Berk Yıldız

21502040

CS415 – Software Product Line Engineering – Homework 4

1. **How is software ecosystem different from software product lines?**
   Software ecosystems are the further applications of the product lines (Bosch,115). A product line carries product-centric approach and software ecosystem carries product line-centric approach (Bosch,117) which mean that a software ecosystem consists of several product lines. For example, when we think of Microsoft services, Microsoft Office, Azure, Skype, Outlook and Windows have their own product lines seperately. However Microsoft presents solutions to customers by creating a combination from all of these product lines so that a customer can meet his/her all needs in a synchronized, compatible and customized environment. The term used for this environment is software ecosystem. A product line can just deal with a product, however software ecosystems can deal with a solution from beginning to end. Also product lines are inside the organizational boundary of a company, however software ecosystems are beyond the organizational boundary and available outside of the company.

2. **What are the reasons mentioned in the paper that tend a company to move towards a software ecosystem from software product line approach?**
   Customer-oriented approach is very important for companies to reach more customers and key point for customer-oriented approach is the customizability. Having a product line can be a solution for increasing variations however there is not a guarentee that these variations can meet all needs of customers. So companies have chance for mass customization by software ecosystem (Bosch, 111). Another point is that, software ecosystems can provide customer loyalty because software ecosystems increase the stickiness of the application platform (Bosch, 111). If a customer involves in a software ecosystem, it would be harder to work with different applications from different software ecosystems. Also after being integrated to a software ecoystem, changing the software ecosystem would cause a serious cost for the customer. So instead of having a customer just by a single product, integrating customer to a software ecosystem would keep customer to work with company also in the different

areas of business. The other reasons which are listed in article of Bosch are listed below:

- Increase value of the core offering to existing users
- Increase attractiveness for new users
- Accelerate innovation through open innovation in the ecosystem
- Collaborate with partners in the ecosystems to share cost of innovation
- Platformize functionality developed by partners in the ecosystem

3.

Variability Mechanism	**Core Differences**	**Impact on Developers (Pros/Cons)**
Variability Representation	-Abstraction of variability -Distribution of variability information -Granularity of variability	-More number of developers can contribute code and changes to variability model but just a small team has to keep track of changes for preventing corruption.
Decisions	-Decision binding -Decision lifecycle -Dependency resolution	-Full derivation of instances is problematic for less-technical users
Encapsulation	-Encapsulation concepts	-Run time guarentee for the behavior ofbasic unit.
Interactions	-Interaction bindings	

4.

Operating System-centric: Harmony OS from Huawei

- **Characteristics:** domain independent, third party applications are expected, it will be installed in all Huawei devices, offers development tools for adoption
- **Challenges:** different hardware integrations and configurations can cause performance problems and inefficiency.
- **Success Factors:** Even newly released, one of the most popular mobile OS in China, developers are prodividing essential applications

Application System-centric: Eclipse IDE

- **Characteristics:** open source, open to third party developments, third party developers extend the domain by providing plug-ins
- **Challenges:** product strategy and platform strategy may differ, bare application must be useful because not all people have interest on third party additions and versions.
- **Success Factors:** one of the most popular IDE in the world, thousands of plug-ins developed by third parties

End-user: phpMyAdmin

- **Characteristics:** Allows user to operate database without programming knowledge
- **Challenges:** low maintainance effort, keeping simple the modelling of application domain
- **Success Factors:** most of the database operations can be done by application, free to use and recommended by the users