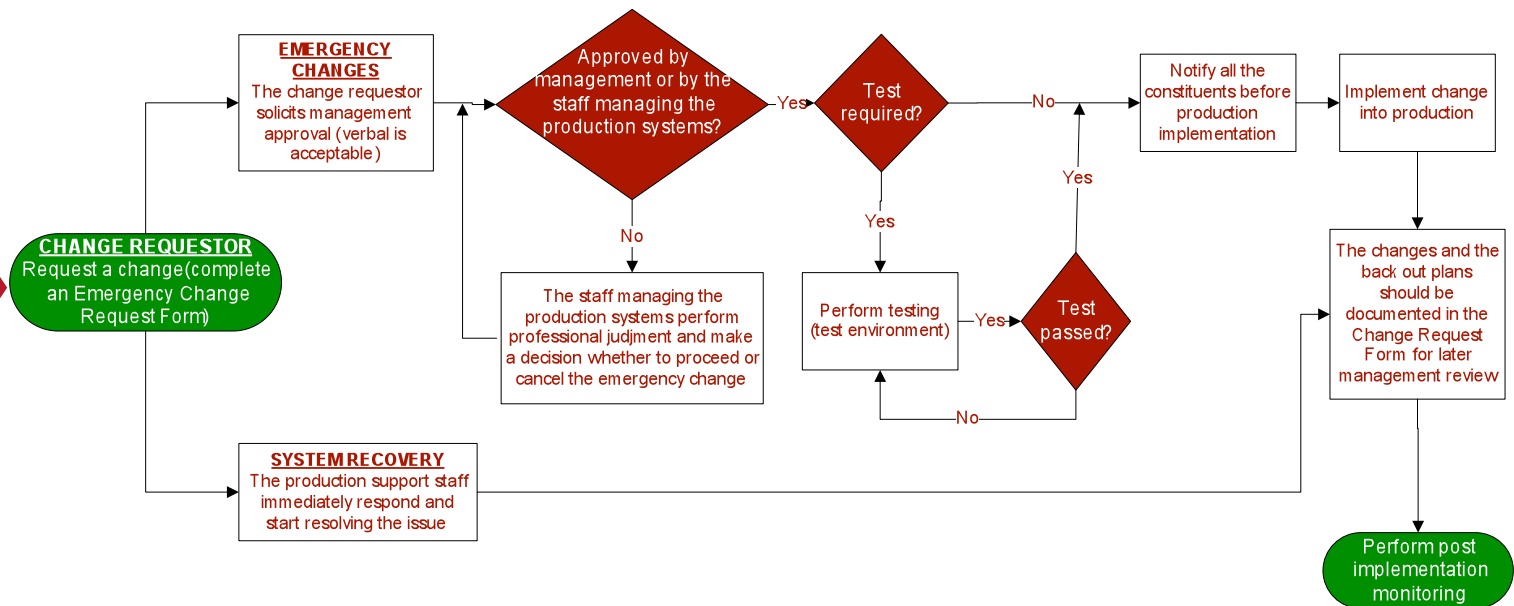
Planned/routing maintenance changes procedure and controls



Change management controls

Emergency/System Recovery change procedure and controls

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Impact of weak change controls

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- ▶ Potential for system outages
- ▶ Prone to unplanned, unauthorized and **undocumented** changes
 - Unauthorized and undocumented changes
 - Causes unexplained additional problems or outages
 - Causes unplanned changes as problems are troublesome to resolve due to the prior undocumented changes

Impact of weak change controls

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- ▶ **Prone to system attack** – example denial of services
- ▶ **Misuse of resource**
 - Unplanned work
 - Creates monetary loss
- ▶ **Causes legal implication**
 - Due to the exposure of sensitive customer data
 - Due to system unavailability to customers
- ▶ **Losing a customer/ business**

Integrity management – Preventing, detecting and responding to changes in production systems

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▶ Prevention

- Restrict logical access
 - Firewall, IDS, OS and Application
- Unnecessary services
 - Disable at the servers
 - Block by the firewalls
- Restrict physical access
 - Restrict physical access that houses critical systems to ONLY authorized employees
 - Perform periodic physical access reviews

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► Detection

- Monitor metadata and look for changes
 - Create, store and monitor baseline metadata values
 - Metadata values: modification time, file size and cryptographic checksum
- Integrity Management Software
 - Reads files or directories to monitor
 - critical network configuration, data files, customer database files, documents and spreadsheets
 - Takes action when a violation (change) occurs
- Intrusion detection (IDS)

Integrity management – Preventing, detecting and responding to changes in production systems

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▶ Recovery

- Maintain a backup copy of the production data
- Identify changes based on the Integrity Management Software report
- Determine whether a change is authorized or not
- Restore a file if the change is deemed unauthorized or malicious

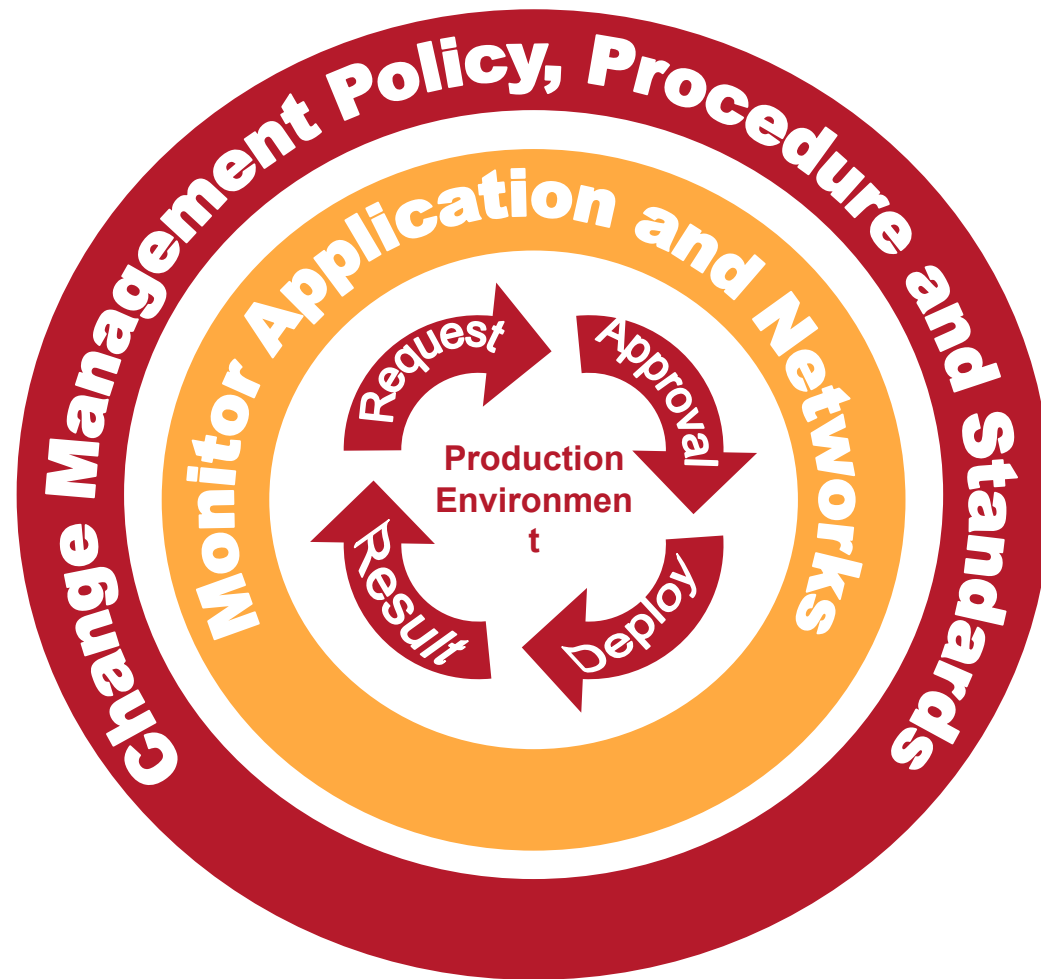
Change management leading practices

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- ▶ Change management policy, procedure and standards
- ▶ Change result management
- ▶ Change request management
- ▶ Deployment management
- ▶ Approval process
- ▶ Monitor application and networks

Change management leading practices

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Change management leading practices

Change management policy, procedure and standard

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- ▶ What is change management policy /procedure?
 - It is the process of planning, organizing, controlling, executing and monitoring changes that affect the delivery of IT services
 - Prioritizes changes based on downtime, lead time, type of services and severity of the change
 - Categorizes change (Low, Medium, High, and Urgent)

Change management leading practices

Change management policy, procedure and standard

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- ▶ Better assess the cost of proposed changes before they are incurred
- ▶ Reduce adverse impact of changes on the quality of services and on Service Level Agreements (SLA)
- ▶ Integrate with and communicate to IT and management
- ▶ Roles and responsibilities
 - Define and designate qualified personnel's roles
 - Segregation of duties (SOD)
 - Communicate to the organization
 - Enforce throughout the change management process

Change management leading practices

Change Request Management

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- ▶ **Change Request Analysis**
 - **Business Analysis**
 - The likelihood of success
 - Significance to business
 - Resources required and business justification
 - **Technical Analysis**
 - System dependencies
 - Technical requirement
 - Project estimate

Change management leading practices

Change Request Management

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- ▶ **Change Request Reporting**
 - Make the change requests visible to management
 - Retain status of the change request when it is analyzed, prioritized, tested and deployed

Change management leading practices

Approval Process

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- ▶ Appropriate approval should be obtain between the different phases of change management process
- ▶ Management approval should be documented

Change management leading practices

Deployment Management

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- ▶ Logical environment (separate)
 - Development, Test/QA and Production
- ▶ Deployment process
 - High category changes
 - Low/Medium category changes
 - Emergency changes
- ▶ Technology leverage
 - To provide auditability and versioning throughout the deployment process

Change management leading practices

Result management

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- ▶ Key Performance Indicators (KPI) about the entire Change Management Process
 - Process bottlenecks, successful techniques, etc.
- ▶ Use the KPIs (by management) to make adjustments to the change management procedure and practices
- ▶ Post change implementation monitoring

Change management leading practices

Monitor application and networks

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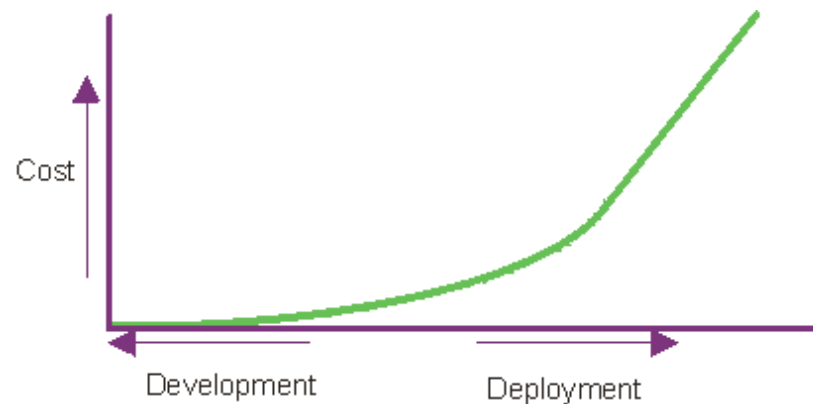
- ▶ Integrity checks
 - using automated monitoring tools
 - Incident response
 - Escalation process
- ▶ Periodic reviews
 - User access – OS, apps, network, etc.
 - System configuration – servers, network equipment, etc.

Software Development Life Cycle

Relationship between change management and SDLC

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- ▶ Managing change is a critical component of any SDLC model
 - Change Management and SDLC are not mutually exclusive
- ▶ Change management occurs throughout the development life cycle
- ▶ Cost of changes is higher once out of development

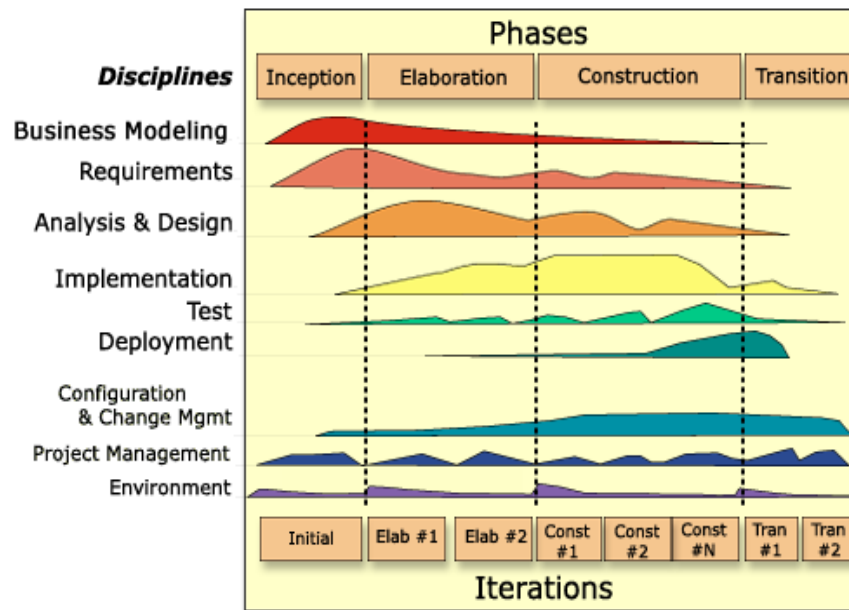


Software Development Life Cycle

Relationship between change management and SDLC

- ▶ Iterative model
 - Agile Methodology
 - Rational Unified Process (RUP)
 - Rapid Application Development (RAD)
 - Joint Application Development (JAD)

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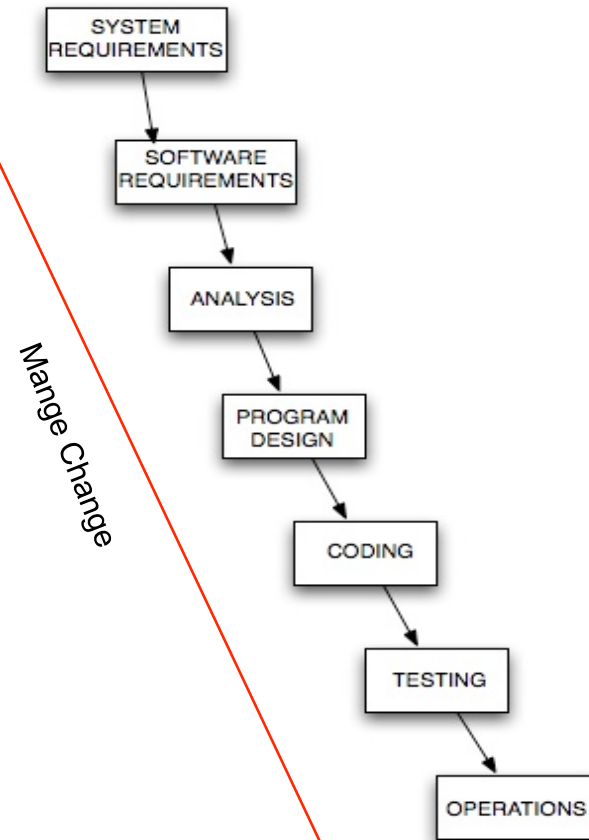
Illustration courtesy of Rational Unified Process

Software Development Life Cycle

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▶ Waterfall model

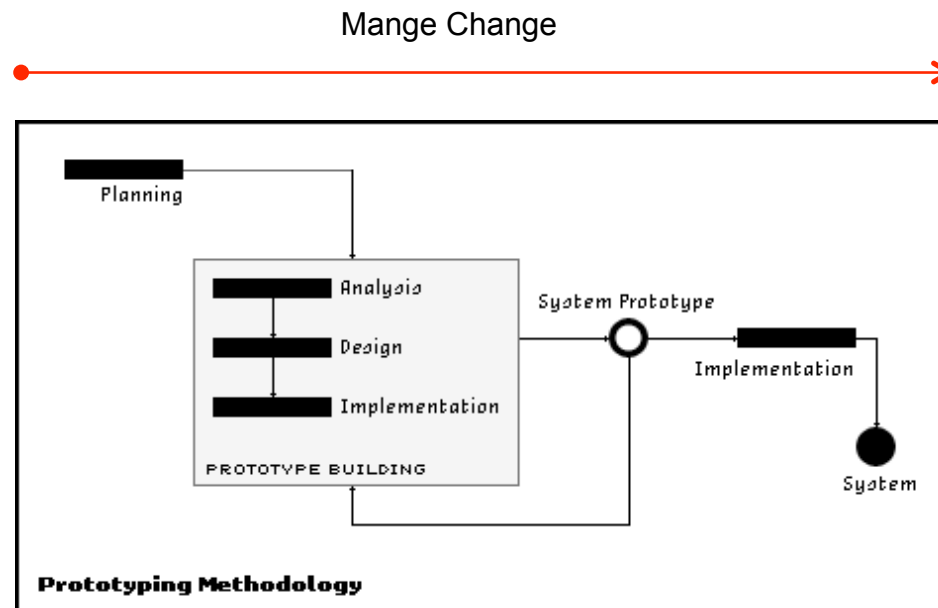


Software Development Life Cycle

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► Prototyping

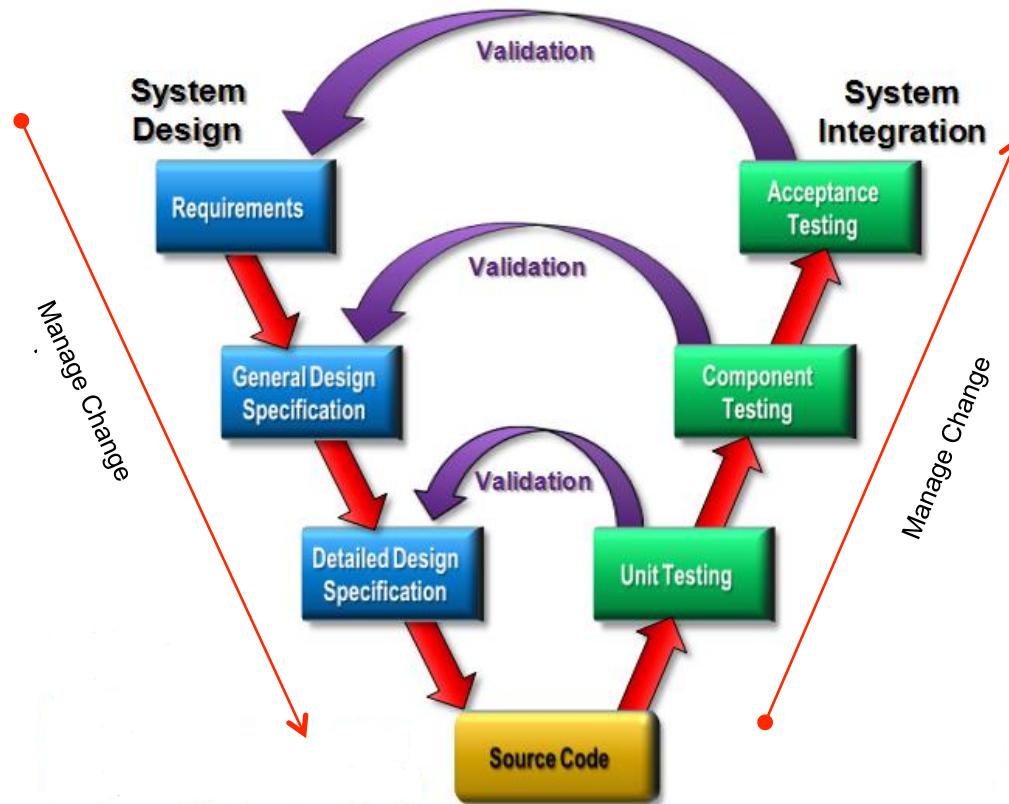


Software Development Life Cycle

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▶ V Model



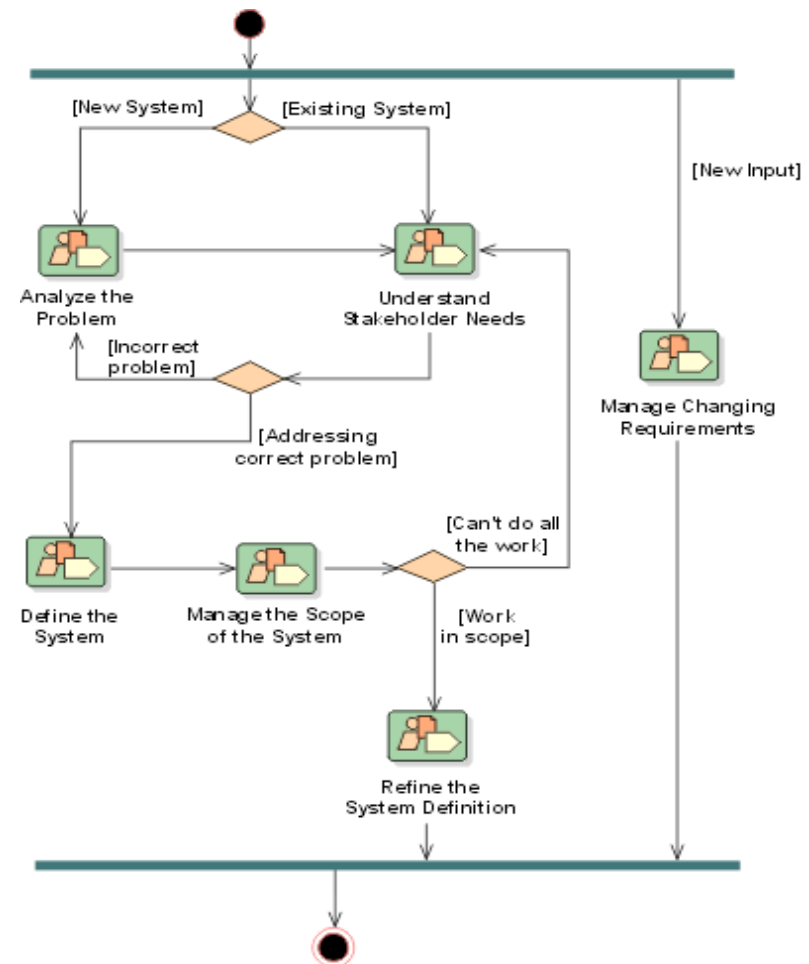
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▶ Audit areas: Program Change and Program Development

- Define in-scope systems relevant to each area
- Test controls based on definition V Model



Software Development Life Cycle

Tools to manage changes better

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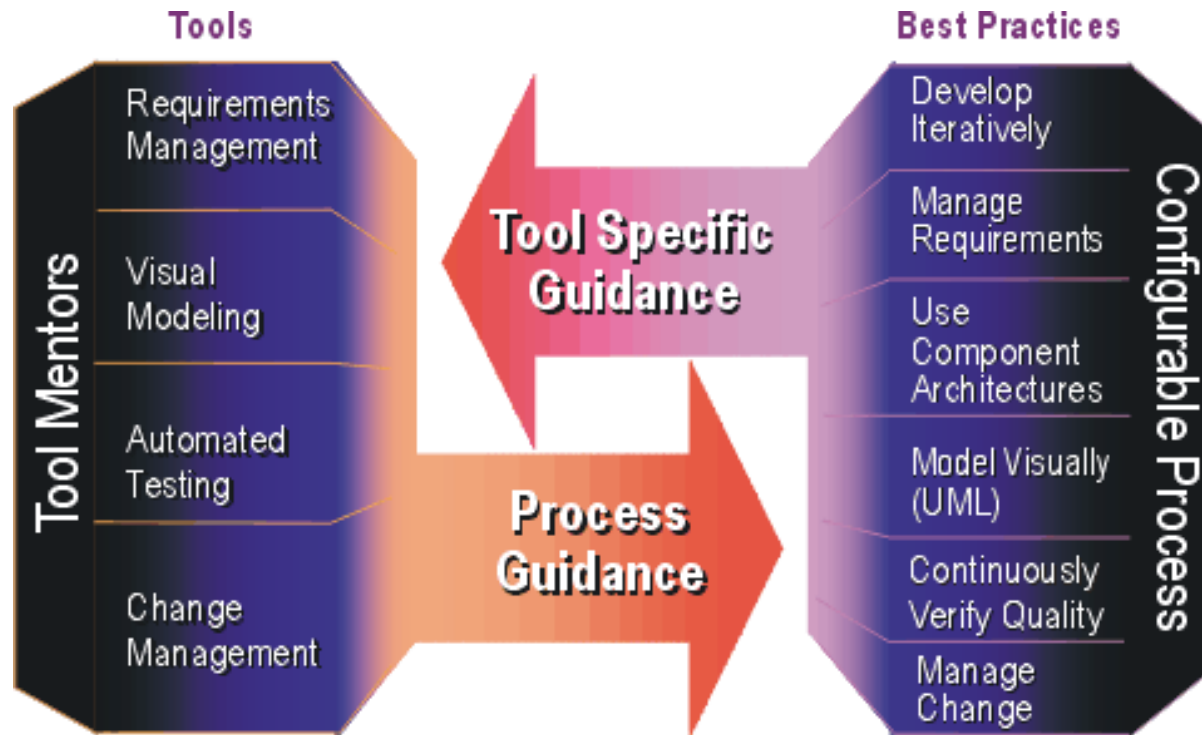


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Questions