RESTful Spring

Brian Sletten
brian@bosatsu.net
Speaker Qualifications

- Independent Software Consultant
- 13 years of software experience
- Work in Semantic Web, AOP, Grid Computing, P2P and security consulting spaces
- Built Spring-based application for large customer
Agenda

- Why Are We Here?
- REST Overview
- Spring w/ Restlets
- Securing RESTful Spring
- Spring w/ NetKernel
- Conclusion
Why Are We Here?
WS–Tenacity

SOA = WSDL + SOAP + UDDI
WS–Tenacity

SOA = WSDL + SOAP + UDDI!!!!
WS–Complexity

- Real Complexity
  - Hard things hard
- Artificial Complexity
  - Easy things are (still!) hard
WS-Inoperability

- SOAP
  - Message-oriented request
  - Mixes verb space and content space (No nouns!)
- WSDL
  - What You See Is What You Get
- UDDI
  - Published metadata about service
  - Simultaneously complex and limited
Conventional Web Service bigots have the gall to claim the moral highground on security.

- Complexity is the bane of security
- Routing Around Network Architecture
- Impotent Intermediaries
WS-Flexibility

- If you build it...
  - Amazon supports both SOAP-based and RESTful Web Services
  - Developers have spoken (80–90% prefer REST)
  - Architectural improvements when you support both styles via the Command Pattern
REST Overview
REST is History

- REST (REpresentational State Transfer)
- Based largely on Roy Fielding’s Ph.D. thesis
- Architectural style designed to promote
  - Performance
  - Scalability
  - Generality
  - Simplicity
  - Modifiability
REST Architecture

From Roy Fielding’s Thesis
RESTful Web Services

- Putting the “Web” in Web Services
- Reusing existing technologies
- Simple things easy, hard thing possible
  - Can layer on complexity as necessary
- Nothing necessarily to buy
Comparison to SOAP

- Separation of Concerns
  - Noun space, Verb space, Content space
- Identifiable resources
- Identifiable requests
- Constrained semantics
- Empowered intermediaries
- Contracts not required (but possible)
Noun Space

- Resources are an abstraction for what is available
  - Files
  - Generated Content
  - Computational Results
  - Concepts/Organizations/People
- What comes back can change over time
  - Think about today’s /. Page
What’s In a Name?

- Resources are referenced via Identifiers
  - http://www.bosatsu.net
  - http://www.菩萨.net
  - urn:isbn:0977616665
- Dereferencing URIs is orthogonal to transferring content
Verb Space

- Constrained semantics for acting upon resources
- Traditionally
  - GET
  - POST
  - PUT
  - DELETE
- Allows intermediaries to apply security/caching policies
GET

- Consequence-free (idempotent) request for a resource
POST

- Transfer all or some portion of a resource to a processing engine on the server
- Create/Update depending on context
Create a resource if it doesn’t exist or overwrite it if it does
Delete

- Remove a resource from a server
Content Space

- Byte streams annotated with metadata
  - Last-modified
  - MIME-type
- No deeper structure specified
  - Clients have freedom/responsibility to know how to interpret
  - Clients can negotiate content form with server
  - Resources are sent to/from client as a concrete Representation
Spring w/ Restlets
Why not WebLogic? Geronimo? Tomcat?

- Possible to expose RESTful services through these containers
- We lose many of the architectural benefits by tying ourselves to non-REST-oriented containers
  - URLs + verbs + resource abstraction provides benefits
  - URLs ≠ scalability
Why not Spring MVC WebFlow?

- Again, you certainly are encouraged to build RESTful APIs with these.
- However, tied to Servlet API:
  - Assumes synchronous I/O in request mechanism.
  - Not as easy to support other transports.
Restlet API

- Simple Java API for providing/consuming RESTful Web Services
- Replacement for Servlet API to avoid I/O and transport limitations
- Container independent
- Object model for RESTful concepts
- Useful to help define RESTful APIs
Restlet Features

- Blocking/Non-blocking IO
- Representations
  - String, XML, JSON, Freemarker templates
- Transports/Protocols
  - HTTP/HTTPS, SMTP, JDBC, FILE, AJP
- Filters
- Spring integration!
package net.bosatsu.spring;

import org.restlet.Restlet;
import org.restlet.Server;
import org.restlet.data.MediaType;
import org.restlet.data.Protocol;
import org.restlet.data.Request;
import org.restlet.data.Response;

public class SimpleServer {
    public static void main( String[] args ) throws Exception {
        Restlet restlet = new Restlet() {
            public void handle(Request request, Response response) {
                response.setEntity("Hello, Florida!", MediaType.TEXT_PLAIN);
            }
        };

        new Server(Protocol.HTTP, 8183, restlet).start();
    }
}
package net.bosatsu.spring;

import org.restlet.Client;
import org.restlet.data.Protocol;

public class SimpleClient {
    public static void main(String[] args) throws Exception {
        Client client = new Client(Protocol.HTTP);
        client.get("http://localhost:8183").getEntity().write(System.out);
    }
}
Spring
Restlet
Examples
Securing RESTful Spring
Basic/Digest Auth

- Same mechanisms used by web servers can be used to protect access to simple RESTful APIs
- Simple and easy
- Assumes trusted sources and should leverage SSL
ACEGI

- Same security framework that protects normal Spring apps can be used to secure Spring-based RESTful APIs
- Interception-based checks can be as elaborate as need be
Securing RESTful Spring Examples
Spring w/ NetKernel
NetKernel

- Java-based microkernel architecture built around the ideas of REST, Unix pipes and SOA
- Tremendously productive and scalable architecture
- Homogenizes everything into URI-addressable features
- Advanced features allow us to improve upon our Spring-based RESTful architecture
Conclusion
REST is AN Answer

- For architectural styles that support it, REST allows systems to be simple but complete.
- It is possible to layer on extra complexity as needed.
- Promotes separation of noun, verb and content spaces for simplicity and extensibility.
- Systems built on principles of REST demonstrate great scalability.
- Some places it is not the right answer.
## References

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Questions?

brian@bosatsu.net

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