

# Introduction to Change Management and SDLC

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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?

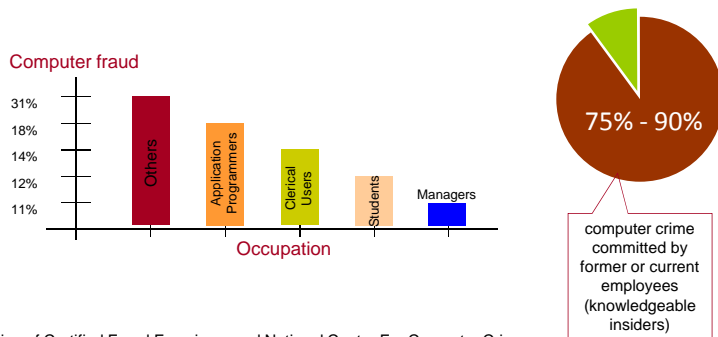
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## Why change management and its significance?

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Total fraud losses in the United States estimated to be \$994 billion in 2008  
Of all the computer crimes reported:

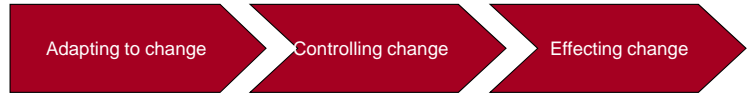


Source: Association of Certified Fraud Examiners and National Center For Computer Crime

# Why Change Management and its significance?

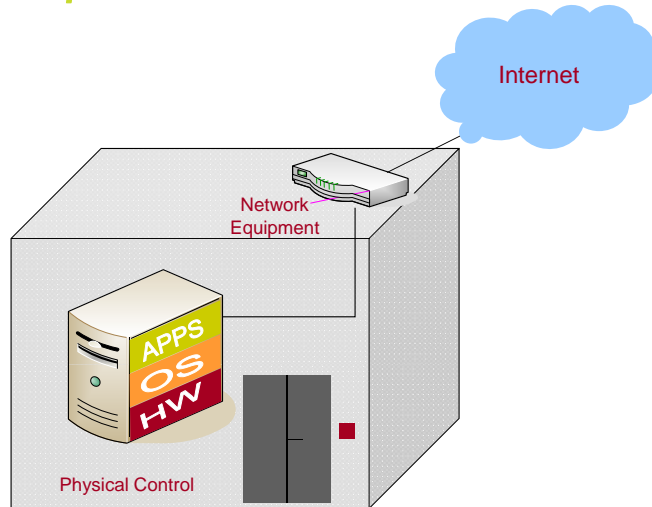
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Change management – it is significant because it helps an organization to be efficient



# 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
  - New releases
  - Bug fixes
- **Application configuration changes**
- **Database changes**
  - Schema changes
  - Database upgrades (version upgrade)

## Types of changes

### Physical access change

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

## Types of changes

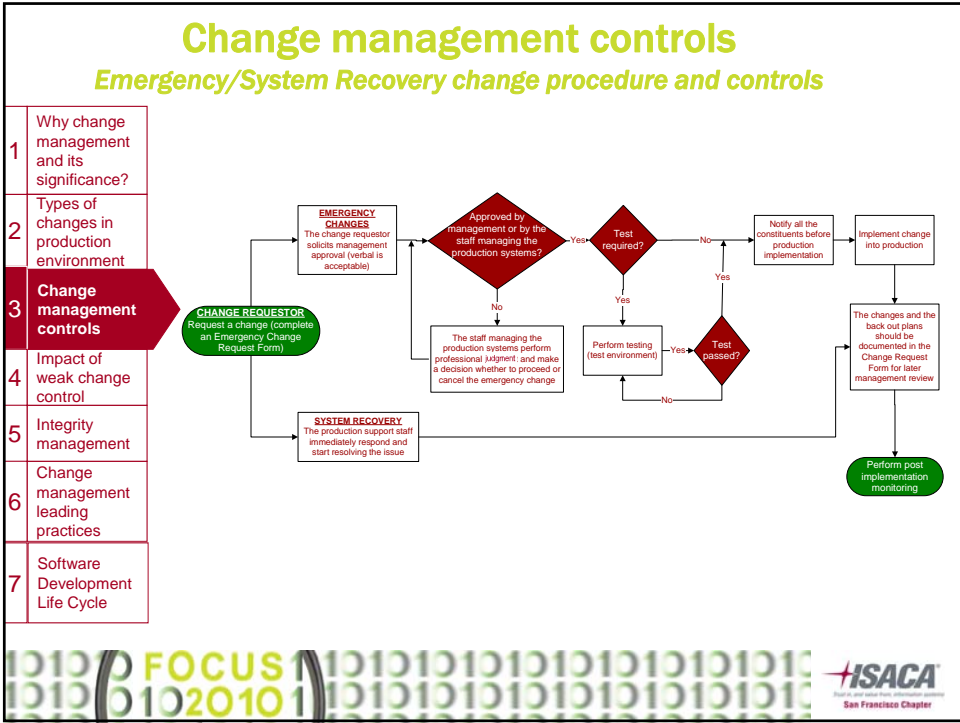
### Logical access change

1	Why change management and its significance?	<ul style="list-style-type: none"> <li>○ OS Access Change           <ul style="list-style-type: none"> <li>– privileged access to production/mission-critical server</li> </ul> </li> <li>○ Application Access Change           <ul style="list-style-type: none"> <li>– privileged access to production/mission-critical application</li> </ul> </li> <li>○ Network Access Change           <ul style="list-style-type: none"> <li>– privileged access to network equipment</li> </ul> </li> </ul>
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## Change management controls

### Planned/routine maintenance changes procedure and controls

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## Impact of weak change controls

1	Why change management and its significance?	<p style="font-size: 1.2em; font-weight: bold;">Potential for <b>system outages</b></p> <p style="font-size: 1.2em; font-weight: bold;">Prone to <b>unplanned, unauthorized and undocumented</b> changes</p> <p style="font-size: 1.2em;">– Unauthorized and undocumented changes Causes unexplained additional problems or outages</p>
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## 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

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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



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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

1	Why change management and its significance?	<ul style="list-style-type: none"> <li>○ Change management policy, procedure and standards</li> <li>○ Change request management</li> <li>○ Approval process</li> <li>○ Deployment management</li> <li>○ Change result management</li> <li>○ Monitor application and networks</li> </ul>
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## Change management leading practices

1	Why change management and its significance?	<p><i>Change management policy, procedure and standards</i></p> <ul style="list-style-type: none"> <li>○ Prioritize/categorize changes based on downtime, lead time, type of services and severity of the change (Low, Medium, High Urgent)</li> </ul>
2	Types of changes in production environment	<ul style="list-style-type: none"> <li>○ Roles and responsibilities                             <ul style="list-style-type: none"> <li>– Define and designate qualified personnel's roles</li> <li>– Segregation of duties (SOD)</li> <li>– Communication</li> <li>– Enforce change-management process</li> </ul> </li> </ul>
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## Change management leading practices

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*Change Request Management*

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






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*Approval Process*

- **Appropriate approval should be obtained between the different phases of change management process**
- **Management approval should be documented**

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### Deployment Management

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



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### Result management

- 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

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### Monitor application and networks

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

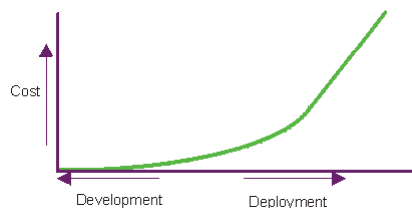


## Software Development Life Cycle

### 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

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○ Waterfall model

```

graph TD
    SR[SYSTEM REQUIREMENTS] --> SWR[SOFTWARE REQUIREMENTS]
    SWR --> AN[ANALYSIS]
    AN --> PD[PROGRAM DESIGN]
    PD --> CO[CODING]
    CO --> TE[TESTING]
    TE --> OP[OPERATIONS]
    
```

# Software Development Life Cycle

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○ Iterative model

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

```

graph TD
    BM[Business Modeling] --> R[Requirements]
    R --> AD[Analysis & Design]
    AD --> I[Implementation]
    I --> T[Test]
    T --> D[Deployment]
    D --> E[Evaluation]
    E --> ENV[Environment]
    ENV --> CCM[Config. & Change Management]
    CCM --> BM
    
```

Illustration courtesy of Rational Unified Process

# Software Development Life Cycle

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### ○ Prototyping

**Prototyping Methodology**

# Software Development Life Cycle

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### ○ V Model



# Software Development Life Cycle

*Tools to better manage change*

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- Requirements Management
- Visual Modeling
- Automated Testing
- Change Management



## Course Review

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- Software Development Life Cycle (SDLC)



## Questions?



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## Contact Information

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