

Enterprise Information Systems for Product Software Vendors:
bringing the vendor and customer closer together

SIKS Dutch/Belgian Enterprise Information Systems Day

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Introduction CCU Model EIS functions Case Studies Exact Planon SSNs Questions

Programme

- Introduction to Product Software and Customer Configuration Updating
- CCU Model description
- An enterprise information system for CCU
- Our case study research
- Practical examples
- Agile community
- Software supply networks
- Discussion and conclusions

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Context of Customer Configuration Updating

- Main research question: "Can product software release, delivery, and deployment be improved by explicitly managing software and customer knowledge within a software supplier's organization?"
- It's about product software: To date product software is a **packaged configuration of software components** or a software-based service, with auxiliary material, which is released for and traded in a specific market [1].

[1] L. Xu and S. Brinkkemper, "Concepts of product software: Paving the road for urgently needed research," in *First International Workshop on Philosophical Foundations of Information Systems Engineering*, LNCS, Springer-Verlag, 2005


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Definition: CCU

Customer configuration updating: "the combination of the vendor side release process, the product update delivery process, the customer side deployment process, and activation and usage process."

i.e., the processes of:

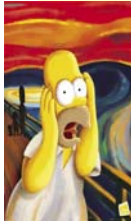
- Release
- Delivery
- Deployment
- Activation and usage



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What's the problem?

- No definition of the CCU process
- No method to evaluate a software supplier's CCU process
- No tools that suffice all the needs of a software supplier¹



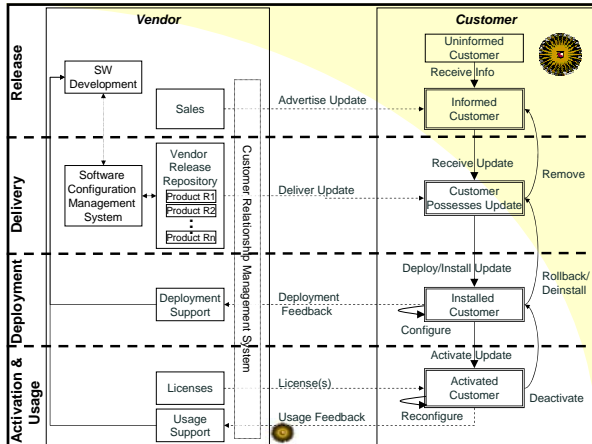
¹ S. Jansen, S. Brinkkemper, and G. Ballintijn, "A process framework and typology for software product updaters," in Ninth European Conference on Software Maintenance and Reengineering, IEEE, 2005, pp. 265-274.

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CCU Model

- Models the **interaction between software vendors and its customers** for each process area
- Based on:
 - Carzaniga
 - Sofa
 - Update model
- Used to evaluate CCU processes of nine (9) case studies in the product software industry²

² Definition and Validation of the Key Process Areas of Release, Delivery and Deployment of Product Software Vendors: turning the ugly duckling into a swan, proceedings of the IEEE *International Conference on Software Maintenance* (ICSM2006, Scientific track), Philadelphia, PA, USA, September, 2006. Accepted for publication.



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Required Functions for a PSW EIS

- **Development**
 - Project management (development, release management)
 - Workflow management (development, release management)
 - Software configuration management (development, release management)
 - Bug track system (support, development, maintenance)
- **Customer relationship management** (marketing, support system integration, FRCS, licensing, etc)
- **Product data management** (release management, variability, etc.)
- **Deployment support** (software delivery and deployment, media creation)
- **Delivery support** (internal/external publishing portals, release information portals, etc)
- **Data gathering** (pay-per-use, commonly used features, bug reporting, etc)
- **Release Management**
 - Release planning (tools, workflow, project, internal communication, etc)
 - Release publishing (tools, connection to website)
- **The federated product** (enterprise integration, exception handling in the supply chain, etc)

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Case Study Approach

- Exploratory case studies at product software companies (3-8 weeks)
- Interview sessions with personnel
- Two interviews per interviewee (1h each)
 - 1. Exploratory
 - 2. Cross checking observations
- Case study protocol that has been applied to six cases to date
- Case study knowledgebase
- Peer reviewing of process and knowledge acquisition

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A method for evaluating CCU for any vendor

- The CCU evaluation method is based on SPICE, the Software Process Improvement and Capability dEtermination (much akin to CMM-I)
- Provides a method to evaluate the processes of release, delivery, deployment, and activation and usage separately, or integrated
- This is done through questions such as "Is there a release plan with regards to your software product that is available to all staff?"
- Method developed through six case studies at Dutch software vendors
 - Company size from 60 to 1500 employees
 - Between 100 and 160,000 customers
 - Same method (case study protocol) for each case

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Exact Software (1)

- ERP Software manufacturer
- Large range of products
- Subjects of case:
 - e-Portal product
 - Deployment tool
- ES has 160.000 customers
 - Small to medium enterprise market
 - Aiming for larger customers
- 2025 employees
- Development takes place (mainly) in three locations:
 - United States
 - The Netherlands
 - Malaysia

"All of a sudden our build servers had no more time left to build... That's when we realized we needed a new way of thinking about the build process, and we relocated our builders the next day."

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Exact Software (2)

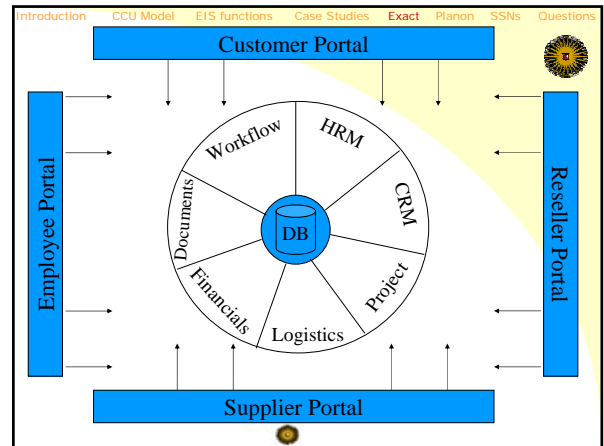
- Serves large amount of customers by
 - Explicit management of CCU process
 - CRM and CCU integration
 - Explicit license management
- Oversimplification has lead to absence of SCM
- Proprietary tools for CCU support

See: S. Jansen, G. Ballintijn, S. Brinkemper, and A. van Nieuwland. **Integrated development and maintenance for the release, delivery, deployment, and customization of product software: a case study in mass-market erp software.** In Journal of Software Maintenance and Evolution: Research and Practice, volume 18, pages 133-151. John Wiley & Sons, Ltd., 2006.

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e-Synergy

- Sold to customers
- Used **internally** as well
- Combines:
 - Documents (SCM)
 - Financials
 - Logistics (PDM)
 - Project
 - CRM
 - HRM
 - Workflow
- Used internally for **CRM/PDM/SCM**



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Software Configuration Management

- Version control** (...)
- Artefact management
- Maintenance process support
- Weekly releases
- Promotion scheme**
- Eats own **dogfood**

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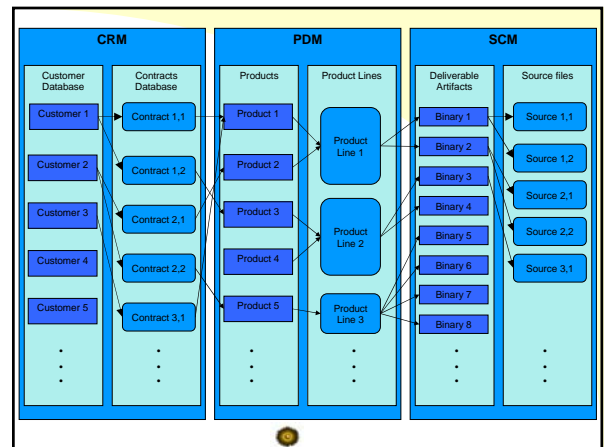
Product Data Management

- Product **composition** (even some variability support)
- Workflow management
 - Projects are composed of tasks
 - Tasks are attached to items in the PDM
- Allow for different views
 - Sales view looks at **deliverables**
 - Executables
 - Manuals
 - Promotional material
 - Developer view looks at **product relationships and source items**

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Customer Relationship Management

- Architecture for **custom solutions**
- Customer can download and install updates
- Automatic license renewal** on vendor side
- Automatic **post deployment user feedback** - Version number of new version is sent after update by the update tool
- Both vendor and customer side **license management** are explicit



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Maintenance

- Vendor side:
 - Integrated system thus supports
 - Version control
 - Software configuration management
 - Product composition
 - Manage deliverables
 - Build problems are solved (three timezones)
 - Release and delivery is can be done **more effectively** allowing ES to serve **many (160k!)** customers
- Customer side:
 - On the customer side the integrated system thus supports
 - License **renewal**
 - Customised** solutions
 - Updating process
 - Automatic **feedback**
 - Customers **spend less time updating** and **encounter less problems**
- Please mind:** All this is possible only because Exact Software builds product for a limited number of technologies, with a **very stable and rigid** development process

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Planon and the agile community

- Integrating different systems
 - Sourceforge (used to be Visual SourceSafe)
 - Bugzilla (used to be Planon CRM)
 - Planon CRM
 - Planon Licenser (proprietary (!))
 - Planon update packages (proprietary (!))
- "Don't build an information system unless you need it!"
 - Excel sheets work fine!
 - Reporting tools **change constantly**
- However, **some functions will not change**
 - Software configuration management
 - Product data management
 - Customer relationship management
 - Project and workflow management
- The agile community requires enterprise information systems tool!**

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So what's left to discover?

- Software vendors organize in **federations**
 - Focus lies on customer interaction and knowledge sharing
 - However, no tools dealing with **software supply networks**
 - Information portals required for both customers and resellers/partners/etc.
- Integration of **different development management methods** with project management and workflow systems
- Product software **knowledge infrastructure**
 - Product software **management workbench**
 - Componentization of information systems (who needs feature X?)
- Development of release repositories and **software delivery portals**
- Component-Off-The-Shelf** evaluation and acquisition systems
- Integrating product and enterprise information system**

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PHEME

- PHEME is a tool for **software knowledge distribution** to transport knowledge between software vendors and end-users in a **software supply network**:
 - Software and updates
 - Feedback reports (usage, error, configuration, etc)
 - Commercial information ("An update of component X has been released")
 - License keys
 - etc.
- So what does it look like?
 - A **memory resident PHEME service**
 - A **protocol** through which PHEME instances communicate, and a protocol through which software products communicate with PHEME
 - Example: Joomla configuration, deployment, and update automation

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PHEME serves well in a Software Supply Network

The diagram illustrates a Software Supply Network. On the left, there are two 'Software Developer' boxes, each containing a vertical stack of customer identifiers: 'Cust. 1', '...', and 'Cust. m'. On the right, there are three 'Operational Environment' boxes, labeled 'Operational Environment 1', 'Operational Environment n', and 'Operational Environment m'. Arrows point from each 'Software Developer' box to each 'Operational Environment' box, indicating the flow of software and updates. Vertical ellipses between the Operational Environment boxes suggest a larger network of environments.

Slinger Jansen and Wilfried Rispens: Balancing Total Cost of Ownership and Cost of Maintenance Within a Software Supply Network, proceedings of the IEEE International Conference on Software Maintenance (ICSM2006, Industrial track), Philadelphia, PA, USA, September, 2006. Accepted for publication

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Conclusions and points for discussion

- There are **no enterprise information systems** that enable product software vendors to manage product software
 - development
 - release
 - delivery
 - deployment
 - usage and activation
- Exact Software is most advanced, but
 - Not generalizable**
 - No support for agile methodologies
 - Not componentized**
 - No release planning tools (and many other features missing, such as COTS evaluation)
- Agile community** needs enterprise information systems tool!
- Software Supply Networks** research contributes, due to more federation between product software vendors (e.g., COTS)

Questions?



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Takehome: There are **no enterprise information systems** that sufficiently support software developers and product software vendors in their **development, release, delivery, and deployment processes**, even though there is an **outspoken need** for such systems.

Please take the time to read:

S. Jansen, G. Ballintijn, S. Brinkkemper, and A. van Nieuwland. **Integrated development and maintenance for the release, delivery, deployment, and customization of product software: a case study in mass-market erp software.** In *Journal of Software Maintenance and Evolution: Research and Practice*, volume 18, pages 133–151. John Wiley & Sons, Ltd., 2006.

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