

# 02 Requirements Phase

SECURAA Security Documentation

## SECURAA Secure SDLC - Requirements & Planning Phase

### Security Requirements Gathering and Threat Modeling

### Document Control

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### Phase Overview

The Requirements & Planning Phase is the foundation of SECURAA's secure development lifecycle. During this phase, we identify security requirements, assess risks, model threats, and establish security acceptance criteria for the feature or project.

## Phase Objectives

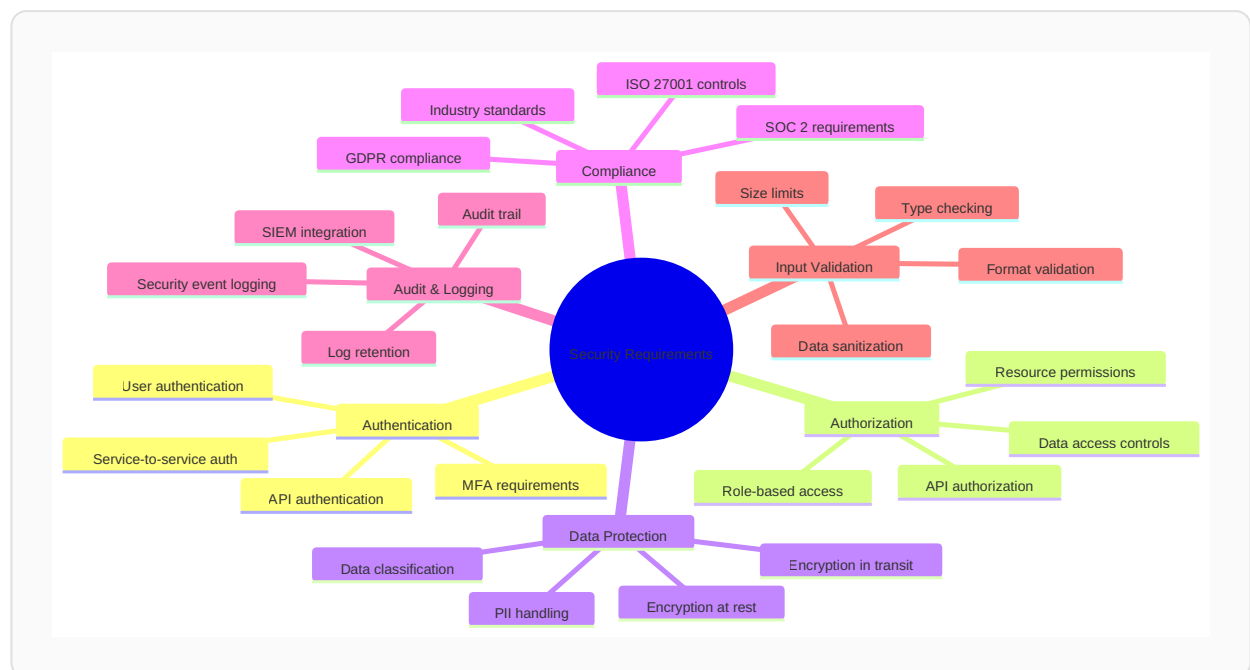
1. **Define Security Requirements** - Establish clear, testable security requirements
2. **Conduct Threat Modeling** - Identify potential security threats and vulnerabilities
3. **Assess Risks** - Evaluate and prioritize security risks
4. **Plan Security Controls** - Design appropriate security controls and countermeasures
5. **Establish Acceptance Criteria** - Define measurable security success criteria

## Phase Duration

- **Simple Feature:** 1-2 days
- **Medium Feature:** 3-5 days
- **Major Feature/Project:** 1-2 weeks

# Security Requirements Gathering

## Types of Security Requirements



## Security Requirements Template

For each feature, we document:

```
## Security Requirements: [Feature Name]

### 1. Authentication Requirements
- [ ] Define authentication method (JWT, OAuth, API key, etc.)
- [ ] Specify authentication endpoints
- [ ] Define session management
- [ ] Specify MFA requirements (if applicable)

### 2. Authorization Requirements
- [ ] Define roles and permissions
- [ ] Specify resource access controls
- [ ] Define API authorization model
- [ ] Document least privilege implementation

### 3. Data Protection Requirements
- [ ] Identify sensitive data elements
- [ ] Specify encryption requirements (at rest/in transit)
- [ ] Define data classification
- [ ] Specify data retention and deletion policies

### 4. Input Validation Requirements
- [ ] Define input validation rules
- [ ] Specify allowed data types and formats
- [ ] Define size and length limits
- [ ] Specify sanitization requirements

### 5. Audit & Logging Requirements
- [ ] Define security events to log
- [ ] Specify log retention period
- [ ] Define log format and fields
- [ ] Specify SIEM integration requirements

### 6. Compliance Requirements
- [ ] Identify applicable compliance frameworks
- [ ] Document specific compliance controls
- [ ] Define compliance testing requirements
- [ ] Specify documentation requirements

### 7. Security Testing Requirements
- [ ] Define SAST requirements
- [ ] Define DAST requirements
- [ ] Specify penetration testing needs
- [ ] Define security acceptance tests
```

## Example: New Integration Security Requirements

**Feature:** ServiceNow Advanced Integration

## Security Requirements:

```
authentication:
  method: OAuth 2.0
  token_type: Bearer
  token_expiry: 3600 seconds
  refresh_token: Required
  mfa_enforcement: Required for admin operations

authorization:
  roles:
    - integration_admin: Full access to integration configuration
    - integration_user: Read-only access to integration data
    - integration_operator: Execute integration tasks
  api_permissions:
    - endpoint: /api/integrations/servicenow/config
      required_role: integration_admin
    - endpoint: /api/integrations/servicenow/execute
      required_role: integration_operator

data_protection:
  sensitive_data:
    - ServiceNow credentials (encrypted with AES-256)
    - API tokens (stored in AWS Secrets Manager)
    - Customer ticket data (encrypted at rest)
  encryption:
    at_rest: AES-256-GCM
    in_transit: TLS 1.3
  data_classification: Confidential

input_validation:
  ticket_id:
    type: string
    pattern: "^[A-Z]{3}[0-9]{7}$"
    max_length: 10
  priority:
    type: enum
    values: [1, 2, 3, 4, 5]
  description:
    type: string
    max_length: 10000
    sanitization: HTML entities escaped

audit_logging:
  events:
    - Integration configuration changes
    - Authentication success/failure
    - API calls with parameters
    - Data access events
```

```
retention: 365 days
format: JSON
destination: CloudWatch Logs + SIEM
```

compliance:

frameworks:

- SOC 2 CC6.1 (Logical Access)
- ISO 27001 A.9.4.1 (Information Access Restriction)

controls:

- Access control enforcement
- Encryption of sensitive data
- Audit logging

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## Threat Modeling

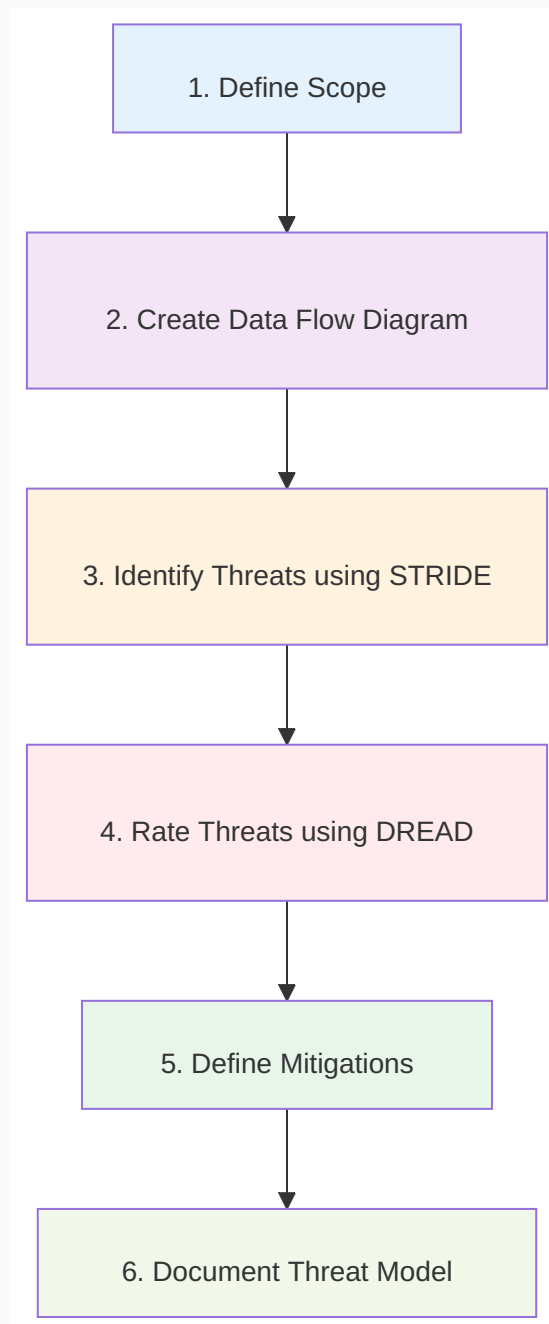
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We use the STRIDE methodology for threat modeling:

### STRIDE Threat Categories

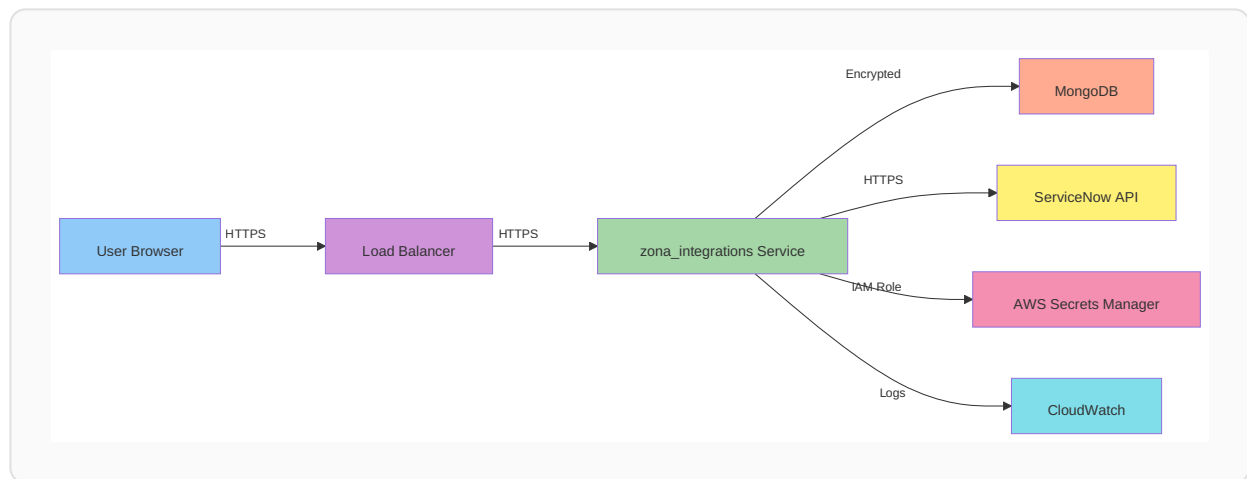
Category	Description	Example Threats
<b>Spoofing</b>	Impersonating someone/ something	Forged authentication tokens, fake API calls
<b>Tampering</b>	Modifying data or code	SQL injection, configuration tampering
<b>Repudiation</b>	Denying an action was performed	Missing audit logs, unsigned transactions
<b>Information Disclosure</b>	Exposing information	Data leaks, exposed credentials
<b>Denial of Service</b>	Making system unavailable	Resource exhaustion, DDoS attacks
<b>Elevation of Privilege</b>	Gaining unauthorized access	Privilege escalation, broken access control

## Threat Modeling Process



### Step 1: Data Flow Diagram

**Example:** Integration Data Flow



## Step 2: Identify Threats

### STRIDE Analysis for Integration Service:

Component	Spoofing	Tampering	Repudiation	Info Disclosure	DoS	Elevation
<b>API Endpoint</b>	Forged JWT tokens	Modified API parameters	Missing request logs	Exposed error messages	Request flooding	Broken authorization
<b>Database</b>	Fake service accounts	NoSQL injection	No change tracking	Unencrypted data	Connection exhaustion	SQL injection → admin
<b>External API</b>	Fake ServiceNow	MITM attacks	Missing audit	API key leakage	Rate limiting abuse	Using stolen credentials
<b>Secrets Storage</b>	Unauthorized access	Modified secrets	No access logs	Plaintext storage	-	IAM policy exploit

## Step 3: Rate Threats (DREAD)

**DREAD Scoring:** - **D**amage Potential (0-10) - **R**eproducibility (0-10) - **E**xploitability (0-10) - **A**ffected Users (0-10) - **D**iscoverability (0-10)

### Example Threat Rating:

```

threat_id: T-001
threat_name: "SQL Injection in Integration Query"
category: Tampering
dread_score:
  damage: 9      # Could expose all customer data
  
```

```
reproducibility: 8 # Easy to reproduce with known techniques
exploitability: 7 # Requires some SQL knowledge
affected_users: 10 # All customers affected
discoverability: 6 # Moderate - requires API access
total: 40/50 # High Risk
risk_level: HIGH
mitigation_required: YES
```

## Step 4: Define Mitigations

### Mitigation Strategy Template:

```
### Threat: [Threat Name]
**Risk Level**: [Critical/High/Medium/Low]
**STRIDE Category**: [Spoofing/Tampering/etc.]

#### Mitigations:
1. **Preventive Controls**
  - [Control 1: e.g., Input validation]
  - [Control 2: e.g., Parameterized queries]

2. **Detective Controls**
  - [Control 1: e.g., SQL injection detection in WAF]
  - [Control 2: e.g., Anomaly detection in logs]

3. **Corrective Controls**
  - [Control 1: e.g., Automatic query termination]
  - [Control 2: e.g., Incident response playbook]

#### Residual Risk: [After mitigations applied]
```

## Threat Model Document Template

```
# Threat Model: [Feature/Component Name]

## Overview
- **Date**: [Date]
- **Participants**: [Names]
- **Scope**: [What's included/excluded]
- **Assets**: [What we're protecting]

## Data Flow Diagram
[Include diagram]

## Threats Identified

### T-001: [Threat Name]
```



- **Category**: STRIDE category
- **Risk**: HIGH/MEDIUM/LOW
- **Description**: [Detailed description]
- **Attack Scenario**: [How it could be exploited]
- **Mitigation**: [How we'll prevent/detect/respond]
- **Residual Risk**: [Risk after mitigation]
- **Owner**: [Who's responsible]
- **Due Date**: [When mitigation must be implemented]

[Repeat for each threat]

## ## Security Requirements

[Derived from threats]

## ## Assumptions

[Security assumptions made]

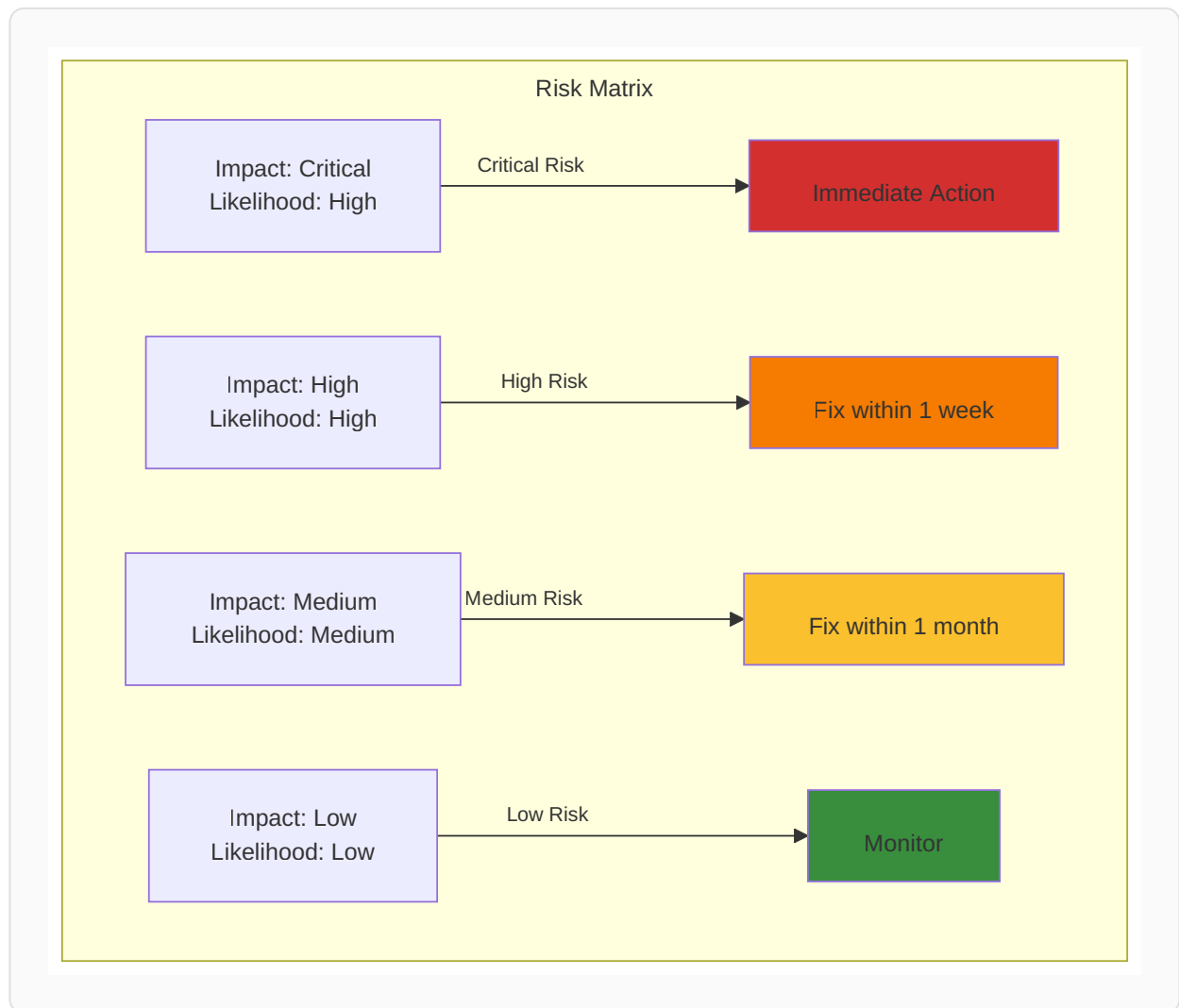
## ## External Dependencies

[Third-party services, libraries, etc.]

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# Risk Assessment

## Risk Rating Matrix



## Risk Assessment Process

### 1. Identify Assets

- Data assets (customer data, credentials, PII)
- System assets (servers, databases, APIs)
- Business assets (reputation, compliance, revenue)

### 2. Identify Threats

- From threat modeling (STRIDE analysis)
- From historical incidents
- From industry threat intelligence

### 3. Identify Vulnerabilities

- Technical vulnerabilities (software flaws)

- Configuration vulnerabilities (misconfigurations)
- Process vulnerabilities (weak procedures)

#### 4. Calculate Risk

- Risk = Likelihood × Impact
- Use consistent scoring methodology
- Document assumptions

#### 5. Prioritize Risks

- Critical risks: Address immediately
- High risks: Address in current sprint
- Medium risks: Address in next release
- Low risks: Monitor and reassess

## Risk Register Template

```
risk_id: RISK-001
risk_name: "Hardcoded API Credentials"
category: Information Disclosure
asset: "Integration Service Credentials"
threat: "Credential theft from source code"
vulnerability: "Credentials stored in configuration files"

likelihood: HIGH
  reasoning: "Configuration files are in version control"
  score: 8/10

impact: CRITICAL
  reasoning: "Could compromise all customer integrations"
  score: 10/10

risk_score: 80/100
risk_level: CRITICAL

current_controls:
  - "Private Git repository"
  - "Access controls on repository"

planned_mitigations:
  - mitigation: "Migrate to AWS Secrets Manager"
    owner: "DevOps Team"
    due_date: "2025-11-20"
    status: "In Progress"
  - mitigation: "Remove credentials from version control history"
    owner: "Security Team"
    due_date: "2025-11-22"
    status: "Not Started"
```

```
residual_risk: MEDIUM
  reasoning: "After migration, only authorized services can access"
  score: 30/100
```

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## Compliance Requirements

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### Compliance Framework Mapping

For each feature, identify applicable compliance requirements:

#### SOC 2 Type II Mapping

```
feature: "User Authentication System"

soc2_controls:
  CC6.1:
    requirement: "Logical and Physical Access Controls"
    implementation:
      - "MFA for administrative access"
      - "Role-based access control"
      - "Session timeout after 30 minutes"
    evidence:
      - "IAM policy configurations"
      - "Authentication logs"
      - "Access review reports"

  CC6.6:
    requirement: "Encryption at Rest"
    implementation:
      - "AES-256 encryption for passwords (bcrypt)"
      - "Encrypted database volumes"
      - "Encrypted backup storage"
    evidence:
      - "Encryption configuration documentation"
      - "Database encryption verification"

  CC7.2:
    requirement: "System Monitoring"
    implementation:
      - "Failed login attempt monitoring"
      - "Unusual access pattern detection"
      - "Real-time security alerting"
    evidence:
      - "CloudWatch dashboards"
```

- "SIEM integration logs"
- "Alert configurations"

## ISO 27001 Mapping

feature: "Data Processing Module"

iso27001\_controls:

A.9.4.1:

requirement: "Information Access Restriction"

implementation:

- "Need-to-know access principle"
- "Data classification enforcement"
- "Access logging and monitoring"

A.10.1.1:

requirement: "Policy on Cryptographic Controls"

implementation:

- "TLS 1.3 for all communications"
- "AES-256-GCM for data at rest"
- "Secure key management (AWS KMS)"

A.14.2.5:

requirement: "Secure System Engineering Principles"

implementation:

- "Secure coding standards"
- "Security code review"
- "Automated security testing"

## GDPR Requirements

feature: "Customer Data Management"

gdpr\_requirements:

data\_protection\_by\_design:

- "Privacy requirements in initial design"
- "Data minimization principles"
- "Purpose limitation enforcement"

data\_subject\_rights:

- "Right to access implementation"
- "Right to erasure (delete) capability"
- "Right to portability (export) feature"

security\_of\_processing:

- "Encryption of personal data"
- "Regular security testing"

- "Access controls and authentication"

breach\_notification:

- "Security event logging"
- "Automated breach detection"
- "72-hour notification capability"

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## Security Acceptance Criteria

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Security acceptance criteria must be defined and agreed upon before development begins.

### Acceptance Criteria Template

Feature: Secure Integration Authentication

Background:

Given the integration service is running  
And security monitoring is enabled

Scenario: Successful authentication with valid credentials

Given a valid API key for ServiceNow integration  
When I call the integration endpoint with the API key  
Then the request should be authenticated successfully  
And the authentication event should be logged  
And the response should not contain sensitive information

Scenario: Failed authentication with invalid credentials

Given an invalid API key  
When I call the integration endpoint  
Then the request should be rejected with 401 status  
And the failed authentication should be logged  
And the user should be locked out after 5 failures  
And security team should be alerted after 3 failures

Scenario: Authorization check for admin operations

Given a user with "integration\_operator" role  
When I attempt to modify integration configuration  
Then the request should be rejected with 403 status  
And the authorization failure should be logged

Scenario: Encryption of sensitive data

Given integration credentials need to be stored  
When credentials are saved to the database  
Then they must be encrypted with AES-256

And the encryption key must be stored in AWS Secrets Manager  
And unencrypted credentials must never be logged

Scenario: Input validation

Given malicious input with SQL injection attempt  
When I submit the input to the integration endpoint  
Then the input should be rejected  
And the injection attempt should be logged as security event  
And the request should return 400 Bad Request

Scenario: Rate limiting enforcement

Given a user makes 101 requests in 1 minute  
When the 101st request is made  
Then the request should be rate limited  
And the response should be 429 Too Many Requests  
And the rate limit event should be logged

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## Requirements Phase Checklist

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Before proceeding to the Design Phase, ensure:

### Security Requirements

- . ☐ All security requirements documented
- . ☐ Authentication requirements defined
- . ☐ Authorization model specified
- . ☐ Data protection requirements identified
- . ☐ Input validation requirements defined
- . ☐ Audit logging requirements specified
- . ☐ Compliance requirements identified

### Threat Modeling

- . ☐ Data flow diagram created
- . ☐ STRIDE analysis completed
- .

- ☐  
Threats identified and documented
- ☐  
Threats rated using DREAD
- ☐  
Mitigations defined for high/critical threats
- ☐  
Threat model reviewed by security team

## **Risk Assessment**

- ☐  
Assets identified
- ☐  
Risks assessed and rated
- ☐  
Risk register updated
- ☐  
Mitigation plans created
- ☐  
Residual risks accepted

## **Compliance**

- ☐  
Applicable compliance frameworks identified
- ☐  
Compliance requirements mapped
- ☐  
Compliance controls defined
- ☐  
Evidence requirements documented

## **Acceptance Criteria**

- ☐  
Security acceptance criteria defined
- ☐  
Criteria are measurable and testable
- ☐  
Criteria reviewed by security team
- ☐  
Criteria approved by product owner

## **Documentation**

- ☐



Security requirements document created

- ☐ Threat model document completed
- ☐ Risk assessment documented
- ☐ All documents reviewed and approved

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## Tools & Templates

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### Tools Used in This Phase

Tool/Process	Purpose	Owner
Threat Modeling Workshop	Collaborative threat identification	Security Team
JIRA Security Ticket	Track security requirements	Product Team
Confluence	Document threat models and requirements	Engineering Team
Risk Register (Excel/Confluence)	Track and manage risks	Security Team

### Document Templates

Available templates: - Security\_Requirements\_Template.md - Threat\_Model\_Template.md - Risk\_Assessment\_Template.yaml - Security\_Acceptance\_Criteria\_Template.feature

Location: /SECURAA\_SDLC/templates/






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## Phase Exit Criteria

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The Requirements & Planning Phase is complete when:

1. ☒ Security requirements are fully documented and approved
2. ☒ Threat model is completed and reviewed by security team

3.  **High and critical risks have mitigation plans**
  4.  **Compliance requirements are identified and mapped**
  5.  **Security acceptance criteria are defined and agreed upon**
  6.  **All required documentation is complete and stored**
  7.  **Security team has signed off to proceed to Design Phase**
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## Next Phase

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Once all exit criteria are met, proceed to [03\\_Design\\_Phase.md](#) for secure architecture design and security review.

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*This document is part of the SECURAA Secure SDLC documentation suite. For questions, contact [security@securaa.com](mailto:security@securaa.com)*