The Role of Configuration Management in Outsourcing and Distributed Development

Lars Bendix  
bendix@cs.lth.se

Christian Pendleton  
Christian.Pendleton@softhouse.se

Department of Computer Science  
Lund University  
Sweden

Softhouse Consulting  
Malmö  
Sweden
Distribution

Distribution is good:
• gives a larger pool of talents and specialists
• allows for cooperation between departments/companies
• facilitates integration for mergers and acquisitions
• allows for around the clock work
• gives more flexibility in scaling up and down projects

Distribution is bad:
• it is more complex to manage
• it creates silos between groups
• people don’t understand and trust each other
• you lose control over remote teams/people
• …

Does it really have to be that way?
CM and Distribution

Configuration Management already handles “distribution”:

• programmers are rarely co-located
• developers are often distributed (also in time)
• we handle development AND maintenance
• where is the Project Manager?
**Our goals**

What are we trying to obtain:

- make sense of DD:
  - is there something here we don’t understand?
  - is there something that others have overlooked?

- what special challenges are there in DD:
  - which ones involve CM?
  - which ones do not involve CM?

- how can challenges be alleviated by CM support
  - “same old stuff”
  - re-think implementation
  - oops – that’s a new one ;-)
The method

Challenges

Analysis

CM in DD

Discussions

Cases
Prior art

ICGSE  >100 papers
… and beyond (Google Scholar)

Challenges:
• da Silva et al., 2010  (54 papers)
• Jiménez et al., 2009  (78 papers)

CM & DD:
• Pilatti et al., 2006  (4 cases)
• Fauzi et al., 2010  (24 papers)
Challenges

da Silva et al., 2010:
• effective communication
• cultural differences
• coordination
• time zone differences
• trust

• asymmetry in processes, policies and standards
• physical distance
• IT infrastructure
• different knowledge levels or knowledge transfer
• tracking and control
• cooperation
• people management/conflict resolution

• language barriers
• task allocation
• identification of roles and responsibilities
• knowledge management
• scope and change management
• overall visibility
• differences in technologies used
• creating team spirit
• project planning
• quality
• intellectual property issues/confidentiality and privacy
• different stakeholders
• schedule management
• synchronizing work between distributed sites
Challenges 1

Da Silva et al., 2010:
- **effective communication**
- cultural differences
- **coordination**
- time zone differences
- trust

- asymmetry in processes, policies and standards
- **physical distance**
- IT infrastructure
- different knowledge levels or knowledge transfer
- **tracking and control**
- **cooperation**
- people management/conflict resolution

- language barriers
- **task allocation**
- identification of roles and responsibilities
- knowledge management
- **scope and change management**
- overall visibility
- differences in technologies used
- creating team spirit
- **project planning**
- quality
- intellectual property issues/confidentiality and privacy
- different stakeholders
- schedule management
- **synchronizing work between distributed sites**
Challenges 1

da Silva et al., 2010:

- **effective communication**
- cultural differences
- **coordination**
- **time zone differences**
- trust

- asymmetry in processes, policies and standards
- **physical distance**
- IT infrastructure
- different knowledge levels or knowledge transfer
- **tracking and control**
- cooperation
- people management/conflict resolution

- language barriers
- **task allocation**
- identification of roles and responsibilities
- **knowledge management**
- **scope and change management**
- overall visibility
- **differences in technologies used**
- creating team spirit
- project planning
- quality
- intellectual property issues/confidentiality and privacy
- different stakeholders
- schedule management
- **synchronizing work between distributed sites**
Challenges 2

Jiménez et al., 2009:

- **communication**
- **group awareness**
- **software configuration management**
- **knowledge management**
- **coordination**
- **collaboration**
- **project and process management**
- **process support**
- **quality and measurement**
- **risk management**
Pilatti et al., 2006:

- **minimize dependencies between distributed teams**
- **work with one instance of SCM environment**
- all CIs required for a build should be put under CM
- projects should define one build coordinator
- establish and clarify CM before starting project
- CM engagement in the beginning should be prioritized
- always plan and document baselines (in CM plan)
- re-plan activities due to scope floating across teams
CM & DD 2

Fauzi et al., 2010:

- dispersed software teams do not get information on what other teams are doing
- difficult to know the traceability of each module
- the definition of modifications or problems to be handled is unclear
- dependency
- delay and increased time required to complete change requests
- working in different SCM environments
- change requests are handled at various levels in the project
- lack of a planned baseline
- lack of coding standards
- code ownership
- unclear flow of development
- tool selection
- artefacts with different versions and content at each site
Categorizations

Configuration Management involvement in DD challenges:

• not related
• weakly related
• strongly related, but not particular to DD
• strongly related
Normalization

But something didn’t quite work:
• there were too many challenges
• granularity was too varied
• some were broad-sweeping and imprecise

So we iterated over the original challenges:
• unify identical or similar challenges
• rename (and redefine) challenges to match CM terminology
• remove “irrelevant” challenges
• aggregate smaller challenges into larger, coherent chunks
• 11-17 resulting normalized challenges
Results 1

Not related to Configuration Management:
  • code ownership
  • need of office space
  • application of an iterative agile process
  • different governments, laws, rules and regulations
  • unclear flow of development
  • lack of coding standards
  • different stakeholders
  • quality
  • creating team spirit
  • identification of roles and responsibilities
  • people management/conflict resolution
  • IT infrastructure
  • process support
  • risk management
Results 2

**Co-located Configuration Management challenges:**

- lack of baselines
- all CIs required for a build should be put under CM
- establish and clarify CM before starting project
- CM engagement in the beginning should be prioritized
- difficult to know the priority of each module
Results 3

Weakly related to Configuration Management:

• project management
• trust
• intellectual property issues
Results 4

**Strongly related to Configuration Management:**
- communication
- co-ordination
- change management
- collaboration
- one SCM environment
- knowledge management
- (virtual) team awareness
Co-ordination (*strongly related*)

(a)

(b)

(a)

(b)
Project management *(weakly related)*

- Handover automation
  - Dependencies relations architecture

CMDB
Team awareness (strongly related)

Hypothetical Continuous Integration
Our mission

We were asking ourselves:
• was there something here we didn’t understand? YES!
• was there something that others had overlooked? YES!

Does it really have to be that way? NO!

Who can benefit:
• project manager
• programmer
• developer
• requirements engineer
• project/product owner
• configuration manager
Take-away I

Configuration Management involvement in DD challenges:

- *not related*
- *weakly related*
- *strongly related, but not particular to DD*
- *strongly related*
Take-away II

Dear CM, here are our lists of:

• distributed challenges you don’t want to hear of
• distributed challenges someone ought to be ashamed of

• distributed challenges where you can add some value

• distributed challenges that you are expected to fix (where you will have to re-think implementation)
• distributed challenges that you did not know you could fix (however, you will need some help – future work)

http://fileadmin.cs.lth.se/cs/Personal/Lars_Bendix/Research/SCM4GSD/