Software Architecture in the Presales Process

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Quarksoft

• A leading software development company based in Mexico City
  – Founded in 2001
  – Offices in Mexico, Spain and USA

• Quarksoft develops custom software for different domains
  – Insurance, Manufacturing, Telecommunication, Government Healthcare
  – Many projects are greenfield development of enterprise applications

• Rated at CMMI level 5
  – Development based on the Team Software Process (TSP)
Team Software Process (TSP)

- Proven method that helps plan, evaluate, manage and control software development work
  - Focus on metrics-based project and quality management
  - Does not provide precise guidance on the engineering activities such as requirements or architectural design
Previous work

- “Introducing Software Architecture Development Methods into a TSP-Based Development Company” (SATURN 2010)

Problem: Many architectural decisions are made before the actual TSP-based development is performed, during Presales

- Documentation using scenarios
- Adapted ADD
- Use of VaB Templates
- Scenario-based evaluations
Project development

• 2 important phases

Presales

[Accepted]

Development (TSP)

[Rejected]

Historic database

- Architect
- Leader

Estimation data

- Architect
- Leader
- Team

Project data

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Project development

• 2 important phases

- Architect
- Leader

Estimation data

Historic database

Development (TSP)

[Accepted]

[Rejected]

These estimates are calculated from components associated with specific technologies.
• Identification of estimation components is an essential task.

Architecture development starts in presales
The presales context

- Limited information
- Short time
- Internal constraints
- Competition with other providers

Architecture in Presales

• We had to adapt architectural methods to the presales context
Presales architectural drivers

• We shifted the focus from purely functional features to an architectural drivers approach
  – Primary features
    • “The kiosk system shall allow birth certificates to be visualized and printed”
  – Early quality attributes
    • “100% of the information that is stored in the kiosk system shall be protected (Security)”
  – Constraints
    • “The operating system of the kiosks is windows XP”
Presales architectural design

• Goals:
  – Estimation
  – Project planning
  – Satisfying drivers

• Design decisions for the presales architecture
  – Selection and adaptation of a reference architecture
  – Selection of technologies
  – Establishment of deployment layout
  – Identification of components for estimation

• The equivalent of performing initial iterations of ADD
Sample reference architecture (from Microsoft Application Architecture Guide)
Presales architectural documentation

• The “primary presentation” and element catalog sections from the VaB template are used

• The diagrams that represent the architecture are included in the project proposal
  – Module view
  – Layers / Technologies
  – Deployment view
Presales architectural evaluation

- 2 – 4 hours peer review process that analyzes design decisions with respect to the drivers
  - Performed before estimation
  - 3 architects
  - Seeks to identify risks both in the design decisions of the technical solution but also in the project strategy

- Some types of risks
  - Requirements, for example
    - Quality Attributes not quantified
  - Design decisions, for example
    - Inappropriate deployment layout
    - No expertise in selected framework
  - Strategy
    - The selected lifecycle is not appropriate to the level of technical risks in the project
Current results: General

• Architecture is now taken into account from the very beginning of the project’s development life cycle

• Early requirement gathering is driven by the architectural drivers

• The approach ensures that the presales architecture design is well aligned to the drivers, but also that the project strategy supports architectural development

• The proposals that are provided to the customer reflect this architectural-centric focus
Current results: Evaluation

• We have conducted 18 evaluations since July 2013
• On average the evaluations uncover between 6 and 7 risks (60% technical)
• Good (internal) customer satisfaction
  – “In general, the evaluation was useful”: 4.2 / 5
  – “The observations made by the evaluation team were valuable”: 4.6 / 5
• Good response time: 2.9 work days on average
Lessons learned

• Starting architectural activities from the beginning of project development is very valuable in this context
  – Results in iterative architectural development

- Early drivers
- Initial ADD iterations
- Initial views
- Initial project plan

- Scenarios
- Subsequent ADD iterations
- Standard views
- Actual project plan

[Diagram: Pre-sales flowchart with stages and decision points, including Pre-sales, Development (TSP), and Final architecture]
More lessons learned

• Major challenges are related to logistics
  – Being able to respond quickly to evaluation requests is essential
  – Training of architects
  – The organization must also be adapted in order to support evaluations

• The presales phase is a great place to experiment with new approaches
  – Frequent evaluations are great for helping the architects gain maturity
Future work

• Evaluate the impact
  – We are starting to conduct evaluations on projects that use the new methods in presales but data needs to be gathered to evaluate the improvements
Thank you!

• Questions?

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