A small product line needing requisitely holistic management

Case study of a call-center application

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Introduction

- What is a software product line?
- Why a product line here?
  - The special requirements of a call-center application
- Why holistic management?
  - Connecting product lines and holistic management
- Example: A call-center application
  - Brief presentation
- Legal protection of a product line
  - One aspect of holistic management in more detail
What is a software product line (SPL)?

- Similar to industrial product lines
  » This does not refer to the act of producing, but the products!
  → One-size-fits-all is no longer enough
    » Example: Cars. Not only color, but many other details can be (and are) configured by customers as well
  → Individual products, but still very similar to each other
    » But not just different configurations!

- For software this means:
  → Different versions with different (⇒not just configuration!) code
  → Simultaneously in "use" (sold, production, maintenance, …)
  → Not just component reuse
    » Components are used on lower levels, e.g. widgets
    » SPL: Reuse of complete modules of business logic
  → No "general" reuse, but for a specific application area only
Why product lines need holistic management

- Just a SPL alone is not enough:
  - Software (and its capabilities) influences processes too
    - Both in the call-center and at the customer
  - Software shapes the offers: What can/cannot be done
    - Decisions in the data model result in business and process implications!
  - Speed and quality of usage influences results
    - Employee (dis-)satisfaction very important
      - You can hear it on the phone and then see it in the response rate!
  - Legal aspects
    - What may be done (calling), how to protect data (privacy), …
    - "Second" usage of the SPL: Selling the SPL/incarnations

A holistic view considers and incorporates all these viewpoints, strongly improving the service to customers
The need for product lines in call-center applications

- Many different campaigns to call people/answer specific calls
  - Typically on very short notice (several days up to two weeks)
  - Require IT support for effective and efficient performance
  - Typically part of an external business process
    » Data is received in a multitude of formats
    » Results must be passed back again in various formats and ways

- Main problem: Desires of customers vary widely
  - Call, ask, fill in form ⇒ Extremely rare!
  - Prescribing a specific process to call/call again
  - When to send which results in which format where
  - How to process results, e.g. send physical/E-Mail serial letters

- Still, employees should use a similar application to reduce learning time and mistakes
Example: A call-center application

● Web application for handling in- and outbound calls
● Typical process as seen by call-center agents (OUT):
  1. Presenting base information for calling (name, phone)
  2. Calling and obtaining some information
     » Alternative: Reschedule for later (busy, unreachable, …)
     » Alternative: Mark record as erroneous (e.g. wrong number)
  3. Save the record to the database and continue with next one
     » Alternative: Send immediately by E-Mail
        – Depending on entered information (various rules)
X. Export information for "further processing"
● Other functions include:
  » Statistics: Database as a whole, agents (time, success, …)
  » User management
  » Data verification
  » Messages to agents
Agent user interface example
(old version)
A small product line needing requisitely holistic management
Example: Product line aspects

- Re-development impossible for each campaign
  - Modules for specific tasks are assembled and configured according to customer's desires; "glue code" for interoperability

- Module examples:
  - Agent registration: Often the name alone is enough (no PW!)
    - Mass campaigns with dozens of agents
  - Timing: Checking the time needed for each record
  - ZIP code verification: Checking against official database
  - Various error conditions ("Not a company", etc.)
  - Work shifts: Number, timespan (calling also in the evening)
  - Exporting: Format, method (full, differential)

- Glue code: Physical layout of data fields (limited space)
Examples: Aspects of requisitely holistic management (1)

- Important viewpoints: Design
  - Example of what to ask first
    - Business: Most important content
    - Computer science: Identifying information (name, address, ...)
    - Legal: Willingness to participate
    - Agent: Greeting and friendly introduction
    - Called person: What is it all about
  - Especially missing: Customer (, public, TelCo, ...)
    - Unless they prescribe it in detail, we provide full service
      - Reason: We are experts at this; they typically just want some results

- Modularizing for a product line
  - These must be business modules, not CS modules/objects
  - Still, CS is important: Data encapsulation and hiding
    - Must be true for business modules also, or they are not reusable
  - Example: Auto-Dialing
Examples: Aspects of requisitely holistic management (2)

- Agent registration is nice from a security point of view, but…
  - Overhead increases: Agents are typically tested for some time before being accepted as permanent
  - Ensures correct spelling of names
    » Sometimes "fake" names are used (e.g. difficult to pronounce)
  - Permissions: Not everyone may do all
    » Exporting records, statistics, …
- Sending records by E-Mail
  - When, where, encryption, attachments, …
  - Format of content (for process integration)
- Incorrect values
  - Really incorrect (strange phone numbers exist!)? Unknown?
  - Agent annoyance, called person dissatisfaction
  - Importance of field
Legal protection of SPL

- The example is a web application
  - Could be "sold" over the web as service to other companies
    » Customization done in-house for external customers
    » Requires intimate knowledge of other call center and their own customers the application will be used for!
  - Or it could be licensed for customization there
    » Web application: They actually receive the complete source!

- What can be sold depends on what is protected!
  - The individual application: ✓
  - A specific campaign (no code, only configuration): ???
  - The product line as such: ???
  - The idea of a web-based call-center application: ✗
Legal protection: Copyright

- Programs are protected by copyright
  - This concerns the programming part of the webpages (PHP)
- But is HTML itself a programming language?
  - Probably not: No loops, decisions; only description of visuals
- Configurations (⇒ important part of SPL!) are similar to HTML
  - They describe a specific "layout" of the program, but do not consist of statements, loops, … themselves
    - » Really? Threshold values are similar to "if" in an abstract notation!
  - But: No direct relation to the end result!
  - See also: Visual GUI builders. They produce a configuration file, which is then "compiled" into source code
  - More complex configurations are therefore probably protected
    - Additionally: If accepted as "program", the creativity threshold is lower than for "normal" works, like pictures, texts, etc.
    - Configurations may therefore be changed under certain circumstances by the owner without consent of the author
Legal protection: Database protection, patents

- Database protection: Modules could be protected as a collection of individually accessible elements
  - But: No creative or special structure for organization ("heap")
  - No investment in selection, verification, or presentation of pre-existing elements $\Rightarrow$ no plain database protection
    » Investment in element (=module) creation (=programming) may not be counted for this type of protection!

- Patent protection for the SPL as a whole?
  - Basic idea: No. Ideas are not patentable
  - Separation into modules: No. Plans are not patentable
    » In Europe; in the USA this might be possible!
  - Solutions to individual technical problems: OK!
    » Example: Integration with PBX might be patentable
      – But: New, inventive, ....
Conclusions

- Product lines are applicable to small programs as well
  - They still must fulfill the general requirements for SPL!
- Because of their "mutability", product lines require a broader view on development, customization and configuration
  - Individually tailored to each situation ⇒ the whole situation must be taken into account!
    - Software and process issues alone insufficient: Agents and customer processes need to be considered as well
    - But not everywhere every viewpoint can or even should be considered!
  - Separation into modules very important: This may NOT be done according to technical (i.e. software) criteria
    - These are business modules and also need other viewpoints!
    - Interdependence of programming and business needs
Questions?

Thank you for your attention!