Starting position: Business processes following the principles of Service Oriented Architecture (SOA) are mostly spread over multiple heterogeneous systems. Therefore, it is crucial that data consistency is guaranteed to assure that critical business processes run reliably and continuously. IT faces new challenges: business processes do not run in only one system but across different systems. This makes it more complex to keep data consistent. The possible sources for failure multiply from a business point of view. More services from different systems are used; these services behave like «black boxes».

Aim: The aim of this thesis is to find a solution for resolving data inconsistencies in heterogeneous system landscapes. Existing concepts and a real customer business process are the basis. The solution contains a pattern that is generic and can support any business process in heterogeneous system landscape. It must be applicable to the existing customer process as well and prove its feasibility.

Proceeding: The detailed analysis helped to thoroughly understand the customer’s business process. It also helped to get an understanding of
how different systems are involved and what their role is. With this knowledge, the possible difficulties can be seen: data inconsistencies may occur due to data loss or due to data corruption. Both aspects need to be dealt with in the solution.

During research, many approaches to dealing with data inconsistency were found. Most approaches deal with inconsistency purely on a database level or with simple web service calls. A more integrated approach to handling this issue in heterogeneous system landscapes does not exist. Therefore, it was not possible to use one particular approach only. Parts from different approaches were used to build the pattern for the solution.

The solution is based on one central Enterprise Service Bus (ESB). In this case the ESB is a SAP NetWeaver Process Integration (PI). There will not be any message exchange between two systems without passing PI. The business process is adopted to match that new condition. The framework of the solution consists of different parts (see figure). Each message processed by PI will be duplicated and stored in a data pool (Data Recording). This data pool will be used, in case of a data inconsistency, to repost the messages. Scheduled Monitoring checks continuously whether there is any inconsistency in the system landscape. The checking is done based on rules stored in the Rules DB. When an inconsistency is detected, Diagnosing takes place to determine the cause of it. Thereafter, the Handling resolves the inconsistency.

The pattern developed was then applied to one particular example in the customer’s business process: when the database with the Delivery Notes experiences a defect or loses data, all the messages can be restored with this solution. The system landscape is thereafter in a consistent situation again.

**Outlook:** In the future, there will be more and more interconnected systems implementing a single business process. Therefore, it is crucial to have an approach that keeps the data consistent.

A first implementation of this pattern will show how the adoption of the business process can be realized in detail, how well the operation of the daily business works and how performance-consuming the solution is.