Archinotes: A Global Agile Architecture Design Tool

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About Us....

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- Research interests
  - Software Architecture
  - Solution Architecture
  - Agile software development

Juan Urrego, M.S.

- Instructor
- Research interests
  - Software Architecture
  - Solution Architecture
  - Agile software development
  - User eXperience
What is this presentation about?

Software Architecture Design !!!

Global Software Development (GSD)

Collaboration

Agility

How is this presentation structured?

Each sprint: 4-5 minutes

- **Sprint 0**
  - GAAD
  - Archinotes
  - Case Study

- **Sprint 1**
  - Architecture vision and scope
  - Requirements
  - Demo

- **Sprint 2**
  - Sprints
  - Viewpoints
  - Models
  - Demo

- **Sprint 3**
  - Collaboration
  - Annotations
  - Demo

- **Sprint 4**
  - Discussion
What is this sprint about?

- Global Agile Architecture Design (GAAD)
- Archinotes: A GAAD Supporting Tool
- Experience report using Archinotes
Global Agile Architecture Design (GAAD)

Software architecture projects requires multiple participants

- Geographically distributed
- Working at different time zones
- Use of heterogeneous tools to support collaborative work
Software architecture projects requires multiple participants

We develop a small study to understand offer and demand patterns:

• Source: monster site
• 20 different countries
• 8 languages
• 3,386 cities
• Different architecture roles (infrastructure, software, SOA, information, solution)
Global Agile Architecture Design (GAAD)

Offer
Infrastructure Architect
Demand

The offer and demand are inverse

SOA Architect
Archinotes:

Archinotes: A Global Agile Architecture Design tool

- Supports geographically distributed teams
- Provides a collaboration tool for architects
- Facilitates the generation of the Software Architecture Document
- Archinotes is based on some agile principles
  - Architecture design following *sprints* and *backlogs*
  - Explicitly use of the Architecture owner role
  - Promotes time framed review meetings: Daily architecture reviews
Archinotes – Architecture General View

Sprint 0

Component Interface Subsystem

Sprint 0


Archinotes - Architecture

Mobile client (Android)  Web client
Academic Experience

- Design tool for the software architecture course
  - undergraduate program on Systems and computing engineering
  - Los Andes University – Bogotá -Colombia
- Fall 2013 and Spring 2014
- Collaboration tool for 30 students / semester
- Medium size project
- 5 Sprints during the semester
Industrial Experience

- Public university in Cartagena – Colombia
- Development team and infrastructure architect located at Cartagena
- Software architecture team located at Bogotá
- 4 months project
- Interaction with an agile development team following Discipline Agile Delivery (DAD)
- Software architecture designed in 5 Sprints
What is this sprint about?

- Defining architecture vision and scope
- Managing architecture requirements
Archinotes supports the definition of the following information about a software architecture project:

- **Overview**: Project background, purpose, scope and general overview of the systems capabilities
- **Stakeholders**: Stakeholders management (classification, main concerns)
- **Business Goals**: Definition of business goals and architectural drivers
Architecture vision and scope

Archinotes supports the definition of the following information about a software architecture project:

- Definition of business and technology constraints
- Definition of functional requirements using operational scenarios.
During Sprint 0 Archinotes was used to define:

- Architecture overview and project overview
- 8 Business Goals
- 10 Operational Scenarios
- 8 Business and Technical constraints
What is this sprint about?

- Architecture backlog / Architecture Sprint backlog
- Designing the architecture with sprints
- Managing Viewpoints and architectural models
Similar to some agile development methodologies, Archinotes supports the definition of a list of requirements to be considered during the design process. Requirements defined in utility trees are used as architecture backlog items.
Putting into practice agility: Sprints

Archinotes supports the definition of working sprints. Sprints can be used to design a software architecture following an incremental approximation.
Architecture backlog / Sprint backlog

A set of quality attributes are taken from the utility tree and expanded as quality scenarios.
During each sprint, the team can create architectural models associated to viewpoints. Archinotes supports most of the viewpoints proposed by Rozanski and Woods in the book “Software Systems Architecture”.
Managing Viewpoints

Architectural models can be edited or versioned by the architecture team.
Experience Report

- During Sprint 0, an utility tree with 8 quality requirements was defined.

<table>
<thead>
<tr>
<th>Sprint</th>
<th># Quality Scenarios</th>
<th># New Models</th>
<th># Versions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sprint 1</td>
<td>3</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Sprint 2</td>
<td>2</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Sprint 3</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Sprint 4</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
</tbody>
</table>
What is this sprint about?

- Synchronous collaboration
- Asynchronous collaboration
Synchronous collaboration

Archinotes supports daily architecture reviews (DAR). DARs are time framed sessions closed invited participants.
Asynchronous collaboration

Archinotes supports asynchronous collaboration by means of annotations associated to architectural models. Annotations can be of different types: Text, audio, images, quality scenarios or custom.
Asynchronous collaboration

Architects can filter annotations stored in the models to read or listen about design decisions and reasoning information.
Experience Report

- During Sprint 0, an utility tree with 8 quality requirements was defined.

<table>
<thead>
<tr>
<th>Sprint</th>
<th># Architecture Reviews</th>
<th># Total Annotations</th>
<th># Average annotations per viewpoint</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sprint 0</td>
<td>5</td>
<td>4</td>
<td>0.8</td>
</tr>
<tr>
<td>Sprint 1</td>
<td>4</td>
<td>8</td>
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<tr>
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<td>6</td>
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</tr>
<tr>
<td>Sprint 4</td>
<td>2</td>
<td>25</td>
<td>4.16</td>
</tr>
</tbody>
</table>
What is this sprint about?

- Conclusions
- Future work
- Working with Archinotes
Conclusions

• Archinotes has proven to be effective as a collaboration tool for distributed teams, supporting daily meetings and annotations

• Promising results after combining agile principles and Software Architecture in small to medium size projects

• At the academic level this tool has facilitated the collaboration among students involved for the first time in a software architecture design project

• At the industry level we need to test the tool in more complex environments (i.e. different countries, more than one architecture team)
Future work

- Real time synchronization between mobile clients and web clients
- Integration with other design tools to import and export architectural models (i.e. xmi)
- Support more viewpoint and integration with reasoning tools (ontologies) to store and search architectural knowledge
Working with Archinotes

- Archinotes will be distributed under the MIT license model
- The tool will be available for downloading fall 2014
- For more information: http://archinotes.uniandes.edu.co