Building a REST API with Django & Django REST Framework

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Goal: Build REST API

- Interface for Firewall Rule Additions
  - Requirements
    - Support Direct API Calls
    - Provide Self-Service Portal
- Preference for Using Python

Data to Receive as Input

- Customer
  - Text Field
- Source/Destination IP Address
  - Single IPv4 Address
- Destination Port
  - Single Integer Value
- Business Justification
  - Text Field - Optional

Selecting a Starting Point

- Django
  - Had Heard of It
  - Python-based
    - Built-In Admin Interface
    - Found REST Module
- Flask
  - Seemed Complex
  - Required Python Knowledge

Learning Basic Building Blocks

- Models
  - Define Data Object
    - Attributes
    - Behaviors
  - Optionally Defines Database Table
- Serializers
  - Translate Models into Other Formats
    - JSON
    - XML
    - Others

Learning Basic Building Blocks

- Views
  - Callable Functions or Classes
  - Take a HTTP Request
    - Return a HTTP Response
- ViewSets
  - Single Class for Set of Related Views
  - Predefined & Build Your Own

Learning Basic Building Blocks

- URLs
  - Mapping Addresses to Views & Templates
- Routers
  - Automatic Way of Mapping for ViewSets
- Settings
  - Configuration of Application

Data Formats Provided by Django REST Framework

- Add Data Formats Using Renderers
  - JSONRenderer
  - XMLRenderer
  - More in rest_framework.renderers Package
- Enable Browsable API Renderer
  - BrowsableAPIRenderer

Considerations Before Building a REST API

- 'Disabling' Certain API Views
- Adding Custom Validators & Handling Validation Errors
- Manipulating Data Flowing within the Application
- Enabling Single API Call to Accept Mult. Input Formats
- Customizing the Save Process Behind an API Post
- Documentation Considerations

‘Disabling’ Certain API Views

- Who Can Access Which Views?
  - Maintain User & Groups Tables
    - Auto-Add New Users or Not
  - Checking User Data from Request
    - Active Directory & Group Memberships
- How Do You ‘Disable’ a View?
  - Define Individual Views
  - Using ViewSets
    - Disable Based on Users
    - Return 403 Forbidden or Other HTTP Response Code

Data to Receive as Input

Iteration 1

- Customer
  - Text Field
- Source/Destination IP Address
  - Single IPv4 Address
- Destination Port
  - Single Integer Value
- Business Justification
  - Text Field - Optional

Iteration 2

- Source/Destination IP Addresses
  - Ranges, Subnet Masks
- List of Destination Ports
  - Ranges
- Business Justification
  - Required
- User
  - Text Field - Optional

Adding Custom Validators & Handling Validation Errors

- When to Use an Existing Validator?
    - Simple Validations
        - IPv4 Address
- When to Create a Custom Validator?
    - Complex Validations
        - Multiple Inputs Allowed
        - No Existing Validator Available
    - Grouping Single Validators
- What to Do When Data is Invalid?
    - Try Another Validator if Applicable
    - Raise ValidationError

Manipulating Data Flowing within the Application

- What Data is Needed for the Model?
  - Consider All Potential Input
  - Think About Future API Plans
  - 'Umbrella' Model
- What Data to Return & is Not Part of Model?
  - Simple to Add to Response Object
  - Consider What Data the User May Need
    - ID Associated With Actions
    - Error Data Needed by User
      - Consider Data Needed by Support Team

Enabling a Single API Call to Accept Multiple Input Formats

- When Would This Be Necessary?
  - Building the API for the Users
  - Updated Functionality for API
- How to Maintain Backwards-Compatibility?
  - Intercept Request via View Logic
    - Modify Input/Output as Necessary
  - Versioning the API
    - Use Default Version When No Version Specified
    - How to Version
      - HTTP Accept Header
      - URL

Customizing the Save Process Behind an API Post

- Why Would This Need to be Done?
  - More Data Behind the Scenes
- Single API POST Saving to Multiple Models & Database Tables
  - Override Save Method of Main Model
  - Call Multiple Save Methods for Each Model
  - Considerations
    - Save Each Database Entry
      - Performance Impact Possible
    - Using Bulk Insert
      - Becomes Challenging When Dealing with Foreign Keys

Documentation Considerations

- Built-In Browsable API
  - Able to Customize the Theme
  - Potential for Fully-Functional API Access
  - Supports Viewing Multiple Data Formats
- Swagger
  - Similar to Browsable API
  - Enhanced Visuals
  - Potential Difficulty Setting What Actions Are Available
- Wikis

Other Lessons Learned

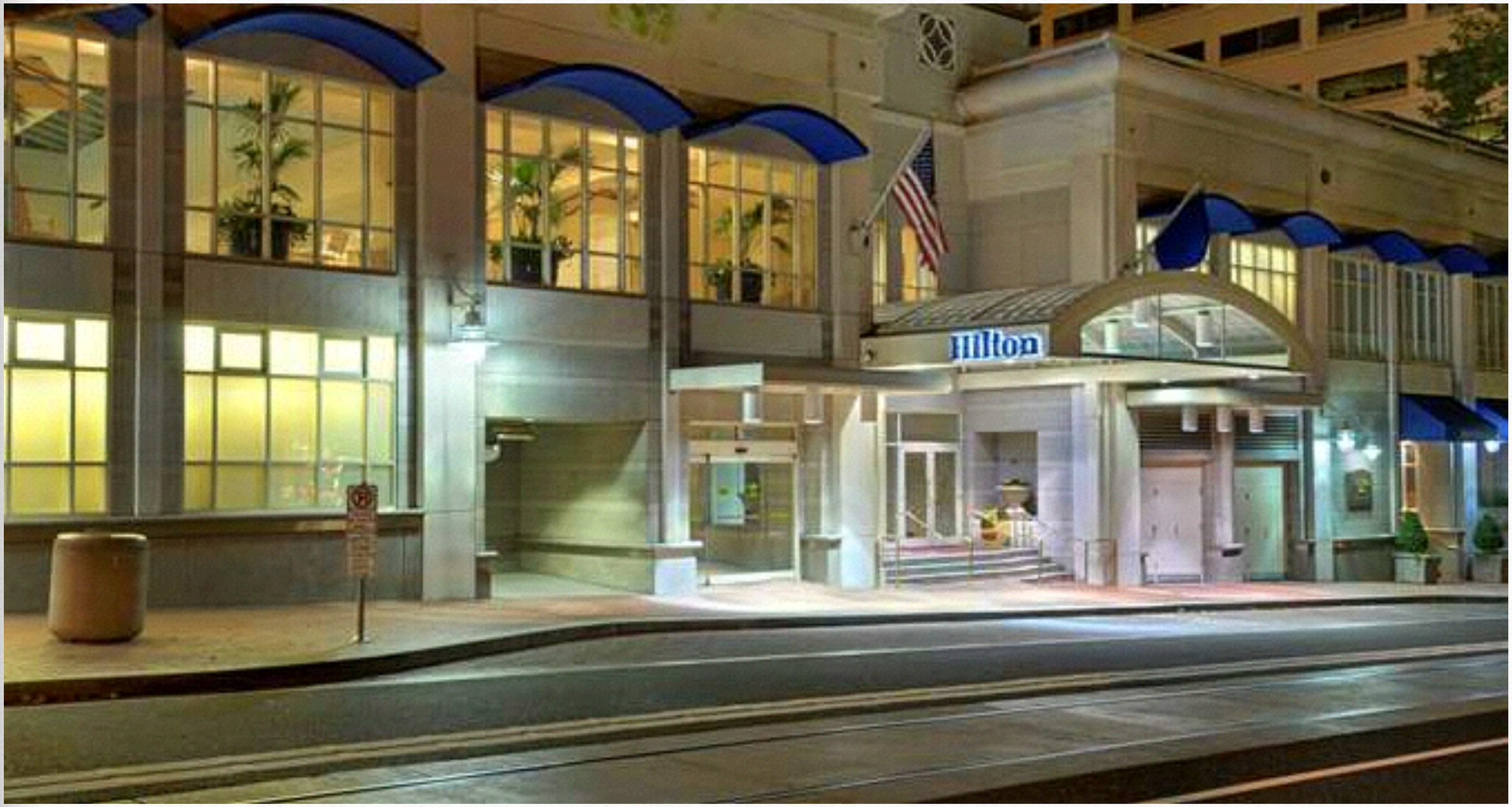
- Django Usage of Pre-Existing Database Tables
  - inspectdb
    - IntegerField vs AutoField
      - Add to Admin Interface for Web Management
  - ‘MySQL Server Has Gone Away’ Error
    - Close Database Connection Prior to Each Query
      - Caution: Should NOT Be Done for Testing
  - Coverage Module
    - Calculates Code Coverage of Tests

Other Lessons Learned

- Dynamic Customization of HTTP Response Header
- Parallel Support of Direct Server Access & Access via Web Proxy
  - Select Production-Level Web Server such as Apache
  - Configure Settings File(s)
    - FORCE_SCRIPT_NAME
    - Browsable API Links
      - Customize HTML Template
      - Customize Router for Addresses of Views
- Benefit of Multiple Settings Files
  - Potential Challenges

Closing Remarks

- Django & Django REST Framework
  - Easy Entry Point for Novices
  - Customizable for Advanced Users
    - Just Requires Willingness to Explore



Thank you!

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Slides: http://github.com/KennyNCSU/DjangoCon2014