



# HRS Grants Module Requirements Specifications

Version v1.0, January 2026

## Revision History

Version	Date	Author	Remarks
1.0	January 2026	HRS team	Initial Version for HRS Hackathon
1.1	January 2026	HRS team	Corrected TOC numbering

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# 1. Overview

## 1.1 Purpose Statement

The Grants module is designed to systematize and streamline the sponsored funding process for research institutions, from proposal creation through award management and closeout. It provides comprehensive capabilities for managing proposals, budgets, awards, compliance requirements, SF424 form generation, and integration with external systems (Grants.gov, financial systems).

## 1.2 Key Guidelines for Grants module Design and Development

- a. Technology stack considerations
  - i. UX designs using Figma or any other modern UX design tool
  - ii. Frontend UI implementation
    - 1. ReactJS / NextJS / Typescript stack
  - iii. Backend implementation
    - 1. Golang
    - 2. DB choice, pick the most optimal open-source DB options for the described requirements
    - 3. Cache, wherever required
- b. Design considerations
  - i. Scalable modern enhanceable architecture and design, keeping in mind:
    - 1. An architecture that allows AI-augmented features to be easily built now and in the coming years
    - 2. Ease of maintainability
    - 3. Ease of enhanceability
    - 4. Ease of debuggability
    - 5. Architecture should stand the test of time for at least the next 5 - 7 years, in terms of modern architecture and design principles
- c. Code considerations
  - i. Code coverage, in terms of Unit testing  $\geq 90\%$
  - ii. Code coverage, in terms of Integration and System testing  $\geq 90\%$
  - iii. Test automation suite testing all APIs for both happy and negative scenarios
  - iv. Highly readable code with appropriate commenting of critical flows
  - v. Document generated for all APIs clearly explaining their usage.
  - vi. Modularized code with common code extracted into libraries which can be easily used by different microservices
  - vii. Use linters and static analyzers as well as dynamic analyzers to ensure strong code quality
  - viii. Ensure secure coding standards are followed. All frontend and API endpoints need to be threat-safe.
- d. Scalability
  - i. Scaling to support 5000+ SaaS tenants

- ii. Support for 500 concurrent users per tenant - operations via UI and API
- e. Performance
  - i. UI response times  $\leq 1$  sec
  - ii. API response times  $\leq 100$  ms
  - iii. DB indexing, caching
- f. Security
  - i. Compliant and aligned with the latest regulations listed below:
    - 1. FedRamp
    - 2. NIST
    - 3. HIPAA
    - 4. OWASP
    - 5. SOC2
  - ii. System SHALL authenticate all API requests via JWT tokens
  - iii. System SHALL authorize actions based on
    - Rights:** User must have required right
    - Associations:** Users must be associated with an entity (PI, PC, Admin, etc.)
    - State:** Entity must be in editable state
    - Tenant:** User must belong to same tenant as entity
  - iv. System SHALL enforce tenant isolation
- g. Observability
  - i. Logging with well-defined levels: DEBUG, INFO, WARN, ERROR
    - 1. Ensure no PII or user/customer details is explicitly logged
    - 2. Any information that has to be logged should be redacted
    - 3. All logs should have timestamp, service name and endpoint logged
  - ii. Traceability for end-end control flow logging
  - iii. Telemetry:
    - Following critical metrics to be captured:
    - 1. CPU usage
      - a. System-wide
      - b. Per microservice basis
    - 2. Memory usage
      - a. System-wide
      - b. Per microservice basis
    - 3. Disk IO usage
      - a. System-wide
      - b. Per microservice basis
    - 4. Storage usage
      - a. System-wide
      - b. Per microservice basis
    - 5. Number of times API is invoked
      - a. Trends on different APIs usage
      - b. APIs taking max time
      - c. APIs taking min time
      - d. Avg API response times, per API

- e. API execution failure trends
      - i. Which APIs fail the most
    - f. Mapping the above metrics to Feature Usage patterns
  - 6. Which features are triggered from UI the most, or the least
    - a. Metrics on which UI buttons are triggered the most, and the least
    - b. Metrics on which UI pages are visited the most, and the least
    - c. Mapping the above metrics to Feature Usage patterns
  - 7. UI response time metrics
    - a. Page load times
    - b. Response times for various actions
    - c. Creation of trends charts for response times & page load times for various UI-driven actions
  - iv. Observability Dashboard
    - 1. Use open-source tool for log storage and viewing
    - 2. Modern UI with widgets explaining the telemetry and traceability data captured above, with appropriate co-relation
    - 3. Use open-source tools as required for the observability requirements listed above
  - h. Deployment and Configuration
    - i. Provide a single docker file, which runs both frontend and backend along with necessary dependencies like DB, cache etc

## 2. System Goals

The system needs to be designed keeping in mind the following goals:

1. **Proposal Lifecycle Management:** Create, review, approve, and submit research proposals through defined workflow states
2. **Multi-stage Review Process:** Support pre-submission, unit review, central review, and post-submission workflows
3. **Budget Management:** Manage complex budgets with personnel costs, general costs, subaward costs, trainee costs, indirect costs, and cost sharing
4. **Award Management:** Create awards from proposals, manage award modifications, track deliverables, and handle closeout
5. **SF424 Form Generation:** Generate and submit SF424 forms to Grants.gov via system-to-system integration
6. **Compliance Tracking:** Track Institutional Review Board (IRB), Institutional Animal Care and Use Committee (IACUC), Institutional Bio-Safety Committee (IBC), and other compliance requirements
7. **Multi-tenant Operations:** Support multiple institutions with tenant isolation via Row-Level Security (RLS)
8. **Role-based Access Control:** Enforce granular permissions for different user roles (PI, PC, Grants Admin, Specialist, etc.)
9. **Change Tracking:** Maintain audit trails of all changes to proposals, budgets, and awards
10. **Document Management:** Store and version proposal/award documents and snapshots
11. **Financial Integration:** Integrate with external financial systems for account creation and reconciliation

## 3. Actors and Use Cases

### 3.1 Actor Definitions

#### 3.1.1 Principal Investigator (PI)

- **Rights:**
  - Create proposals
  - Edit related proposals in unit-editable states
  - Edit all budgets in unit-editable states
  - Certify proposals (self-certification)
  - Edit SF424 forms in unit-editable states

#### 3.1.2 Primary Contact (PC)

- **Rights:**
  - Edit related proposals in unit-editable states
  - Edit all budgets in unit-editable states
  - Manage proposal personnel
  - Edit SF424 forms in unit-editable states

#### 3.1.3 Grants Administrator (Unit Admin)

- **Rights:**
  - Multiple unit-level rights
  - Edit proposals and budgets for their responsible unit
  - Assign reviewers
  - Approve proposals in unit review
  - Request clarifications
  - Manage unit access
  - Edit SF424 forms in unit-editable states

#### 3.1.4 Grants Specialist (Central Staff)

- **Rights:**
  - Edit proposals in most states (except post-submission states)
  - Assign central staff
  - Request clarifications
  - Certify proposals for others
  - Record submission to sponsor
  - Manage post-submission updates
  - Create awards
  - Validate and submit SF424 forms
  - Manage financial integration
  - Full edit access to awards in central states

- **Non-Editable States**

- SubmittedtoSponsor
- StatusUpdateProvided
- Discarded
- AwardReceived
- AwardAnticipated
- AwardAnticipatedAdvancedAccount
- WithdrawnfromSponsor
- NotFunded
- Invited
- NotInvited
- Awarded

### *3.1.5 Grants Data Manager*

- **Rights:** *grants-data-mgr-can-initiate-data-updates*

- Edit proposals in CentralUpdates state
- Initiate data updates
- Complete data updates
- Manage proposal and award states
- Assign central staff
- Record submission to sponsor
- Discard proposals
- Create awards

### *3.1.6 Award Approver*

- **Rights:**

- Approve awards in final review states
- Edit awards in final review and final modification review
- Request clarifications
- Create additional financial accounts
- Manage financial integration
- Close out awards
- Create award modification versions

### *3.1.7 Budget Investigator*

- **Rights:** *grnts-edit-single-budget-investigator-unit-editable-states*

- Edit specific assigned budget in unit-editable states
- View budget details
- Manage budget allocations

### *3.1.8 Additional Access Personnel*

- **Rights:**

- Configurable editor or viewer rights

- Edit proposals (if editor access granted)
- Edit specific budgets (if budget editor access granted)
- View proposal details (if viewer access)
- Edit SF424 forms (if editor access in unit-editable states)

## 3.2 Use Case Scenarios

### 3.2.1 UC-001: Create and Submit New Proposal

**Actors:** PI, PC, Grants Administrator, Grants Specialist

**Flow:**

1. PI/PC creates proposal in **PreSubmission** state
2. PI/PC completes general information, personnel, compliance, budgets
3. PI/PC submits for review → transitions to **UnitReview** (if utilized) or **CentralReview**
4. Grants Admin reviews in **UnitReview**:
  - a. Option A: Approves → transitions to **CentralReview**
  - b. Option B: Requests clarification → transitions to **UnitReviewClarificationRequested** → back to **PreSubmission**
5. Specialist reviews in **CentralReview**:
  - a. Option A: Approves → transitions to **SubmissionConfirmationRequested**
  - b. Option B: Requests clarification → transitions to **CentralReviewClarificationRequested** → back to **PreSubmission**
6. Specialist/Approver confirms submission → transitions to **SubmissionConfirmed**
7. Specialist records submission to sponsor → transitions to **SubmittedtoSponsor**

**Alternative Flows:**

- Discard proposal at any pre-submission stage → **Discarded**
- Bypass ancillary review blocks (with justification)
- Record alternate approvals (for external approvals)

### 3.2.2 UC-002: Manage Post-Submission Updates

**Actors:** Specialist, PI, PC

**Flow:**

1. Sponsor requests changes after submission
2. Specialist initiates **ManagePostSubmissionUpdate** action → **PostSubmissionUpdateRequired**
3. PI/PC makes required updates to proposal/budgets
4. Post-submission budget versions become editable
5. PI/PC completes updates → **CompletePostSubmissionUpdate** → **PostSubmissionUpdateComplete**

6. Specialist reviews and records status update → **StatusUpdateProvided**

### 3.2.3 UC-003: Create Award from Proposal

**Actors:** Specialist, Data Manager, Award Approver

**Flow:**

1. Proposal in eligible state (typically SubmittedtoSponsor or later)
2. Specialist/Data Manager executes **CreateAward** action
3. System creates award in **Initialized** state
4. Links proposal to award (proposal.associated\_award)
5. Award workflow begins → **RequestUnitUpdates** or **UnitSetup**

### 3.2.4 UC-004: Award Setup and Approval

**Actors:** PI, Grants Admin, Specialist, Award Approver

**Flow:**

1. Award in **Initialized** → **UnitSetup** state
2. Specialist requests unit updates → **UnitModification**
3. Unit personnel complete award details, compliance, financial setup
4. Submit unit updates → **CentralReview**
5. Specialist reviews:
  - a. Option A: Request clarification → **ClarificationsRequestedCentralReview** → back to UnitModification
  - b. Option B: Approve → **FinalReview**
6. Award Approver reviews in **FinalReview**:
  - a. Option A: Request clarification → **ClarificationsRequestedFinalReview** → back to UnitModification
  - b. Option B: Approve → Depending on financial integration status:
    - i. With FSI: **FsiPending** → **Active** (on success) or **FsiError** (on failure)
    - ii. Without FSI: **Active**

### 3.2.5 UC-005: Award Modification

**Actors:** Specialist, Grants Admin, PI

**Flow:**

1. Award in **Active** state
2. Modification needed (e.g., budget change, scope change, no-cost extension)
3. Specialist initiates modification → **ModificationInitialized**



4. Creates new award version
5. Unit personnel modify → **UnitModification** (for modifications)
6. Review process → **CentralModificationReview** → **FinalModificationReview**
7. Approve → Updates active award, archives previous version

### *3.2.6 UC-006: SF424 Form Generation and Submission*

**Actors:** Specialist, Business Analyst, PI, PC

**Flow:**

1. Proposal in appropriate state with complete data
2. System validates SF424 data completeness
3. Specialist/Business Analyst executes **ValidateSf424** action
4. System marks sf424\_validation\_status
5. If locked by validation, Specialist can **UnlockSF424**
6. Specialist generates XML using SF424 service
7. Specialist submits via **SubmitSf424** action
8. System calls Grants.gov API
9. Stores submission XML, documents, and response
10. Records submission status in proposal

### *3.2.7 UC-007: Manage Compliance Requirements*

**Actors:** PI, Specialist, Compliance Officer

**Flow:**

1. Proposal or award requires compliance review
2. System presents compliance forms (IRB, IACUC, IBC, ESC, Agreements)
3. PI/research team provides compliance protocol information
4. Compliance data persistence:
  - a. *irb\_data*: IRB protocols and approvals
  - b. *iacuc\_data*: Animal use protocols
  - c. *ibc\_data*: Biohazard protocols - *embryonic\_stem\_cell\_data*: ESC line information
  - d. *proposal\_agreement\_data*: Data use agreements, MTAs
5. Ancillary review workflow blocks submission until requirements met
6. Option to bypass block with justification (bypass\_ancillary\_block, bypass\_ancillary\_block\_reason)

### *3.2.8 UC-008: Budget Management Across Versions*

**Actors:** PI, Budget Investigator, Grants Admin

**Flow:**

1. Create initial budget (version: "Proposal")
2. Budget editable in unit-editable states
3. If post-submission update required, create post-submission budget version
4. Post-submission budgets editable in PostSubmissionUpdateRequired and PostSubmissionUpdateComplete states
5. Calculate totals across budget periods
6. Support multiple budgets per proposal (subawards, consortiums)
7. Track budget counts at proposal level

### *3.2.9 UC-009: Personnel Cost Management*

**Actors:** Personnel with salary view rights, Grants Admin

**Flow:**

1. Personnel costs stored in budgets.personnel\_costs
2. Access controlled by special rights:
  - a. *grnts-read-proposal-personnel-costs-page*
  - b. *grnts-edit-personnel-costs-page-related-budgets*
  - c. *grnts-edit-proposal-personnel-costs-page-unit-editable-states*
3. View restricted to personnel with proper rights and associations
4. Edit restricted to unit-editable states and specific roles

### *3.2.10 UC-010: Financial Account Integration*

**Actors:** Specialist, Award Approver, Financial System

**Flow:**

1. Award approved → creates financial account(s)
2. Account details include:
  - a. *external\_account\_id*: ID in external financial system
  - b. *financial\_system\_id*: Target financial system
  - c. *account\_allocations*: Budget allocations by period
  - d. *account\_idc\_details*: Indirect cost setup
  - e. *account\_activity\_setup*: Activity codes, cost centers
3. Submit account to financial system
4. Award enters **FsiPending** state
5. External system processes:
  - a. Success: Award → **Active**, populate *external\_account\_id*
  - b. Failure: Award → **FsiError**, populate *account\_errors*
6. Specialist can manage integration via **ManageFinancialIntegration** action

## 4. Functional Requirements

### 4.1 Proposal Management

#### *FR-001: Proposal Creation*

**Description:** System SHALL allow authorized users to create new proposals with required fields.

**Details:**

- Required fields: principalInvestigator, responsibleUnit, shortTitle, longTitle, applicationType, proposalPhase, primaryProjectPurpose
- System-generated: proposal\_id, id (PROP#####), hrn (Huron Resource Name), dateCreated, dateModified
- Default state: PreSubmission
- Multi-tenant: tenant\_id enforced via RLS

#### *FR-002: Proposal States and Transitions*

**Description:** System SHALL support distinct proposal states with defined transitions.

**States:**

- PreSubmission
- Discarded
- CentralReview
- UnitReview
- SubmittedtoSponsor
- UnitReviewClarificationRequested
- CentralReviewClarificationRequested
- SubmissionConfirmationRequested
- SubmissionConfirmed
- PostSubmissionUpdateRequired
- AwardAnticipatedAdvancedAccount
- WithdrawnfromSponsor
- NotFunded
- Invited
- NotInvited
- PostSubmissionUpdateComplete
- StatusUpdateProvided
- AwardReceived
- AwardAnticipated
- ManagePostSubmissionUpdate
- CentralUpdates

- Awarded

**Transition Rules:**

- State changes trigger change tracking
- Previous state stored in proposal\_state\_previous
- State transitions restricted by action permissions

*FR-003: Proposal Actions*

**Description:** System SHALL support actions that trigger state transitions or data updates.

**Key Actions:**

- Discard
- SubmitForReview
- Approve
- RequestClarification
- SubmitResponse
- CertifyProposal
- SubmissionConfirmationRequest
- RecordSubmissionToSponsor
- RecordAlternateApprovals
- ConfirmSubmission
- CreateAward
- CompletePostSubmissionUpdate
- ManagePostSubmissionUpdate
- CreateAdditionalBudget
- InitiateDataUpdate
- CompleteDataUpdate
- ValidateSf424
- UnlockSF424
- SubmitSf424
- ManageAccess
- ManageDocuments
- ManageState
- RecordStatusUpdate
- ProvideStatusUpdate

*FR-004: Proposal General Information*

**Description:** System SHALL store and manage general information for proposals.

**Fields:**

- Institution (applicant\_institution)
- Sponsors (direct\_sponsor, direct\_sponsor\_external, prime\_sponsor)
- Application type
- Proposal phase (type)
- Primary project purpose
- Research type
- Proposed dates (start, end)
- Titles (short, long)
- Responsible unit
- Submission method
- Budget management approach
- Custom properties

*FR-005: Proposal Personnel Management*

**Description:** System SHALL manage internal and external personnel assignments.

**Personnel Types:**

- Principal Investigator (required, from proposals table)
- Primary Contact (from proposal\_personnel)
- Internal personnel
- External personnel
- Additional access personnel

**Personnel Attributes:**

- Person HRN
- Role on project
- Effort percentage
- Key person designation
- Edit access flag (for additional access)

*FR-006: Unit Access and Review*

**Description:** System SHALL support unit-based access control and reviewer assignments.

**Capabilities:**

- Assign grants administrators to responsible unit
- Administrator active/inactive status
- Assign unit reviewers

- Reviewer active/inactive status
- Unit-level budget view access for reviewers

#### *FR-007: Proposal Submission Information*

**Description:** System SHALL capture submission-related information.

**Fields:**

- Submission method
- Sponsor deadline
- Internal deadline
- Submission contacts
- Funding opportunity information
- Sponsor award information
- Record of submission details

#### *FR-008: Proposal Compliance Management*

**Description:** System SHALL track compliance requirements and protocols.

**Compliance Types:**

- IRB (Institutional Review Board): irb\_data
- IACUC (Institutional Animal Care and Use Committee): iacuc\_data
- IBC (Institutional Biosafety Committee): ibc\_data
- Agreements: proposal\_agreement\_data
- Other Projects: proposal\_other\_projects\_data

**Workflow Integration:**

- Ancillary review blocks can prevent submission
- Bypass mechanism: bypass\_ancillary\_block (boolean) + bypass\_ancillary\_block\_reason (text)

#### *FR-009: Proposal Additional Information*

**Description:** System SHALL store project descriptions and additional details.

**Fields:**

- Project summary/abstract
- Facilities and resources
- Equipment
- Bibliography

- Other supporting information

#### *FR-010: Proposal Versioning and Snapshots*

**Description:** System SHALL maintain versions and snapshots of proposals.

**Capabilities:**

- Store proposal versions
- Create snapshots at key milestones
- Snapshot access controlled by rights (centralStaffCanViewProposalSnapshots, SalaryViewerCanViewProposalSnapshots)
- Provide API endpoint for managing snapshots

#### *FR-011: Proposal Certification*

**Description:** System SHALL support proposal certification by authorized personnel.

**Rights:**

- Self-certification: *grnts-can-certify-proposal-self*
- Certify for others: *grnts-can-certify-proposal-others*

**Data:** Certification details persistence

#### *FR-012: Proposal Relationships*

**Description:** System SHALL support proposal-to-proposal and proposal-to-award relationships.

**Relationships:**

- Associated award: Link to created award
- Associated proposal: Link to related proposal
- Related projects: Create linked proposals

#### *FR-013: Proposal Document Management*

**Description:** System SHALL support document attachment and management.

**Actions:** ManageDocuments action for upload/removal

#### *FR-014: Proposal Tags*

**Description:** System SHALL support tagging proposals for categorization.

**Actions:**

- ApplyTag
- RemoveTag
- Tag (update)

#### *FR-015: Proposal Validation*

**Description:** System SHALL validate proposal data for completeness and correctness.

**Validation Types:**

- Required field validation
- Budget validation
- Compliance validation
- SF424 form validation

**API Response:** Validation errors and warnings

#### *FR-016: Proposal Complexity Scoring*

**Description:** System SHALL calculate proposal complexity scores based on multiple factors.

**Proposal Complexity Factors:**

- complexityKeyPersonProposal: Number of key personnel
- complexityActiveBudgetProposal: Number of active budgets
- complexitySubawardeeProposal: Number of subawardees
- complexityAncillaryCountProposal: Number of compliance reviews
- complexityCostShareUnitsProposal: Number of cost-sharing units
- complexityTotalPointsProposal: Total complexity score

**Post-Submission Complexity Factors:**

- complexityActiveBudgetPostSubmission
- complexityKeyPersonPostSubmission
- complexitySubawardeePostSubmission
- complexityAncillaryCountPostSubmission
- complexityCostShareUnitsPostSubmission
- complexityTotalPointsPostSubmission

## 4.2 Budget Management

#### *FR-017: Budget Creation*

**Description:** System SHALL allow creation of multiple budgets per proposal.



**Required Fields:**

- proposal\_id
- budget\_name
- budget\_responsible\_unit
- budget\_version (“Proposal” or “PostSubmission”)

**Generated Fields:** budget\_id, id, hrn, dateCreated, dateModified

*FR-018: Budget Structure*

**Description:** System SHALL support comprehensive budget categories.

**Budget Components:**

- personnel\_costs
- general\_costs
- subaward\_costs
- trainee\_costs
- cost\_sharing
- idc\_standard: (indirect costs - standard rates)
- idc\_non\_standard: (indirect costs - non-standard)
- budget\_cost\_selection: (selected cost categories)

*FR-019: Budget Indirect Costs*

**Description:** System SHALL support indirect cost calculations.

**Types:**

- Standard IDC: Institutional standard rates
- Non-standard IDC: Negotiated or sponsor-mandated rates

**Application:** idc\_standard\_rate\_applied flag

*FR-020: Budget Investigator Assignment*

**Description:** System SHALL allow assignment of budget investigator distinct from PI.

**Permissions:** Budget investigator can edit their assigned budget in unit-editable states

#### *FR-021: Budget Additional Access*

**Description:** System SHALL support additional personnel access to specific budgets.

**Access Control:**

- Budget access user (HRN)
- Edit access flag
- Controlled by right

#### *FR-022: Budget Unit Access*

**Description:** System SHALL support unit-based budget access for grants administrators.

**Access:** Grants administrators of budget's responsible unit can edit budget

#### *FR-023: Budget Versions*

**Description:** System SHALL support proposal and post-submission budget versions.

**Versions:**

- "Proposal": Initial budget, editable in unit-editable states
- "PostSubmission": Post-submission changes, editable in PostSubmissionUpdateRequired and PostSubmissionUpdateComplete states

#### *FR-024: Budget Period Management*

**Description:** System SHALL support multi-year budget periods.

#### *FR-025: Budget Summary and Totals*

**Description:** System SHALL calculate and display budget summary information.

**Proposal-Level Totals:**

- summary\_budget\_total\_cost
- summary\_budget\_total\_direct\_cost
- summary\_budget\_total\_indirect\_cost
- summary\_budget\_postsub\_total\_cost
- summary\_budget\_postsub\_total\_direct\_cost
- summary\_budget\_postsub\_total\_indirect\_cost

#### *FR-026: Budget Validation*

**Description:** System SHALL validate budget data.

**Validation Types:**

- Mathematical accuracy
- Period alignment with project dates
- IDC calculation correctness
- Required field completeness

#### *FR-027: Budget Copy Functionality*

**Description:** System SHALL support copying budgets.

**Use Cases:**

- Copy proposal budget to post-submission version
- Copy budget when creating related proposals
- Copy budget when creating award from proposal

#### *FR-028: Personnel Costs Detailed Management*

**Description:** System SHALL provide detailed personnel cost management.

**Capabilities:**

- Person assignment to budget
- Effort percentage by period
- Salary calculation
- Fringe benefits
- Salary escalation by year
- Personnel access restricted by special rights

#### *FR-029: Budget Custom Properties*

**Description:** System SHALL support institution-specific budget fields via custom properties.

### 4.3 Award Management

#### *FR-030: Award Creation from Proposal*

**Description:** System SHALL create awards from approved proposals.

**Process:**

- Action: CreateAward
- Links to proposal via proposal\_id
- Copies relevant proposal data
- Creates initial award state: Initialized
- Updates proposal.associated\_award

#### *FR-031: Award States and Workflow*

**Description:** System SHALL support 26 award states with defined workflows.

**States:**

- UnitSetup
- Initialized
- UnitModification
- CentralReview
- ClarificationsRequestedCentralReview
- AccountAdditionalFinancialAccount
- ClarificationsRequestedFinalReview
- FinalReview
- SubmitResponse
- Active
- AdvancedAccount
- TerminatedEarly
- TransferredOut
- ClosedOut
- CentralUpdates
- ModificationInitialized
- FinalModificationReview
- ClarificationsRequestedCentralModificationReview
- ClarificationsRequestedFinalModificationReview
- CentralModificationReview
- Expired
- Discarded
- OnHold
- FsiPending (Pending Financial Integration)
- FsiError (Integration Error)

#### *FR-032: Award General Information*

**Description:** System SHALL store comprehensive award information.

**Core Fields:**

- id (generated award ID)
- short\_title, long\_title
- principal\_investigator
- primary\_contact
- responsible\_unit
- awardee\_institution
- direct\_sponsor, direct\_sponsor\_id
- primary\_sponsor, primary\_sponsor\_id
- budget\_management\_level
- budget\_period\_dates
- award\_state, award\_state\_previous

**Other Fields:**

- sponsor\_documents
- additional\_access
- personnel
- award\_terms\_data
- funding\_action
- custom\_properties

*FR-033: Award Central Staff Assignment*

**Description:** System SHALL support central staff assignment to awards.

**Staff Roles:**

- Specialist: Primary central reviewer
- Approver: Final approval authority
- Data Manager: Data updates and state management

*FR-034: Award Deliverables Management*

**Description:** System SHALL track award deliverables and reporting requirements.

**Action:** CreateDeliverables

*FR-035: Award Modification Requests*

**Description:** System SHALL support award modification request tracking.

**Use Cases:**

- Budget modifications
- Scope changes
- No-cost extensions
- PI changes
- Re-budgeting requests

#### *FR-036: Award Versioning*

**Description:** System SHALL maintain award versions for modifications.

**Process:**

- Create modification version when ModifyAward action executed
- Store version history in award\_versions
- Separate table: award\_versions for version snapshots
- Track modification details and completed modifications

#### *FR-037: Award Compliance Tracking*

**Description:** System SHALL track award-level compliance requirements.

**Compliance Types:**

- irb\_data: IRB protocols during award period
- iacuc\_data: Animal use protocols
- ibc\_data: Biohazard protocols
- embryonic\_stem\_cell\_data: ESC line information
- agreement\_data: Data use agreements
- data\_security: Data security compliance
- foreign\_activities\_data: Foreign collaboration tracking

#### *FR-038: Award Financial Data*

**Description:** System SHALL track award financial information.

**Financial Fields:**

- award\_approve\_total: Total award amount
- award\_approve\_obligated: Obligated amount
- award\_approve\_reconciled: Reconciled amount
- award\_approve\_anticipated: Anticipated amount
- award\_approve\_variance: Variance amount
- financial\_tab\_data: Additional financial details

#### *FR-039: Award Budget Periods*

**Description:** System SHALL manage award budget periods.

#### *FR-040: Award Funding Actions*

**Description:** System SHALL track funding increments and actions.

**Use Cases:**

- Initial funding
- Incremental funding
- Funding reductions
- Supplemental funding

#### *FR-041: Award Documents*

**Description:** System SHALL manage award-related documents.

**Document Types:**

- Award notice
- Terms and conditions
- Sponsor correspondence
- Modification documents
- Closeout documents

#### *FR-042: Award Snapshots*

**Description:** System SHALL create snapshots of awards at key milestones.

#### *FR-043: Award State Management*

**Description:** System SHALL allow authorized users to manually manage award state.

#### *FR-044: Award Closeout*

**Description:** System SHALL support award closeout process.

**Final State:** ClosedOut

#### *FR-045: Award Other Projects Tracking*

**Description:** System SHALL track other projects related to the award (for conflict/overlap tracking).

## 4.4 Financial Account Management

#### *FR-046: Financial Account Creation*

**Description:** System SHALL create financial accounts linked to awards and budgets.

**Required Associations:**

- award\_id
- budget\_id

**Generated Fields:** account\_id, id, hrn

#### *FR-047: Account Financial Setup*

**Description:** System SHALL configure financial account details.

**Configuration Areas:**

- account\_details: Basic account information
- account\_type: Account classification
- account\_attributes: Additional attributes
- account\_activity\_setup: Activity codes, org codes
- account\_idc\_details: IDC distribution
- account\_idc\_distribution: IDC allocation across units

#### *FR-048: Account Allocations*

**Description:** System SHALL manage budget allocations across financial accounts.

**Use Cases:**

- Allocate budget by period to account
- Track allocation totals
- Subaward allocations



#### *FR-049: Account Additional Access*

**Description:** System SHALL control access to financial accounts.

**Access Control:** Additional personnel with account view/edit rights

#### *FR-050: Account Financial Integration*

**Description:** System SHALL integrate with external financial systems.

**Process:**

1. Account configured → Submit to external system
2. Award state → FsiPending
3. External system processes account creation
4. Success: Populate external\_account\_id, award → Active
5. Failure: Populate account\_errors, award → FsiError

**Management:** ManageFinancialIntegration action for retry/troubleshooting

#### *FR-051: Account Listing*

**Description:** System SHALL list financial accounts with filtering.

#### *FR-052: Account-Associated Budgets*

**Description:** System SHALL display budgets associated with accounts.

#### *FR-053: Account Validation*

**Description:** System SHALL validate account configuration before financial integration.

## 4.5 SF424 Form Management

#### *FR-054: SF424 Form Structure*

**Description:** System SHALL support multiple SF424 form variants.

**Form Types:**

- usda\_form: USDA-specific SF424
- grants\_gov\_form: Standard Grants.gov SF424
- hhs\_phs\_form: HHS/PHS SF424

- hhs\_hrsa\_form: HRSA SF424
- phs\_human\_subject\_clinicaltrials\_form: Clinical trials supplement
- neh\_form: National Endowment for Humanities
- epa\_form: EPA-specific form
- key\_personnel: Key personnel form data

#### *FR-055: SF424 Key Personnel*

**Description:** System SHALL capture SF424 key personnel information.

**Data Sources:**

- Proposal personnel
- Extended person profiles (for SF424-specific data)

#### *FR-056: SF424 Validation*

**Description:** System SHALL validate SF424 form data for completeness.

**Process:**

- Check required fields
- Validate data formats
- Set sf424\_validation\_status
- Optionally lock form (sf424\_locked)

#### *FR-057: SF424 Lock/Unlock*

**Description:** System SHALL support locking SF424 forms to prevent changes.

**Use Case:** Lock after validation, unlock if changes needed

#### *FR-058: SF424 Form Generation*

**Description:** System SHALL generate SF424 XML from proposal data.

**Service:** Separate SF424 service for XML generation

**Standards:** Grants.gov XML schema compliance

#### *FR-059: SF424 Submission to Grants.gov*

**Description:** System SHALL submit SF424 packages to Grants.gov.

**Process:**

1. Generate XML package
2. Attach required documents
3. Submit via Grants.gov API
4. Store submission XML, documents, response
5. Set sf424\_submit\_action flag

**Storage:**

- sf424\_submission\_xml: Submission package XML file reference
- sf424\_submission\_documents: Attached documents
- sf424\_submission\_response: Grants.gov response
- sf424\_subaward\_submission\_documents: Subaward-specific documents

*FR-060: SF424 Submission Status Tracking*

**Description:** System SHALL track SF424 submission status.

**Statuses:**

- Draft
- Validated
- Submitted
- Accepted
- Rejected
- Processing

*FR-061: SF424 PDF Generation*

**Description:** System SHALL generate PDF versions of SF424 forms.

**Use Cases:**

- Preview before submission
- Institutional records
- Print copies

*FR-062: SF424 Details View Access*

**Description:** System SHALL control access to SF424 details section.

**Access Levels:**

- General users: View SF424 details when related to proposal
- Central staff: View SF424 details with any relationship

#### *FR-063: SF424 Form Editing in Workflows*

**Description:** System SHALL allow SF424 form editing in specific workflow states.

**Owner Editable States:**

- PreSubmission
- CentralReviewClarificationRequested
- UnitReviewClarificationRequested
- SubmissionConfirmationRequested

**Owner Unit Editable States:**

- UnitReview
- CentralReview
- ConfirmSubmission

**Rights by Role:**

- PI: *grnts-edit-SF424-unit-editable-states-overall-pi*
- PC: *grnts-edit-SF424-unit-editable-states-overall-primary-contact*
- Additional Access Editor: *grnts-edit-SF424-unit-editable-states-overall-editor*
- Unit Admin: *grnts-edit-SF424-unit-editable-states-overall-unit-admin*

## 4.6 Extended Person and Organization Data

#### *FR-064: Extended Person Profiles*

**Description:** System SHALL maintain extended person profiles for SF424 and grant-specific data.

**Use Cases:**

- SF424 contact information
- Researcher profiles
- Salary and fringe data
- Credentials and qualifications
- Effort tracking

#### *FR-065: Extended Organization Data*

**Description:** System SHALL maintain extended organization profiles.

**Use Cases:**

- Institutional SF424 data
- DUNS numbers
- EIN numbers
- Congressional districts
- Organizational capabilities

#### *FR-066: External Project Personnel*

**Description:** System SHALL track external personnel (non-institutional) on projects.

**Use Cases:**

- Consultants
- Subaward personnel
- Collaborators from other institutions

## 4.7 Central Actions and Configuration

#### *FR-067: Applicant Institution Management*

**Description:** System SHALL allow central staff to manage applicant institution information.

**Scope:** Institution-wide SF424 defaults

#### *FR-068: SF424 Assurances Management*

**Description:** System SHALL manage disclosure of lobbying activities and SF424 assurances.

**Forms:**

- SF-LLL: Lobbying disclosure
- SF424B: Assurances (Non-Construction)
- SF424D: Assurances (Construction)

#### *FR-069: Grants.gov and eRA Services Management*

**Description:** System SHALL manage Grants.gov and eRA Commons credentials.

**Configuration:**

- Grants.gov credentials
- eRA Commons credentials
- Authorized organization representatives (AORs)

#### *FR-070: Funding Opportunity Management*

**Description:** System SHALL store funding opportunity information from Grants.gov.

**Data:**

- Opportunity number
- CFDA number
- Agency
- Opportunity title
- Deadlines
- ERA details (era\_details)

### 4.8 Action Logging and Change Tracking

#### *FR-071: Action Log*

**Description:** System SHALL maintain action logs for proposals and awards.

**Logged Information:**

- Action taken
- User who executed action
- Timestamp
- From state / to state
- Comments/notes

#### *FR-072: Change Tracking via Triggers*

**Description:** System SHALL automatically track changes to critical entities.

**Tracked Entities:**

- proposals
- awards
- budgets
- proposal\_personnel
- proposal\_compliances
- proposal\_submission\_information
- proposal\_additional\_information

**Output:** Change event messages logged to DB

#### *FR-073: Change Tracking Serialization*

**Description:** System SHALL serialize changes to JSON format for event processing.

**Process:**

1. Trigger captures old and new record
2. Resolver functions translate IDs to display values
3. Formatter functions structure data
4. Serializer outputs JSON with before/after state

#### *FR-074: Change Tracking Toggle*

**Description:** System SHALL allow disabling change tracking for bulk operations.

## 4.9 Bulk Import and Migration

#### *FR-075: Award Bulk Import*

**Description:** System SHALL support bulk import of awards.

**Use Cases:**

- Migration from legacy systems
- Bulk award creation

**Tracking:** migrated\_project\_award flag, source\_identifier\_award

#### *FR-076: Account Bulk Import*

**Description:** System SHALL support bulk import of financial accounts.

**Tracking:** migrated\_project\_account flag, source\_identifier\_account

#### *FR-077: Migration Tracking*

**Description:** System SHALL track migrated records from legacy systems.

**Fields:**

- migrated\_project\_proposal / migrated\_project\_award / migrated\_project\_budget / migrated\_project\_account

- source\_identifier\_proposal / source\_identifier\_award / source\_identifier\_budget / source\_identifier\_account
- legacy\_id\_proposal / legacy\_id\_award / legacy\_id\_budget / legacy\_id\_account

**Constraint:** Unique constraint on (source\_identifier, tenant\_id) for awards and accounts

## 4.10 Search, Filter, and Pagination

### *FR-078: Proposal Listing with Filters*

**Description:** System SHALL support listing proposals with filtering, sorting, and pagination.

**Parameters:**

- Pagination: pageSize, offset
- Filter: filter parameter (query syntax)
- Sort: sort parameter
- IncludeFields: Select specific fields to return

**Response:** ProposalsListResponse with pagination metadata

### *FR-079: Award Listing*

**Description:** System SHALL support listing awards with filtering, sorting, and pagination.

### *FR-080: Account Listing*

**Description:** System SHALL support listing financial accounts with filtering.

## 4.11 Custom Properties

### *FR-081: Custom Properties Support*

**Description:** System SHALL support institution-specific custom field.

**Use Cases:**

- Institution-specific data requirements
- Extensibility without schema changes
- Report fields



- Integration data

## 4.12 Data Update Workflows

### *FR-082: Initiate Data Update (Proposal)*

**Description:** System SHALL support initiating controlled data updates to proposals in restricted states.

**Right:** *grnts-data-mgr-can-initiate-data-updates*

**Use Case:** Update proposal data after submission without full state transition

### *FR-083: Complete Data Update (Proposal)*

**Description:** System SHALL complete data update workflows for proposals.

**Right:** *grnts-data-mgr-can-execute-complete-data-updates*

### *FR-084: Initiate Data Update (Award)*

**Description:** System SHALL support initiating controlled data updates to awards.

**Right:** *grnts-data-mgr-can-initiate-data-updates*

### *FR-085: Complete Data Update (Award)*

**Description:** System SHALL complete data update workflows for awards.

**Right:** *grnts-data-mgr-can-execute-complete-data-updates-award*

## 4.13 Relationships and Related Projects

### *FR-086: Create Related Project*

**Description:** System SHALL allow creation of related proposals/projects.

**Rights:**

- User: *grnts-can-create-related-project*
- Specialist: Right included in specialist rights

**Use Cases:**

- Renewal proposals
- Competing continuations
- Linked projects
- Multi-component submissions

*FR-087: Manage Relationships*

**Description:** System SHALL allow management of proposal/award relationships.

#### 4.14 Tags and Categorization

*FR-088: Tag Management*

**Description:** System SHALL support tagging for categorization and filtering.

**Operations:**

- Apply tag
- Remove tag
- Update tags

#### 4.15 Access Management

*FR-089: Manage Access Action*

**Description:** System SHALL provide action to manage access to proposals and awards.

**Rights:**

- User: *grnts-can-manage-access*
- Specialist: *grnts-specialist-can-manage-access*
- Specialist (Award): *grnts-specialist-can-manage-access-award*

**Scope:** Modify additional access personnel, reviewers, unit administrators

#### 4.16 Person data management

*FR-090: Maintain institutional person information*

**Description:** System SHALL maintain institutional personal information.

**Data Scope:**

- Person lookup by HRN
- Person profile data
- Salary and fringe information
- Active status

## 4.17 Organization data management

### *FR-091: Maintain institutional organization hierarchy*

**Description:** System SHALL maintain institutional organization hierarchy information.

**Data Scope:**

- Organization lookup by HRN
- Organization hierarchy
- Grants administrator assignments
- Active status

## 5. Data and Retention Requirements

### 5.1 Core Data Entities

#### *DR-001: Proposals Entity*

**Primary Key:** proposal\_id (integer, auto-generated)

**Business Key:** id (VARCHAR, e.g., "PROP00000101")

**HRN:** hrn (e.g., "hrn:hrs:proposals:101")

**Tenant Isolation:** tenant\_id

**Timestamps:** date\_created, date\_modified

**Active Flag:** active BOOLEAN

**Key Relationships:** - principal\_investigator → persons - responsible\_unit → organizations - applicant\_institution → organizations - direct\_sponsor → organizations - specialist → persons - datamanager → persons

**Storage:**

- proposed\_dates
- certifypersondetails
- tags
- record\_submission\_to\_sponsor
- provide\_status\_update
- approval\_details
- record\_status\_update
- proposal\_versions
- custom\_properties
- update\_reporting\_data
- manage\_documents\_proposal
- budget\_period\_details
- modularized\_direct\_cost\_details
- snapshots
- sf424\_submission\_documents
- sf424\_submission\_response
- sf424\_pdf\_document
- manage\_state

### *DR-002: Awards Entity*

**Primary Key:** award\_id (integer, auto-generated)

**Business Key:** id (VARCHAR)

**HRN:** hrn

**Tenant Isolation:** tenant\_id

**Timestamps:** date\_created, date\_modified

**Active Flag:** active BOOLEAN

#### **Key Relationships:**

- proposal\_id → proposals
- principal\_investigator → persons
- responsible\_unit → organizations
- direct\_sponsor → organizations
- primary\_sponsor → organizations

#### **Storage:**

- sponsor\_documents
- additional\_access
- funding\_action
- personnel
- award\_terms\_data
- award\_manage\_deliverables
- custom\_properties
- initiate\_data\_update
- modify\_award
- award\_versions
- manage\_award\_modification\_request
- irb\_data
- embryonic\_stem\_cell\_data
- ibc\_data
- iacuc\_data
- agreement\_data
- data\_security
- foreign\_activities\_data
- financial\_tab\_data
- snapshots
- closeout\_award

- manage\_state
- manage\_documents
- modification\_details
- completed\_modifications
- award\_other\_projects\_data
- tags

### *DR-003: Budgets Entity*

**Primary Key:** budget\_id (integer, auto-generated)

**Business Key:** id (VARCHAR)

**HRN:** hrn

**Tenant Isolation:** tenant\_id

**Key Relationships:**

- proposal\_id → proposals
- budget\_investigator → persons
- budget\_responsible\_unit → organizations

**Storage:**

- additional\_budget\_access
- idc\_standard
- idc\_non\_standard
- budget\_cost\_selection
- personnel\_costs
- general\_costs
- subaward\_costs
- trainee\_costs
- cost\_sharing
- custom\_properties
- budget\_period\_details

### *DR-004: Accounts Entity*

**Primary Key:** account\_id (integer, auto-generated)

**Business Key:** id (VARCHAR)

**HRN:** hrn

**Tenant Isolation:** tenant\_id

**Key Relationships:**

- budget\_id → budgets
- award\_id → awards

**Storage:**

- account\_details
- account\_type
- account\_idc\_details
- account\_attributes
- account\_activity\_setup
- account\_idc\_distribution
- account\_additional\_access
- account\_allocations
- account\_allocations\_totals
- custom\_properties

**Integration Fields:**

- external\_account\_id: ID in external financial system
- financial\_system\_id: Target financial system identifier
- account\_errors: TEXT[] array of error messages

*DR-005: Proposal Personnel Entity*

**Primary Key:** proposal\_personnel\_id

**Unique Constraint:** (proposal\_id, tenant\_id)

**Tenant Isolation:** tenant\_id

**Storage:**

- internal\_personnel: Array of internal personnel assignments
- external\_personnel: Array of external personnel
- additional\_access: Array of additional access grants

*DR-006: Proposal Compliances Entity*

**Primary Key:** proposal\_compliance\_id

**Unique Constraint:** (proposal\_id, tenant\_id)

**Tenant Isolation:** tenant\_id

**Storage:**

- irb\_data
- iacuc\_data
- ibc\_data
- embryonic\_stem\_cell\_data
- proposal\_agreement\_data
- proposal\_other\_projects\_data

*DR-007: SF424 Forms Entity*

**Primary Key:** sf424\_form\_id

**Unique Constraint:** (proposal\_id, tenant\_id)

**Tenant Isolation:** tenant\_id

**Storage:**

- usda\_form
- phs\_human\_subject\_clinicaltrials\_form
- neh\_form
- epa\_form
- key\_personnel
- grants\_gov\_form
- hhs\_phs\_form
- hhs\_hrsa\_form

*DR-008: Proposal Submission Information Entity*

**Relationship:** One-to-one with proposals

*DR-009: Proposal Additional Information Entity*

**Relationship:** One-to-one with proposals

*DR-010: Award Deliverables Entity*

**Relationship:** Many-to-one with awards



#### *DR-011: Award Modification Requests Entity*

**Relationship:** Many-to-one with awards

#### *DR-012: Funding Actions Entity*

**Relationship:** Many-to-one with awards

#### *DR-013: Award Versions Entity*

**Relationship:** Many-to-one with awards (version history)

### 5.2 Relationships and Constraints

#### *DR-014: Unique Constraints with Tenant ID*

**Purpose:** Ensure uniqueness within tenant, allow same IDs across tenants

### 5.3 Change Tracking and Audit Requirements

#### *DR-015: Audit Trail via Change Tracking*

**Description:** System maintains complete audit trail of changes.

**Mechanism:**

- Trigger on UPDATE/DELETE captures old and new values
- Serializer function converts to JSON event
- Event published to change tracking DB

#### *DR-016: Timestamp Tracking*

**Description:** System tracks creation and modification timestamps.

**Maintenance:** date\_modified updated automatically (likely via trigger or application logic)

#### *DR-017: State History*

**Description:** System maintains previous state for auditing and rollback scenarios.

## 5.4 Snapshot and Versioning Requirements

### *DR-018: Proposal Snapshots*

**Description:** System captures point-in-time snapshots of proposals.

**Triggers:**

- Submit for review
- Approval milestones
- Submission to sponsor
- Award creation

**Access Control:** Restricted by rights

### *DR-019: Award Snapshots*

**Description:** System captures point-in-time snapshots of awards.

**Triggers:**

- Initial approval
- Modification milestones
- Funding action events
- Closeout

### *DR-020: Proposal Versions*

**Description:** System maintains version history of proposals.

**Use Cases:**

- Post-submission updates
- Resubmissions
- Revisions
- Compare versions

### *DR-021: Award Versions*

**Description:** System maintains version history of awards for modifications.

**Use Cases:**

- Budget modifications

- Scope changes
- No-cost extensions
- Re-budgeting

## 5.5 Retention and Deletion

### *DR-022: Soft Delete via Active Flag*

**Description:** System uses soft deletes rather than hard deletes.

**Benefits:**

- Preserve data for audit
- Support undelete operations
- Maintain referential integrity
- Comply with retention policies

### *DR-023: Discarded State*

**Description:** System marks proposals/awards as discarded rather than deleting.

**Distinction:**

- Discarded state vs. active=false
- Discarded: User-initiated workflow action
- Active=false: System-level deactivation

## 6. Integration Requirements

### 6.1 External System Integrations

#### *IR-001: Grants.gov Integration*

**Description:** System SHALL integrate with Grants.gov for:

- **Opportunity Download:** Fetch funding opportunity details via API
- **SF424 Submission:** Submit application packages via Grants.gov Web Services
- **Submission Tracking:** Query submission status
- **Response Handling:** Store and process submission responses

**Data Exchange:**

- Inbound: Funding opportunity details → funding\_opportunities table
- Outbound: SF424 XML package → Grants.gov
- Inbound: Submission response → proposals.sf424\_submission\_response

#### *IR-002: eRA Commons Integration*

**Description:** System SHALL integrate with NIH eRA Commons for:

- **Authentication:** Store eRA Commons credentials
- **Application Tracking:** Link to eRA Commons application IDs
- **Commons Data:** Store eRA-specific metadata

#### *IR-003: Financial System Integration*

**Description:** System SHALL integrate with institutional financial systems for account creation.

**Integration Flow:**

1. Award approved → Account configuration completed
2. System calls financial system API with account details
3. Award state → FsiPending
4. Financial system processes asynchronously
5. Callback or polling updates status:
  - Success: Populate external\_account\_id, award → Active
  - Failure: Populate account\_errors, award → FsiError
6. Specialist can retry via ManageFinancialIntegration action

**Data Exchange:**

- Outbound: Account configuration (JSON payload with account\_details, account\_activity\_setup, account\_idc\_details, etc.)
- Inbound: External account ID or error messages

## 6.2 API Contracts

### *IR-004: API Versioning*

**Description:** System SHALL version APIs to support backward compatibility.

### *IR-005: API Authentication*

**Description:** System SHALL authenticate API requests via token-based authentication.

**Mechanism:** JWT tokens

### *IR-006: API Authorization*

**Description:** System SHALL authorize API requests based on user rights and associations.

### *IR-007: Pagination Standards*

**Description:** System SHALL support pagination for list endpoints.

**Response Format:**

```
{  
  "pagination": {  
    "pageSize": 25,  
    "offset": 0,  
    "total": 100  
  },  
  "data": [...]  
}
```

### *IR-008: Search, Filter and Sort Standards*

**Description:** System SHALL support searching, filtering and sorting for list endpoints.

### *IR-009: Field Selection*

**Description:** System SHALL support field selection to return subset of properties.

**Use Case:** Reduce payload size for list views

## 6.3 Event Schemas

### *IR-010: Change Event Schema*

**Evidence:** Change tracking serializer function output

**Description:** System SHALL publish change events in standardized JSON format.

**Event Structure:**

```
{
  "table": "proposals",
  "operation": "UPDATE",
  "tenant_id": 1,
  "old_record": {...},
  "new_record": {...},
  "timestamp": "2024-01-01T12:00:00Z"
}
```

**Resolvers:** Translate internal IDs to display values (e.g., state IDs to state names)

### *IR-011: Action Event Schema*

**Evidence:** Action execution logging

**Description:** System SHALL publish action events.

**Event Structure:**

```
{
  "entity_type": "proposal",
  "entity_hrn": "hrn:hrs:proposals:123",
  "action": "Approve",
  "user_hrn": "hrn:hrs:persons:456",
  "timestamp": "2024-01-01T12:00:00Z",
  "from_state": "UnitReview",
  "to_state": "CentralReview"
}
```

## 6.4 Data Exchange Formats

### *IR-012: SF424 XML Format*

**Description:** System SHALL generate SF424 XML conforming to Grants.gov schemas.

**Schemas:** Grants.gov form-specific XSD schemas (stored in Sf424.Service)

**Namespaces:** Standard Grants.gov namespaces

### *IR-013: Financial System JSON Format*

**Description:** System SHALL exchange financial data in JSON format.

**Format:** Institution-specific API contract

## 7. UX / UI Requirements

### 7.1 Personas

#### *Persona: Principal Investigator (P\_01)*

- **Capabilities:**
  - Create new proposals (Rights.createProposal)
  - Edit all budgets in unit-editable states (Rights.principalInvestigatorCanEdit)
  - Edit related proposals in unit-editable states (Rights.editRelatedProposalInUnitEditableStates)
  - Certify proposals (self-certification) (grnts-can-certify-proposal-self)
  - Edit SF424 forms in unit-editable states (grnts-edit-SF424-unit-editable-states-overall-pi)
  - Submit proposals for review
  - Manage proposal personnel (add/remove key personnel)
  - View proposal snapshots
- **Restrictions:**
  - **Cannot edit** proposals in states: SubmittedtoSponsor, StatusUpdateProvided, Discarded, AwardReceived, AwardAnticipated, Awarded
  - **Cannot edit** after submission to sponsor (except in PostSubmissionUpdateRequired state)
  - **Cannot** assign reviewers or central staff
  - **Cannot** record submission to sponsor
  - **Cannot** create awards
  - **Cannot** approve proposals (requires Specialist or Admin)
- **Key Data Access:**
  - Proposals (own and related where key personnel)
  - Budgets (all budgets for own proposals)
  - Personnel (proposal team)
  - SF424 forms (federal application forms)
  - Compliance protocols (IRB, IACUC, IBC)
- **Overlaps With:**
  - P\_02 (Primary Contact) - shares editing capabilities in unit-editable states



### *Persona: Primary Contact (P\_02)*

- **Capabilities:**
  - Edit related proposals in unit-editable states
  - Edit all budgets in unit-editable states (Rights.primaryContactCanEdit)
  - Manage proposal personnel
  - Edit SF424 forms in unit-editable states
  - View proposal details and snapshots
  - Submit proposals for review (on behalf of PI)
- **Restrictions:**
  - **Cannot** create proposals (only PI can)
  - **Cannot** certify proposals (self-certification)
  - **Same state-based restrictions as PI** (cannot edit after submission)
  - **Cannot** assign reviewers or central staff
- **Key Data Access:** Same as P\_01 (PI)
- **Overlaps With:** P\_01 (PI) - nearly identical editing capabilities

### *Persona: Grants Administrator / Unit Admin (P\_03)*

- **Capabilities:**
  - Edit proposals for **their responsible unit** in unit-editable states
  - Edit all budgets for unit's proposals
  - **Assign unit reviewers**
  - **Approve proposals in UnitReview state**
  - **Request clarifications** from PI/PC
  - **Bypass ancillary review blocks** (with justification)
  - Edit SF424 forms for unit proposals
  - Manage unit access (add/remove grant administrators)
- **Restrictions:**
  - **Limited to responsible unit proposals only** (not institution-wide)
  - **Cannot** record submission to sponsor (Specialist only)
  - **Cannot** create awards
  - **Cannot** edit proposals in CentralReview or post-submission states
- **Key Data Access:**
  - Proposals (responsible unit only)
  - Budgets (unit proposals)

- Unit reviewers
- Unit personnel assignments
- **Overlaps With:** P\_01, P\_02 (editing capabilities), P\_04 (review workflow)

*Persona: Grants Specialist (Central Staff) (P\_04)*

- **Capabilities:**
  - Edit proposals in **most states except post-submission** (specialistNonEditableStates)
  - **Assign central staff** (Specialist, Data Manager, Approver)
  - **Request clarifications** from PI/PC or Unit Admin
  - **Certify proposals for others** (grnts-can-certify-proposal-others)
  - **Record submission to sponsor**
  - **Manage post-submission updates**
  - **Create awards** from proposals
  - **Validate and submit SF424 forms** to Grants.gov
  - **Manage financial integration** (retry FSI errors)
  - Full edit access to awards in central states
  - Approve proposals in CentralReview state
- **Restrictions:**
  - **Cannot edit** proposals in states:
    - SubmittedtoSponsor
    - StatusUpdateProvided
    - Discarded
    - AwardReceived
    - AwardAnticipated
    - AwardAnticipatedAdvancedAccount
    - WithdrawnfromSponsor
    - NotFunded
    - Invited
    - NotInvited
    - Awarded
- **Key Data Access:**
  - Proposals (all, institution-wide)
  - Awards (all, institution-wide)
  - Budgets (all)
  - SF424 forms (all)
  - Central staff assignments
  - Financial integration status

- **Overlaps With:** P\_05 (Data Manager), P\_06 (Award Approver) - central staff collective

*Persona: Grants Data Manager (P\_05)*

- **Capabilities:**
  - Edit proposals in **CentralUpdates state**
  - **Initiate data updates** (grants-data-mgr-can-initiate-data-updates)
  - **Complete data updates** (grnts-data-mgr-can-execute-complete-data-updates)
  - **Manage proposal and award states** (override state transitions)
  - Assign central staff
  - Record submission to sponsor
  - Discard proposals
  - Create awards
- **Restrictions:**
  - **Limited to data correction workflows** (not general proposal editing)
  - **Cannot** approve proposals or awards (review authority only)
- **Key Data Access:** Same as P\_04 (Specialist)
- **Overlaps With:** P\_04 (Specialist) - central staff collective

*Persona: Award Approver (P\_06)*

- **Capabilities:**
  - **Approve awards in final review states**
  - Edit awards in **FinalReview** and **FinalModificationReview** states
  - **Request clarifications** from Unit or Central staff
  - **Create additional financial accounts**
  - **Manage financial integration** (retry FSI errors)
  - **Close out awards**
  - Create award modification versions
- **Restrictions:**
  - **Limited to final approval stage only** (cannot edit in earlier states)
  - **Cannot** create awards (Specialist only)
  - **Cannot** initiate modifications (unit/specialist only)
- **Key Data Access:**
  - Awards (final review stage)
  - Financial accounts
  - Award modification requests

- **Overlaps With:** P\_04 (Specialist) - central staff collective

## 7.2 Journeys by Persona

### *Journey: Create and Submit Proposal (J\_01)*

- **Goal:** PI creates a new research proposal, completes required sections, and submits for institutional review
- **Personas:**
  - P\_01 (Principal Investigator)
  - P\_02 (Primary Contact)
- **Prerequisites:**
  - User authenticated (JWT token)
  - User has grnts-create-proposal right
  - User affiliated with institutional organization
- **Happy Path Steps:**
  - **Navigate to proposals landing**
  - **Click “Create Proposal” button** → Permission guard Rights.createProposal
  - **System creates proposal in PreSubmission state**
  - **Complete General Information tab**
    - Select sponsor, application type, proposal phase, project dates
  - **Add Personnel**
    - Add PI (automatically set), PC, key personnel
  - **Create Budget(s)**
    - Add personnel costs, general costs, subaward costs, IDC
  - **Complete Compliance**
    - IRB, IACUC, IBC protocols
  - **Complete SF-424 Forms** (if required)
  - **Execute “Submit for Review” action**
    - State transition: PreSubmission → UnitReview (if utilized) or CentralReview
  - **System validates proposal completeness**
  - **Proposal enters review queue**
- **Alternate/Error Paths:**

- **User lacks create permission** → Rights.createProposal guard → Outcome: Button disabled, error response if direct API call **Validation fails (required fields missing)** → Outcome: Inline error messages, cannot submit
- **Budget calculation errors** → Outcome: Error display
- **Compliance incomplete** → Outcome: Submission blocked or bypass with justification
- **Exit Points:**
  - Success: Proposal in UnitReview or CentralReview state, notification (external system)
  - Cancel: Proposal remains in PreSubmission as draft
  - Discard: Proposal state → Discarded

### *Journey: Unit Review and Approval (J\_02)*

- **Goal:** Unit grants administrator reviews proposal from their department, requests clarifications or approves for central review
- **Personas:**
  - P\_03 (Grants Administrator)
- **Prerequisites:**
  - User is grants administrator for proposal's responsible unit
  - Proposal in UnitReview state
  - User has unit admin rights
- **Happy Path Steps:**
  - **Grants Admin accesses unit review queue**
  - **Open proposal for review** → Permission check: grantsAdministratorOfProposalResponsibleUnitCanEdit
  - **Review all sections (General Info, Personnel, Budgets, Compliance, SF424)**
  - **Assign unit reviewer** (optional)
  - **If issues found: Execute "Request Clarification" action**
    - State transition: UnitReview → UnitReviewClarificationRequested → PreSubmission
    - PI receives notification, can edit and resubmit
  - **If acceptable: Execute "Approve" action**
    - State transition: UnitReview → CentralReview
  - **Proposal enters central review queue**
- **Alternate/Error Paths:**

- **User not unit admin for responsible unit** → Outcome: Cannot access proposal, appropriate error
- **Proposal not in UnitReview state** → Outcome: Approve action disabled/unavailable
- **Required ancillary reviews incomplete** → Outcome: Warning or block (bypass mechanism available)
- **Exit Points:**
  - Success: Proposal in CentralReview
  - Clarification: Proposal returned to PreSubmission
  - Timeout: Proposal remains in UnitReview

### *Journey: Central Review and Submission to Sponsor (J\_03)*

- **Goal:** Central grants specialist reviews proposal, approves for submission, generates SF-424, and submits to Grants.gov
- **Personas:**
  - P\_04 (Grants Specialist)
- **Prerequisites:**
  - User has Grants Specialist rights
  - Proposal in CentralReview state
  - SF-424 forms complete (if required by sponsor)
- **Happy Path Steps:**
  - **Specialist accesses central review queue**
  - **Review proposal** → Permission specialistCanEdit
  - **If issues: Request Clarification** →
    - State: CentralReview → CentralReviewClarificationRequested → PreSubmission
  - **If acceptable: Execute “Approve” action**
    - State: CentralReview → SubmissionConfirmationRequested
  - **Validate SF-424 form** (if required)
    - Sets sf424\_validation\_status
    - Locks form (sf424\_locked = true)
  - **Generate SF-424 XML**
  - **Submit SF-424 to [Grants.gov](https://www.grants.gov)**
    - API call to Grants.gov web service
    - Stores submission XML, documents, response
  - **Confirm submission**

- State: SubmissionConfirmationRequested → SubmissionConfirmed
- **Record submission to sponsor**
  - State: SubmissionConfirmed → SubmittedtoSponsor
  - Stores submission details
- **Alternate/Error Paths:**
  - **SF-424 validation fails** → Outcome: Cannot submit, specialist must unlock and PI must fix
  - **Grants.gov submission fails** → Outcome: Submission response stored, retry mechanism (manual)
  - **Required certifications missing** → Outcome: Submission blocked
  - **User lacks specialist rights** → Outcome: Cannot execute submission actions, appropriate API error
- **Exit Points:**
  - Success: Proposal in SubmittedtoSponsor state
  - Clarification: Returned to PreSubmission
  - Error: Remains in current state with error details

#### *Journey: Create Award from Proposal (J\_04)*

- **Goal:** After funding notification, Specialist creates an award from an approved proposal
- **Personas:**
  - P\_04 (Grants Specialist)
  - P\_05 (Grants Data Manager)
- **Prerequisites:**
  - Proposal in eligible state (typically SubmittedtoSponsor or StatusUpdateProvided)
  - Funding notification received from sponsor
  - User has create award rights
- **Happy Path Steps:**
  - **Specialist accesses proposal**
  - **Execute “Create Award” action**
  - **System creates award in Initialized state**
    - Copies relevant proposal data to award
    - Links proposal to award (proposal.associated\_award = award hrn)

- **Award displayed in Specialist's queue**
- **Specialist completes award general information**
- **Specialist requests unit updates**
  - State: Initialized → UnitSetup or RequestUnitUpdates
- **Alternate/Error Paths:**
  - **User lacks create award rights** → Outcome: Action button hidden/disabled, appropriate API error
  - **Proposal not in eligible state** → Outcome: Action unavailable
  - **Award already created for proposal** → Outcome: Error message (duplicate prevention inferred)
- **Exit Points:**
  - Success: Award created in Initialized state
  - Error: Award creation fails, proposal remains without award link

#### *Journey: Award Approval and Financial Integration (J\_05)*

- **Goal:** Unit and central staff complete award setup, approver approves, and system integrates with financial system to create account
- **Personas:**
  - P\_01 (PI - award owner)
  - P\_03 (Grants Administrator)
  - P\_04 (Grants Specialist)
  - P\_06 (Award Approver)
- **Prerequisites:**
  - Award in Initialized or UnitSetup state
  - Award linked to proposal
  - Financial system integration configured
- **Happy Path Steps:**
  - **Specialist requests unit updates**
    - State: Initialized → UnitSetup or UnitModification
  - **Unit personnel (PI, Admin) complete award details**
    - Award personnel, compliance, financial setup
  - **Unit submits updates**
    - State: UnitModification → CentralReview



- **Specialist reviews award**
    - If issues: RequestClarification → ClarificationsRequestedCentralReview → UnitModification
    - If acceptable: CompleteCentralReview → FinalReview
  - **Award Approver reviews**
    - If issues: RequestClarification → ClarificationsRequestedFinalReview → UnitModification
    - If acceptable: ApproveAward → FinalReview (approved)
  - **Financial account configured**
    - Account details, IDC, activity codes
  - **System submits account to financial system** → Evidence: Financial integration logic, state FsiPending
    - State: FinalReview → FsiPending (Financial System Integration Pending)
  - **Financial system processes** (asynchronous):
    - **Success:** Populates external\_account\_id, State: FsiPending → Active
    - **Failure:** Populates account\_errors, State: FsiPending → FsiError
  - **Award becomes active**
- **Alternate/Error Paths:**
    - **Financial integration fails** → Outcome: Award in FsiError state, Specialist executes ManageFinancialIntegration to retry
    - **Clarifications requested** → Outcome: Award returned to UnitModification, unit makes changes
    - **Approver unavailable** → Outcome: Award stuck in FinalReview
- **Exit Points:**
    - Success: Award in Active state with external\_account\_id
    - Error: Award in FsiError state with error details
    - Pending: Award in FsiPending awaiting financial system

### *Journey: Budget Management (J\_06)*

- **Goal:** PI/PC creates and manages budgets for proposal, including personnel costs, general costs, and indirect costs
- **Personas:**
  - P\_01 (PI)
  - P\_02 (PC)
  - P\_03 (Grants Administrator)

- **Prerequisites:**
  - Proposal exists
  - Proposal in unit-editable state
  - User has budget edit rights
  
- **Happy Path Steps:**
  - **Navigate to Budget tab**
  - **Click “Create Budget”**
    - Budget created with budget\_version=‘Proposal’
  - **Name budget**
  - **Select budget responsible unit**
  - **Assign budget investigator** (optional)
  - **Add personnel costs**
    - Person, role, effort %, salary, fringe
  - **Add general costs**
    - Equipment, travel, materials, consultants
  - **Add subaward costs** (if applicable)
  - **Calculate indirect costs**
    - Apply institutional IDC rate or custom rate
  - **System calculates totals**
  - **Save budget**
  
- **Alternate/Error Paths:**
  - **Proposal not in unit-editable state** → Outcome: Budget form read-only
  - **User lacks budget edit rights** → Outcome: Budget view-only, error on edit
  - **Budget calculation errors** → Outcome: Validation errors
  - **Multiple budgets exceed limits** → Outcome: Unknown
  
- **Exit Points:**
  - Success: Budget saved, totals updated
  - Cancel: Budget discarded or left as draft

#### *Journey: Post-Submission Budget Update (J\_07)*

- **Goal:** Sponsor requests budget changes after proposal submission; PI updates budget with new post-submission version
  
- **Personas:**
  - P\_01 (PI)
  - P\_04 (Grants Specialist)

- **Prerequisites:**
  - Proposal in SubmittedtoSponsor or StatusUpdateProvided state
  - Sponsor requested changes
  - Specialist initiates post-submission update workflow
  
- **Happy Path Steps:**
  - **Specialist executes “Manage Post Submission Update” action**
    - State: SubmittedtoSponsor → PostSubmissionUpdateRequired
  - **PI accesses proposal**
  - **Navigate to Budget tab**
  - **Create post-submission budget version**
    - Alternatively: System auto-creates post-submission version
  - **PI updates budget**
  - **PI completes updates**
    - State: PostSubmissionUpdateRequired → PostSubmissionUpdateComplete
  - **Specialist reviews and records status update** → Evidence: Action RecordStatusUpdate
    - State: PostSubmissionUpdateComplete → StatusUpdateProvided
  
- **Alternate/Error Paths:**
  - **PI updates wrong budget version** → Outcome: Proposal budget vs. post-submission budget confusion
  - **Specialist doesn’t initiate workflow** → Outcome: PI cannot edit, state blocks changes
  - **Multiple update requests from sponsor** → Outcome: Unclear (no versioning beyond Proposal/PostSubmission)
  
- **Exit Points:**
  - Success: Status update provided to sponsor
  - Pending: Awaiting PI updates

*Journey: SF-424 Form Validation and Submission (J\_08)*

- **Goal:** Business Analyst or Specialist validates SF-424 form data, generates XML, and submits to Grants.gov
  
- **Personas:**
  - P\_04 (Grants Specialist)

- **Prerequisites:**
  - Proposal in SubmissionConfirmationRequested or similar state
  - SF-424 forms completed (grants\_gov\_form, hhs\_phs\_form, etc.)
  - Key personnel data complete
  
- **Happy Path Steps:**
  - **Navigate to SF-424 tab**
  - **Review SF-424 form sections**
    - Grants.gov form, HHS PHS form, HRSA form, Key Personnel
  - **Execute “Validate SF-424” action**
    - System checks required fields, data formats
    - Sets sf424\_validation\_status
    - If valid: Locks form (sf424\_locked = true)
  - **If locked and needs changes: Execute “Unlock SF-424”**
  - **Generate SF-424 XML**
  - **Execute “Submit SF-424” action**
    - Calls Grants.gov web service API
    - Stores submission XML (sf424\_submission\_xml)
    - Stores submission response
  - **Check submission status**
    - Query Grants.gov for submission status
    - Update sf424\_user\_status
  
- **Alternate/Error Paths:**
  - **Validation fails (required fields missing)** → Outcome: Error messages, cannot submit
  - **Grants.gov submission fails (network, validation)** → Outcome: Response stored, manual retry
  - **SF-424 form incomplete** → Outcome: Validation errors, specialist unlocks for PI to fix
  - **User lacks validation rights** → Outcome: Button disabled, error
  
- **Exit Points:**
  - Success: SF-424 submitted, submission response stored
  - Error: Submission failed, response contains error details
  - Pending: Submission in progress

## 7.3 Detailed Requirements

### *UX\_001: User must authenticate before accessing system*

- **Persona(s):** All personas
  - **Journey(s):** All journeys (prerequisite)
  - **Trigger:** User navigates to any application route
  - **Expected Behavior:**
    - User redirected to login page if not authenticated
    - JWT token stored in browser after successful login
    - JWT token sent with all API requests in Authorization header
    - Validate the received token
- 

### *UX\_002: PI/PC can only edit proposals in unit-editable states*

- **Persona(s):**
    - P\_01 (Principal Investigator)
    - P\_02 (Primary Contact)
  - **Journey(s):**
    - J\_01 (Create and Submit Proposal)
    - J\_07 (Post-Submission Budget Update)
  - **Trigger:** User attempts to edit proposal in any state
  - **Expected Behavior:**
    - **If proposal in owner-editable state:** All form fields editable, Save button enabled
    - **If proposal NOT in owner-editable state:** All form fields read-only, Save button disabled, informational message displayed
    - Permission check occurs on page load and action buttons
  - **Notes:** State-based permissions critical to workflow integrity
- 

### *UX\_003: Create Proposal button only visible if user has create right*

- **Persona(s):**
    - P\_01 (Principal Investigator)
  - **Journey(s):**
    - J\_01 (Create and Submit Proposal)
  - **Trigger:** User accesses proposals landing page
  - **Expected Behavior:**
    - **If user has grnts-create-proposal right:** “Create Proposal” button visible and enabled
    - **If user lacks right:** Button hidden or disabled (implementation unclear)
    - Clicking button navigates to /proposal/smartform and APIs to create proposal
-

#### *UX\_004: Proposal validation runs before submission*

- **Persona(s):**
    - P\_01 (Principal Investigator)
    - P\_02 (Primary Contact)
  - **Journey(s):**
    - J\_01 (Create and Submit Proposal)
  - **Trigger:** User clicks "Submit for Review" button
  - **Expected Behavior:**
    - System calls validation API endpoint
    - **If validation passes:** Proposal state transitions to UnitReview or CentralReview, success notification
    - **If validation fails:** Inline error messages displayed, proposal remains in PreSubmission, user must fix errors
- 

#### *UX\_005: Create Award button only visible if user has create award right*

- **Persona(s):**
    - P\_04 (Grants Specialist)
    - P\_05 (Grants Data Manager)
  - **Journey(s):**
    - J\_04 (Create Award from Proposal)
  - **Trigger:** User accesses proposal workspace for a proposal in eligible state (SubmittedToSponsor or StatusUpdateProvided)
  - **Expected Behavior:**
    - If user has grnts-can-create-award right (or role-specific variants): "Create Award" button visible and enabled
    - If user lacks right: Button hidden or disabled (implementation unclear)
    - If proposal not in eligible state: Button hidden or disabled
    - If award already exists for proposal: Button hidden; "View Award" link shown instead
    - Clicking button creates award in Initialized state, copies proposal data, and navigates to /award/smartform
- 

#### *UX\_006: Budget totals automatically calculated and displayed*

- **Persona(s):**
  - P\_01 (PI)
  - P\_02 (PC)
  - P\_03 (Grants Administrator)
- **Journey(s):**
  - J\_01 (Create and Submit Proposal)
  - J\_06 (Budget Management)
- **Trigger:** User saves budget (personnel costs, general costs, IDC)
- **Expected Behavior:**

- o System calculates total direct costs (personnel + general + subaward + trainee)
  - o System calculates indirect costs (IDC rate applied to direct costs)
  - o System calculates total costs (direct + indirect + cost sharing)
  - o Totals displayed in budget summary section
  - o Proposal-level totals updated across all budgets
- 

#### *UX\_007: Unit Admin can only edit proposals for their responsible unit*

- **Persona(s):**
    - o P\_03 (Grants Administrator)
  - **Journey(s):**
    - o J\_02 (Unit Review and Approval)
  - **Trigger:** Unit Admin attempts to access proposal
  - **Expected Behavior:**
    - o **If proposal.responsible\_unit matches user's admin unit:** Full edit access (state-dependent)
    - o **If proposal.responsible\_unit does NOT match:** No access, appropriate error or hidden from list
    - o Proposals landing page filtered to show only unit's proposals
  - **Notes:** Multi-tenant access control at organizational unit level
- 

#### *UX\_008: Specialist can edit proposals in most states except post-submission*

- **Persona(s):**
    - o P\_04 (Grants Specialist)
  - **Journey(s):**
    - o J\_03 (Central Review and Submission)
  - **Trigger:** Specialist attempts to edit proposal
  - **Expected Behavior:**
    - o **If proposal NOT in specialistNonEditableStates:** Full edit access
    - o **If proposal in non-editable state:** Form read-only, Save button disabled
    - o Clear message: "Proposal in [State] - Specialist cannot edit"
  - **Notes:** Prevents specialist edits after submission to maintain audit trail
- 

#### *UX\_009: SF-424 form locked after validation*

- **Persona(s):**
  - o P\_04 (Grants Specialist)
- **Journey(s):**
  - o J\_03 (Central Review and Submission)
  - o J\_08 (SF-424 Validation and Submission)
- **Trigger:** Specialist executes ValidateSf424 action
- **Expected Behavior:**

- o **After validation:** SF-424 form fields become read-only, sf424\_locked=true
    - o **Locked indicator displayed:** “SF-424 validated and locked”
    - o **Unlock button available** (specialist right required): Allows reverting to editable state
    - o **Cannot edit without unlocking:** Save attempts rejected
  - **Notes:** Prevents accidental changes after validation
- 

#### *UX\_010: Award financial integration shows pending/error states*

- **Persona(s):**
    - o P\_04 (Grants Specialist)
    - o P\_06 (Award Approver)
  - **Journey(s):**
    - o J\_05 (Award Approval and Financial Integration)
  - **Trigger:** Award approved and financial account submitted to external system
  - **Expected Behavior:**
    - o **State = FsiPending:** “Financial integration in progress...” message, spinner/loading indicator
    - o **State = FsiError:** “Financial integration failed” error message, display account\_errors, “Retry Integration” button visible
    - o **State = Active (success):** “Award active, account created: [external\_account\_id]” success message
- 

#### *UX\_011: Budget versions separated (Proposal vs. PostSubmission)*

- **Persona(s):**
    - o P\_01 (PI)
    - o P\_04 (Grants Specialist)
  - **Journey(s):**
    - o J\_01 (Create and Submit Proposal)
    - o J\_07 (Post-Submission Budget Update)
  - **Trigger:** User accesses Budget tab
  - **Expected Behavior:**
    - o **In PreSubmission state:** Only ‘Proposal’ version budgets displayed and editable
    - o **In PostSubmissionUpdateRequired state:** Both ‘Proposal’ (read-only) and ‘PostSubmission’ (editable) budgets displayed
    - o **Clear labeling:** “Original Budget” vs. “Post-Submission Budget”
    - o **Version toggle** (if applicable): Switch between viewing original and updated budgets
  - **Notes:** Version separation critical to avoid editing wrong budget
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#### *UX\_012: Personnel costs visibility restricted by special rights*

- **Persona(s):**
    - P\_01 (PI - limited)
    - P\_03 (Grants Administrator)
    - Users with salary view rights
  - **Journey(s):**
    - J\_06 (Budget Management)
  - **Trigger:** User navigates to Personnel Costs page
  - **Expected Behavior:**
    - **If user has readPersonnelCosts right:** Personnel costs page visible with salary data
    - **If user lacks right:** Personnel costs page hidden or salaries redacted (show only effort %)
    - **If user has editPersonnelCosts right:** Can edit salaries and fringe
    - **Clear indicator:** “Salary information restricted” if no view rights
  - **Notes:** Sensitive salary data protection via granular rights
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#### *UX\_013: Clarification request returns proposal to PreSubmission with notification*

- **Persona(s):**
    - P\_03 (Grants Administrator)
    - P\_04 (Grants Specialist)
    - P\_01 (PI - receives notification)
  - **Journey(s):**
    - J\_02 (Unit Review and Approval)
    - J\_03 (Central Review and Submission)
  - **Trigger:** Admin/Specialist clicks “Request Clarification” button
  - **Expected Behavior:**
    - Clarification modal opens with comment field
    - Admin/Specialist enters clarification reason
    - System transitions proposal state to ClarificationRequested intermediate state, then to PreSubmission
    - PI receives notification
    - PI accesses proposal, sees clarification message banner
    - PI makes corrections and resubmits
- 

#### *UX\_014: Multiple budgets per proposal supported*

- **Persona(s):**
  - P\_01 (PI)
  - P\_02 (PC)
- **Journey(s):**
  - J\_06 (Budget Management)

- **Trigger:** User clicks “Add Budget” button on Budgets tab
  - **Expected Behavior:**
    - Budget list displays all budgets for proposal
    - User can create additional budgets (subawards, consortiums, etc.)
    - Each budget has unique name and responsible unit
    - Totals calculated across all budgets
    - Budget count displayed: “3 budgets”
  - **Notes:** Common for complex proposals with subawards
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#### *UX\_015: Award modification creates versioned copy*

- **Persona(s):**
    - P\_04 (Grants Specialist)
    - P\_01 (PI - award owner)
  - **Journey(s):**
    - J\_05 (Award Approval and Financial Integration)
  - **Trigger:** Specialist initiates award modification
  - **Expected Behavior:**
    - Current award state preserved as version
    - New modification version created
    - Version number incremented
    - Modification workflow begins (UnitModification → CentralModificationReview → FinalModificationReview)
    - Upon approval, modification version replaces active award data
    - Version history accessible
- 

#### *UX\_016: Compliance protocols (IRB, IACUC, IBC) required for submission*

- **Persona(s):**
    - P\_01 (PI)
    - P\_02 (PC)
  - **Journey(s):**
    - J\_01 (Create and Submit Proposal)
  - **Trigger:** User completes Compliance tab and attempts submission
  - **Expected Behavior:**
    - Compliance tab displays protocol forms (IRB, IACUC, IBC, ESC, Agreements)
    - Required protocols marked with asterisk
    - **If required protocols incomplete:** Submission blocked with error message
    - **Bypass option** (admin/specialist): “Bypass ancillary review block” with justification field
    - **If bypassed:** Submission proceeds with justification logged
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## 7.4 Summary: Persona Capabilities Matrix

Capability	P_01 (PI)	P_02 (PC)	P_03 (Admin)	P_04 (Specialist)	P_05 (Data Mgr)	P_06 (Approver)
Create Proposal	✓	✗	✗	✗	✗	✗
Edit Proposal (PreSubmission)	✓	✓	✓ (unit)	✓	✗	✗
Submit Proposal	✓	✓	✗	✗	✗	✗
Review Proposal	✗	✗	✓ (unit)	✓ (central)	✗	✗
Approve Proposal	✗	✗	✓ (unit)	✓ (central)	✗	✗
Request Clarification	✗	✗	✓	✓	✗	✗
Edit Budgets	✓ (all)	✓ (all)	✓ (unit)	✓	✗	✗
View Personnel Costs	Limited	Limited	✓	✓	✓	✓
Edit SF-424 Forms	✓ (unit states)	✓ (unit states)	✓ (unit states)	✓	✗	✗
Validate SF-424	✗	✗	✗	✓	✗	✗
Submit SF-424 to Grants.gov	✗	✗	✗	✓	✗	✗
Record Submission to Sponsor	✗	✗	✗	✓	✓	✗
Create Award	✗	✗	✗	✓	✓	✗
Edit Award (Unit States)	✓ (owner)	✓ (owner)	✓ (unit)	✗	✗	✗
Edit Award (Central States)	✗	✗	✗	✓	✗	✗
Edit Award (Final Review)	✗	✗	✗	✗	✗	✓
Approve Award	✗	✗	✗	✗	✗	✓
Manage Financial Integration	✗	✗	✗	✓	✗	✓
Closeout Award	✗	✗	✗	✓	✗	✓
Certify Proposal (Self)	✓	✗	✗	✗	✗	✗
Certify Proposal (Others)	✗	✗	✗	✓	✗	✗
Assign Reviewers (Unit)	✗	✗	✓	✗	✗	✗
Assign Central Staff	✗	✗	✗	✓	✓	✗

Capability	P_01 (PI)	P_02 (PC)	P_03 (Admin)	P_04 (Specialist)	P_05 (Data Mgr)	P_06 (Approver)
Manage State (Override)	✗	✗	✗	✗	✓	✗
Initiate Data Updates	✗	✗	✗	✗	✓	✗
Access All Proposals	✗ (own/ related)	✗ (own/ related)	✗ (unit)	✓ (all)	✓ (all)	✓ (all)

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