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ASP.NET Web API 2



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# Joshua Barron

# Delivering Rich User Experiences with API-centric design and AngularJS

# Outline

- Problem Domain & Challenges
- Design Goals
- Technical Architecture
- Key Outcomes & Innovations

# Problem Domain

- **Foreign National Request (FNR) application**
  - Manages security plans for foreign nationals requiring access to Sandia
    - Visits
    - Employment
  - Intensive data entry
  - Complex rules and policies
  - Extensive approval process with many parties involved

# Challenges

- User experience problems
- Performance
- Maintenance & interoperability

# Current Interface

General Info | Justification | Host | Sandia Locations | Non Sandia Locations | IS Resources | FN Info | Required Approvals

## Foreign National Information

You must enter all required information for each foreign national. Use the Add/Change links for each field. If you need to obtain or update this information, you may send the foreign national an [information worksheet](#). For additional help with this screen please see the [User Guide](#).

### Foreign Nationals

Select a Foreign National to view/edit  
Foreign National: Mouse, Mickey [Add/Remove Foreign Nationals for this FNRSP](#)

Biographical Information				Add/Change
Family (Last) Name:	Mouse	Category:	Visitor	
Given (First) Name:	Mickey	Birth Date:	12/10/1956	Military ID:
Middle Name:		Birth City:		Gender: M
Nickname:		Birth State:		Citizenship1: Albania
US SSN:		Birth Country:	Belgium	Citizenship2:

**Employer Information** [Add/Change](#)  
Current Employer  
Employment Information Not Entered

**Education Information** [Add/Change](#)  
Education Information Not Entered

**Lawful Status Document Information** [Add/Change](#)  
U.S. Lawful Permanent Resident:

**Passport Information**  
Passport Information Not Entered

**Government Issued Identification (Visa) Information**  
Government Issued Identification Information Not Entered

# Design Goals

- Highly responsive, intuitive interface
  - Reduce cognitive load
  - Suited to specific tasks
  - Reduce data entry
- Increase performance (client-side & server-side)
- Reduce the number of interfaces the application exposes

# Prototype & Technical Problems

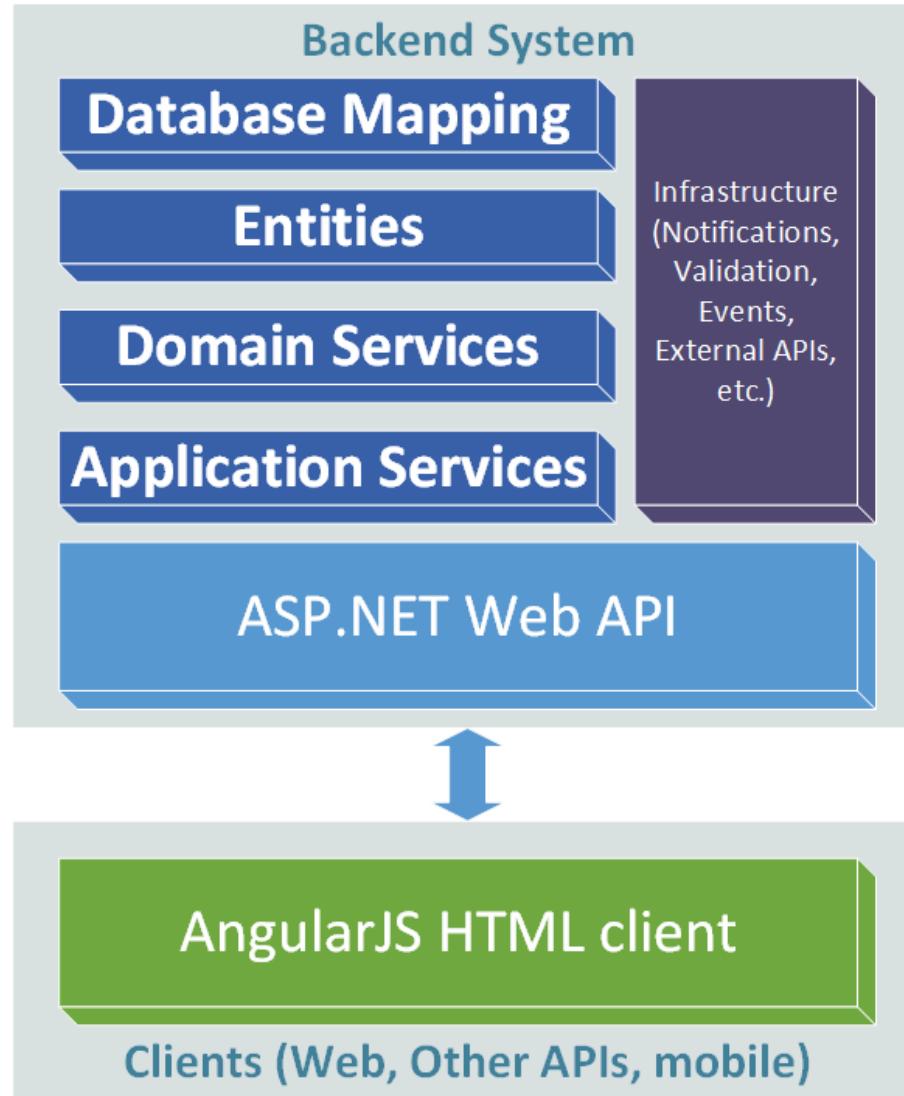


- Created a prototype application with ASP.NET MVC and jQuery
- Innovative features were well received but difficult to implement
- Hard to support multiple clients

# Architecture

- ASP.NET Web API (v2) backend
  - REST(-ish)
  - Self-describing
  - Easier than MVC
- HTML5, AngularJS web client (SPA)
  - CoffeeScript
  - Bootstrap foundation
  - “MVC” but all on the client

# Architecture Diagram



# Example Component

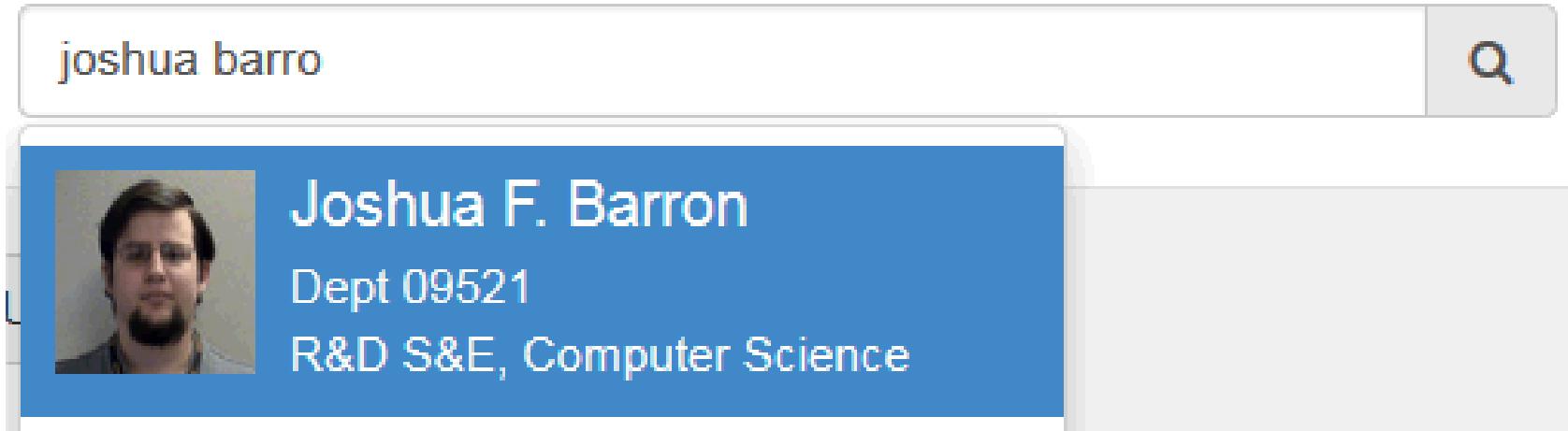
```
app.directive "snlautocomplete", ->
  return
    restrict: "E",
    controller: ["$scope", "$http", ($scope, $http) ->
      $scope.required = $scope.required || false
      $scope.limitTo = $scope.limitTo || 7
      $scope.placeholder = $scope.placeholder || "Search for a person"
      if $scope.ngModel
        $scope.ngModelName = $scope.ngModel.prettyName
      $scope.searchPeople = ($viewValue) ->
        return $http.get('api/people/search/' + $viewValue)
          .then (result) ->
            people = result.data.results
            if people == null or people.length == 0
              people.push
                isEmptyMessage: true
                message: "Your query returned no results."
            return people
    ]
    templateUrl: 'Content/views/components/autocomplete/snlautocomplete.html'
```

# Example Component (cont.)

```
<div class="input-group">
  <input type="text" class="form-control"
    ng-model="ngModelName"
    dynamic-name="inputName"
    typeahead="p for p in searchPeople($viewValue) | limitTo:limitTo"
    typeahead-loading="isLoading"
    typeahead-min-length="1"
    typeahead-wait-ms="200"
    typeahead-editable="false"
    typeahead-on-select="onSelect($item, $model, $label)"
    typeahead-template-url="app/views/components/autocomplete/snlautocompleteitem.html"
    placeholder="{{placeholder}}"
    ng-required="required" />
  <span class="input-group-addon">
    <i ng-class="isLoading ? 'fa fa-refresh fa-spin' : 'fa fa-search'"></i>
  </span>
</div>
```

# Example Component Usage

```
<snlautocomplete ng-model="plan.hosts.host"  
placeholder="'Search for host'" input-name="'host'" />
```



The screenshot shows a search interface. At the top, there is a search bar with the text "joshua barro" and a magnifying glass icon on the right. Below the search bar, a list of results is displayed. The first result is highlighted in blue and shows a small profile picture of a man with glasses and a beard, followed by the name "Joshua F. Barron", the department "Dept 09521", and the title "R&D S&E, Computer Science". The background of the result card is blue, while the other cards are white.

# Usability Testing

- Key to improving user experience
- Validates existing designs
- Generates new ideas

# Automatic Saving & Validation

- We save each section of the main data entry form as the user completes fields
- Errors are delivered in a timely manner
- Side effects of changes can be communicated immediately

# Automatic Saving & Validation

Security Plan #60025 (v. 1) Sensitivity: Generic [Why?](#)

View Security Plan Last saved 2 minutes ago

Jump to Section

- General Info
- Foreign Nationals
- Justification**
- Export Control
- Hosts
- Locations
- Cyber Access
- Comments
- Attachments

Help Articles

Scroll to each section to view help articles.

[View Complete User Guide \(FAQ\)](#)

## Justification

Why are you requesting access for foreign nationals? Explain the purpose and benefits in the justification field. You must also select a DOE goal that will be met by this visit, and explain the kinds of information that will be discussed during the visit or assignment.

**Justification and \* Anticipated Benefits**

Explain why this visit is necessary, and what the benefit(s) will be.

**Certification of DOE \* Mission Advancement**

Select the goal that best applies to this request.

**CRADA Project Numbers**

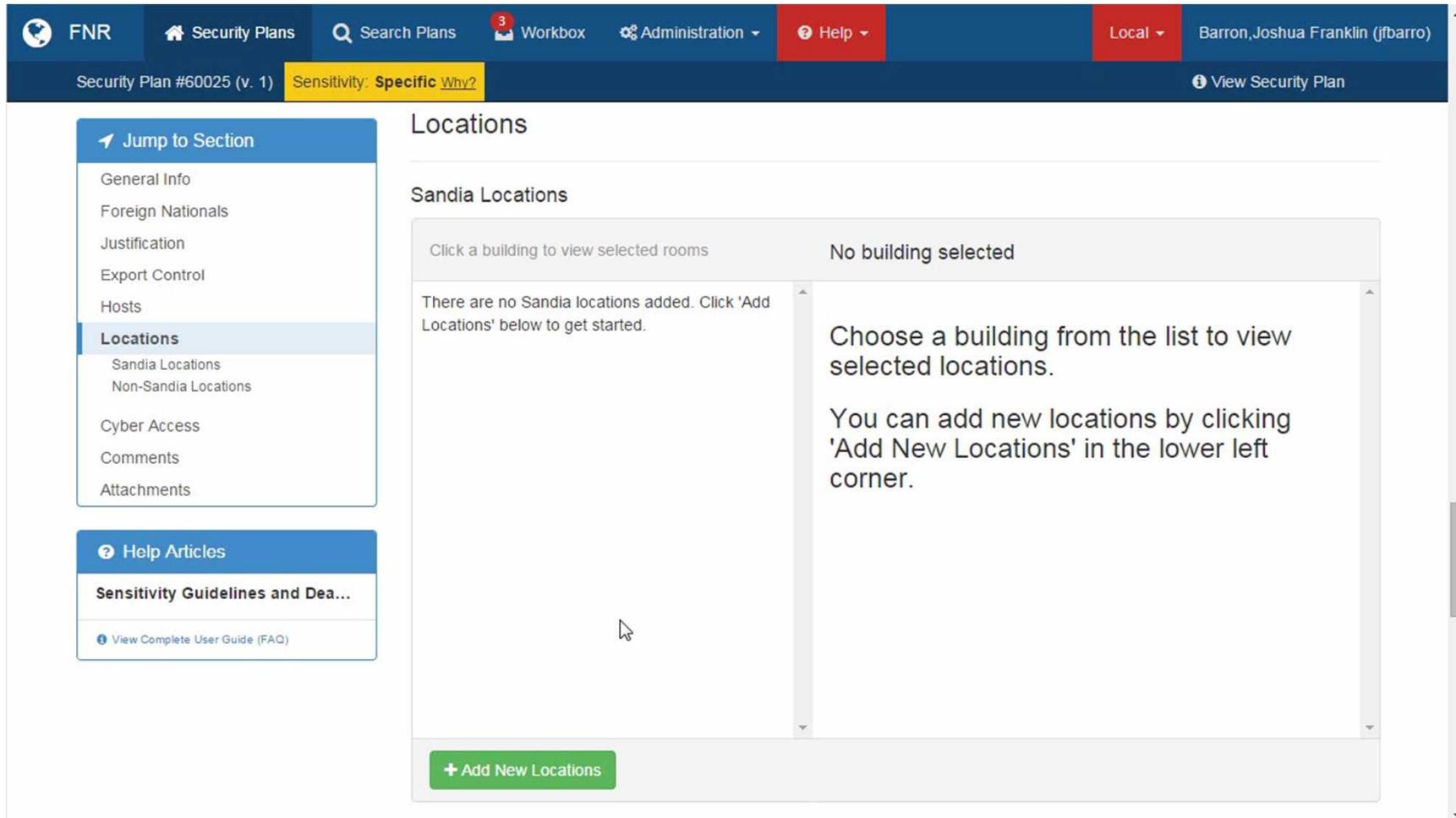
If there are any associated CRADA project numbers with this plan, enter them as a list above. Otherwise, leave this field blank.

**Technologies \***

Select technologies...

Select at least one and no more than three technologies

# Tailored Interfaces



The screenshot shows a web-based application interface for managing security plans. The top navigation bar includes links for FNR, Security Plans, Search Plans, Workbox (with 3 notifications), Administration, Help, Local (selected), and a user account for Barron, Joshua Franklin (jfbarro). The current page is a Security Plan (v. 1) with the title "Sensitivity: Specific [Why?](#)".

The main content area is titled "Locations" and displays the "Sandia Locations" section. It includes a message to "Click a building to view selected rooms" and a note that "No building selected". Below this, it says "There are no Sandia locations added. Click 'Add Locations' below to get started." A large text box on the right provides instructions: "Choose a building from the list to view selected locations. You can add new locations by clicking 'Add New Locations' in the lower left corner." At the bottom of this section is a green button labeled "+ Add New Locations".

On the left side, a sidebar titled "Jump to Section" lists various plan components: General Info, Foreign Nationals, Justification, Export Control, Hosts, Locations (which is currently selected), Sandia Locations, Non-Sandia Locations, Cyber Access, Comments, and Attachments. Below this is a "Help Articles" section with links to "Sensitivity Guidelines and Dea..." and "View Complete User Guide (FAQ)".

# Context-Sensitive Help

- JavaScript is used to detect when different sections of the form are in focus – this triggers a context-sensitive search on the user guide
- Delivers relevant guidance to users automatically

# Context-Sensitive Help

FNR    Security Plans    Search Plans    Workbox    Administration    Help    Dev    Barron, Joshua Franklin (jfbarro)    View Security Plan

Security Plan #60026 (v. 1)    Sensitivity: Generic [Why?](#)

## Edit

Security Plan #60026 v. 1

Enter or update the following information to complete your Security Plan. When you are ready, select the "Submit" button at the bottom of this form to begin approvals.

**Jump to Section**

- General Info
- Foreign Nationals
- Justification
- Export Control
- Hosts
- Locations
- Cyber Access
- Comments
- Attachments

**Help Articles**

[View Complete User Guide \(FAQ\)](#)

**General Info**

\* indicates required fields

**Name of Plan**  Enter an optional name to help you identify this plan, such as IAEA Conference 2015 or Benedict Cumberbatch - Employee.

**Security Plan Type \***

**Start Date \***  MM-dd-yyyy

**End Date \***  MM-dd-yyyy

**Visit Reason \***

Select the reason that best applies to this request.

**Foreign Nationals**

**+ Add a Foreign National**

# Performant Interface

FNR    Security Plans    Search Plans    Workbox (3)    Administration    Help    Dev    Barron, Joshua Franklin (jfbarro)

## Create a New FNR Security Plan

Create a new security plan from scratch, from a template, or by cloning an existing plan.

**Before You Begin...**

The FNR Security Plan process requires a lot of information. Before you create a new security plan, complete the following:

- Is an FNR Security Plan required?  — This flowchart includes time required to approve.
- Host Information Worksheet  — If you are not the host, have the host complete this form.
- Foreign National (FN) Information Sheet  — Have one completed for each FN that has not been here within the past year.

<b>New</b> <p>This option will allow you to create a brand new security plan.</p> <p><b>★ Create from scratch</b></p>	<b>Template</b> <p>This option will allow you to create a new security plan using a template that you or FIO have defined.</p> <p>You cannot create a plan from a template because you have no templates to use as a source.</p>	<b>Clone</b> <p>This option will allow you to create a new security plan by cloning (copying) one of your existing plans.</p> <p><b>Select the plan you want to clone</b></p> <p><b>Do you want to copy existing foreign nationals to the new</b></p>	<b>Revise</b> <p>This option will allow you to make changes to an existing approved security plan.</p> <p>You cannot revise a plan because you have no approved plans to change.</p>
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# Responsive Design

FNR    Security Plans    Search Plans    Workbox (3)    Administration    Help    Dev    Barron,Joshua Franklin (jfbarro)

Security Plan #60026 (v. 1)    Sensitivity: Generic [Why?](#)    [View Security Plan](#)

## Edit

Security Plan #60026 v. 1

Enter or update the following information to complete your Security Plan. When you are ready, select the "Submit" button at the bottom of this form to begin approvals.

[Jump to Section](#)

- [General Info](#)
- [Foreign Nationals](#)
- [Justification](#)
- [Export Control](#)
- [Hosts](#)
- [Locations](#)
- [Cyber Access](#)
- [Comments](#)
- [Attachments](#)

[Help Articles](#)

[Sensitivity Guidelines and Dea...](#)

[View Complete User Guide \(FAQ\)](#)

**General Info**

**Name of Plan**  ✓  
Enter an optional name to help you identify this plan, such as IAEA Conference 2015 or Benedict Cumberbatch - Employee.

**Security Plan Type \***

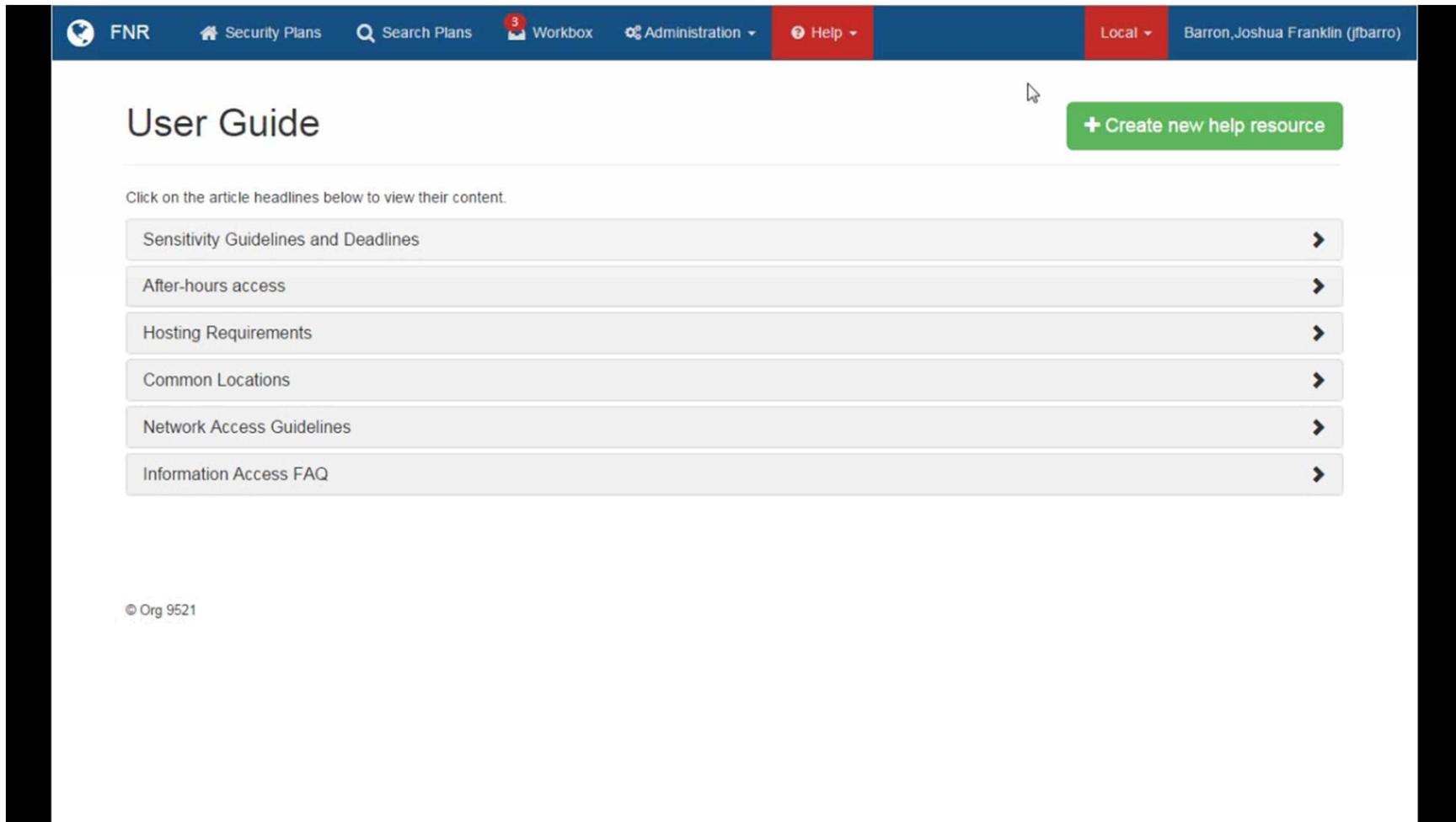
**Start Date \***  MM-dd-yyyy Select Date

**End Date \***  MM-dd-yyyy Select Date

**Visit Reason \***

Select the reason that best applies to this request.

# API Documentation



A screenshot of a web-based user guide interface. The top navigation bar includes links for "FNR", "Security Plans", "Search Plans", "Workbox" (with a red notification badge), "Administration", "Help", "Local", and the user "Barron, Joshua Franklin (jfbarro)". A green button on the right says "+ Create new help resource". The main content area is titled "User Guide" and contains a list of articles with arrows to expand them. The footer includes a copyright notice: "© Org 9521".

User Guide

Click on the article headlines below to view their content.

- Sensitivity Guidelines and Deadlines
- After-hours access
- Hosting Requirements
- Common Locations
- Network Access Guidelines
- Information Access FAQ

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# Key Outcomes

- Web interface that allows for creativity in design and innovative features that enhance user experience
  - Responsive design allows basic cross-platform usage
- Performant, rich API that exposes the business layer to clients in a uniform manner
- Opportunity to develop multiple client applications using the same API

# QUESTIONS / COMMENTS?