HL7 Tutorial Specification

Version: 0.2 Title: **FHIR for Software Developers**

Complete the table below

|  |  |  |
| --- | --- | --- |
| Title | FHIR for Software Developers | This title is unique and friendly it explains what is intended. Make sure that the title makes sense to those who don’t know the topic well. |
| Summary | A deep-dive into the infrastructure parts of the FHIR specification. Get insight in how to design, develop and test software that uses the FHIR interoperability standard, all the way from the wire-format up to validation and storage. | Explain what the tutorial is about. Remember this is marketing information about your intended tutorial or information session and should encourage people, and give them a reason to attend. |
| The tutorial will benefit | Software developers, team leads, infrastructure architects | This defines the audience |
| Upon completion of this tutorial the students will have obtained the following | * Understand how Resources align with object-oriented and other common software-engineering principles. * List the four of interoperability paradigms supported by FHIR * Understand the FHIR REST service operations and how to implement them * Understand how the Atom, Xml and JSON wire formats are used in FHIR * Understand versioning and bundles * Compare strategies for using object models, validation and (de)serialization * Use relational or document-oriented storage for persistence of resources * Understand how to implement search functionality * Know and use the provided reference implementations | These are the competencies. They are driven by verbs. These verbs include the following, each indicating a higher level skill:  1: know - recall, list, name  2: explain, understand  3: do (perform, use)  4: analyse  5: strategise  (see appendix A) |
| Prerequisites | The “Introduction to HL7 FHIR” tutorial. |  |
| Skills required to teach | Extensive familiarity with the FHIR specification. Expert knowledge of database platforms, software-engineering principles, and internet-technologies. | Identify the skills needed to present this material |
| Faculty | Ewout Kramer, Jean Duteau, Grahame Grieve (backup) | Indicate the person prepared to deliver and be responsible for this course |

# Actual Training Plan

See sample below to assist you in completing the training plan.

|  |  |  |  |
| --- | --- | --- | --- |
| Topic | Competency/Content | Minutes | Resources |
| Introduction | Introduce presenter and attendees, identify familiarity with material and software engineering background. | 10 |  |
| Software engineering principles in FHIR | How Resources map to object-oriented design principles. | 5 |  |
| Deconstructing FHIR data into bundles, resources, datatypes and primitives | 10 | FHIR Xml, Datatypes |
| A quick tour of the resources | 5 | Resource documentation |
| The REST service interface | The REST operations: CRUD, versioning, URL’s and references. | 10 | REST specification |
| Mapping to HTTP methods headers and results | 5 |  |
| Bundles, Messages, Documents and the different interoperability paradigms | 10 |  |
| Providing and consuming conformance profiles | 5 |  |
| Serialization | How FHIR uses Xml, JSON and Atom | 10 |  |
| Designing in-memory object models for Resources and datatypes | 10 | The C# and Java reference implementations in the distribution |
| (De)serialization and the how to use the reference API’s | 5 | The C# and Java reference implementations in the distribution |
| Handling extensions | 5 |  |
| FHIR models | Content of a Resource specification | 5 | A Resource XLS |
| Using FHIR model artifacts in software | 10 |  |
| Validation | 10 | Example: and XSD schema |
| Persistence | What do I need for storage, versioning and search? | 10 |  |
| Using document-oriented storage | 10 | Example: MongoDb |
| Using a relational DBMS | 10 | Example: Sql Server |
| Wrap up | Combining the parts: overview of a complete FHIR service | 10 | Example: architecture of Spark (C#) |
|  | Questions | 10 |  |

# Training Plan - Sample

Strategy is to use this training plan for students to critique and provide a blank training plan spreadsheet to support their analysis of their own courses.

Note: Every session (60 minutes or 1.5 hours for quarters of a day) should allow for 15 minutes of questions or ‘settling – arrival / pack up’ time which allows the group to relate and cope with fast and slow learners who have additional questions or needs.

Overhead materials: one slide every 2 minutes is generally considered a fast pace, often too fast for people to take in information. For a 1.5 hour presentation of complex information such as that of HL7 there should be no more than 45 slides, and preferably 30 slides. Additional information may be provided. If you have a course that changes significantly according to the audience needs, the materials should have clear sections or topics and declaration of those topics covered and not covered should be made both to the students and recorded in course feedback information.

|  |  |  |  |
| --- | --- | --- | --- |
| Topic | Competency/Content | Minutes | Resources |
| Introduction | Introduce yourself and explain what the session is designed to provide,  Confirm with learners what they want out of the session | 2 |  |
| General Design of tutorial or information session | 1: understand the need to identify appropriate content and methodology to meet stakeholder need | 5 | Exercise - consider for your area of interest |
| 2: understand development of competencies to meet need | 8 | Sample of competencies for this course, what would be some of the competencies you would identify |
| 3: identify expected background of learners | 2 |  |
| Structure of deliverable | 4: understand what a learning plan needs to contain, breaking content into defined timeslots and identified resources/exercises | 10 | How many slides are in tutorials you provide?  Consider relevance of strategies for flexible learning |
| 5: understand delivery methods and assessment methods and tools | 5 | What alternatives could be used in your situation, what is required to ensure learners achieve required outcomes |
| 6: understand the need to measure assessment and content against competencies | 8 | sample tutorial outline |
| HL7 requirements | 7: prepare proposal for HL7 education | 2 |  |
|  | 8: undertake basic tutorial quality review | 3 | How could you do this in HL7? |
| Questions |  | 5 |  |
|  | TOTAL TIME | 50 |  |
| Speakers are invited to speak as a representative of HL7 and to do a tutorial for HL7. Speakers may indicate their name and their firm’s name on the introduction slides.  Speakers are not allowed to include slides or hold discussions during HL7 tutorials, indicating “our company provides XXX or XXX” or provide ‘infomercials’ on their company, the products they sell, etc.  HL7 will not allow speakers to use the HL7 tutorials as a time for marketing of individual firms. | | | |

Appendix A Bloom's Taxonomy(Bloom, 1956), with Skills Framework for the Information Age (SFIA) (SAIF Foundation) level comparison

|  |  |  |
| --- | --- | --- |
| **Bloom’s Taxonomy** | **Verbs used to describe the levels of tasks an individual at a given level of competency is able to perform.** | **SFIA levels** |
| Knowledge | Arrange, define, duplicate, label, list, memorize, name, order, recognize, relate, recall, repeat, and reproduce state. | 1: Follow |
| Comprehension | classify, describe, discuss, explain, express, identify, indicate, locate, recognize, report, restate, review, select, translate, understand | 2: Assist |
| Application | Apply, choose, demonstrate, dramatize, employ, illustrate, interpret, operate, practice, schedule, sketch, solve, use, write. | 3: Apply |
| Analyse | Analyze, appraise, calculate, categorize, compare, contrast, criticize, differentiate, discriminate, distinguish, examine, experiment, question, and test. | 4: Enable |
| Synthesis | Arrange, assemble, collect, compose, construct, create, design, develop, formulate, manage, organize, plan, prepare, propose, set up, and write. | 5: Ensure, Advise  6: Initiate, influence |
| Evaluation | appraise, argue, assess, attach, choose compare, defend estimate, judge, predict, rate, score, select, support, value, evaluate | 7: Set Strategy, inspire, mobilise |

Bibliography

BLOOM, B. (ed.) 1956. *Taxonomy of education objectives: The classificaiton of educational goals: Handbook 1, cognitive domain*: Longmans, Green, New York, Toronto.

SFIA FOUNDATION. 2008. *Skills Framework for the Information Age* [Online]. Available: <http://www.sfia.org.uk/cgi-bin/wms.pl/932> [Accessed 11 Feb 2010].