INF 5120 Model based System development

e-Business supply chain management -

Global Business case scenario

Oblig 2

Innleveringsfrist 2.mai kl 23:59

Læringsmål for obligen

Oblig 2 vil fokusere på følgende:

- Praktisk erfaring med å lage et metoderammeverk tilpasset en bestemt type systemer. Her vil det si Service Oriented Architecture (SOA) med bruk av web services (wsdl/xml)
- Praktisk erfaring med virksomhetsmodellering og kravmodellering
- Praktisk erfaring med systemmodellering
- Praktisk erfaring med modellering av metamodeller (metamodeller for PIM og PSM)
- Praktisk erfaring med å skrive modell-til-modell transfomasjonsregler med ATL (eller XMFMosaic) for PIM til PSM transformasjoner
- Praktisk erfaring med skriving av modell-tekst transformasjonsregler med MOFScript (eller XMFMosaic) for PSM-modell til kode

Description of Task

A Car supply chain management – with min-max replenishment service

Introduction

Throughout the 1990s, GM, RR and AR car manufactories individually spent considerable resources to handle their warehouse, logistics and contracts. While these companies were keeping up with the fast-paced technology curve, a new solution had to be designed and implemented. Upgrades to legacy systems can only go so far, as a result, the ability to stay ahead of the curve was increasingly difficult.

The challenge

To reduce the administrative overhead, warehouse cost and better support for its dealers, it is vital that companies in the car manufacturing supply chain can share information. In order to support their goals they decided to collaborate design a new solution that are able to handle both explicit contracts between car manufactories and their suppliers, and implicit contracts where car manufactories have a broker that purchase small car parts like lights, bumpers etc. based on quality attributes defined by the car manufacturer. To develop a pilot case they decided to assign an agreement with the suppliers of car lights (Philips and Bosch).

Chose a software supplier

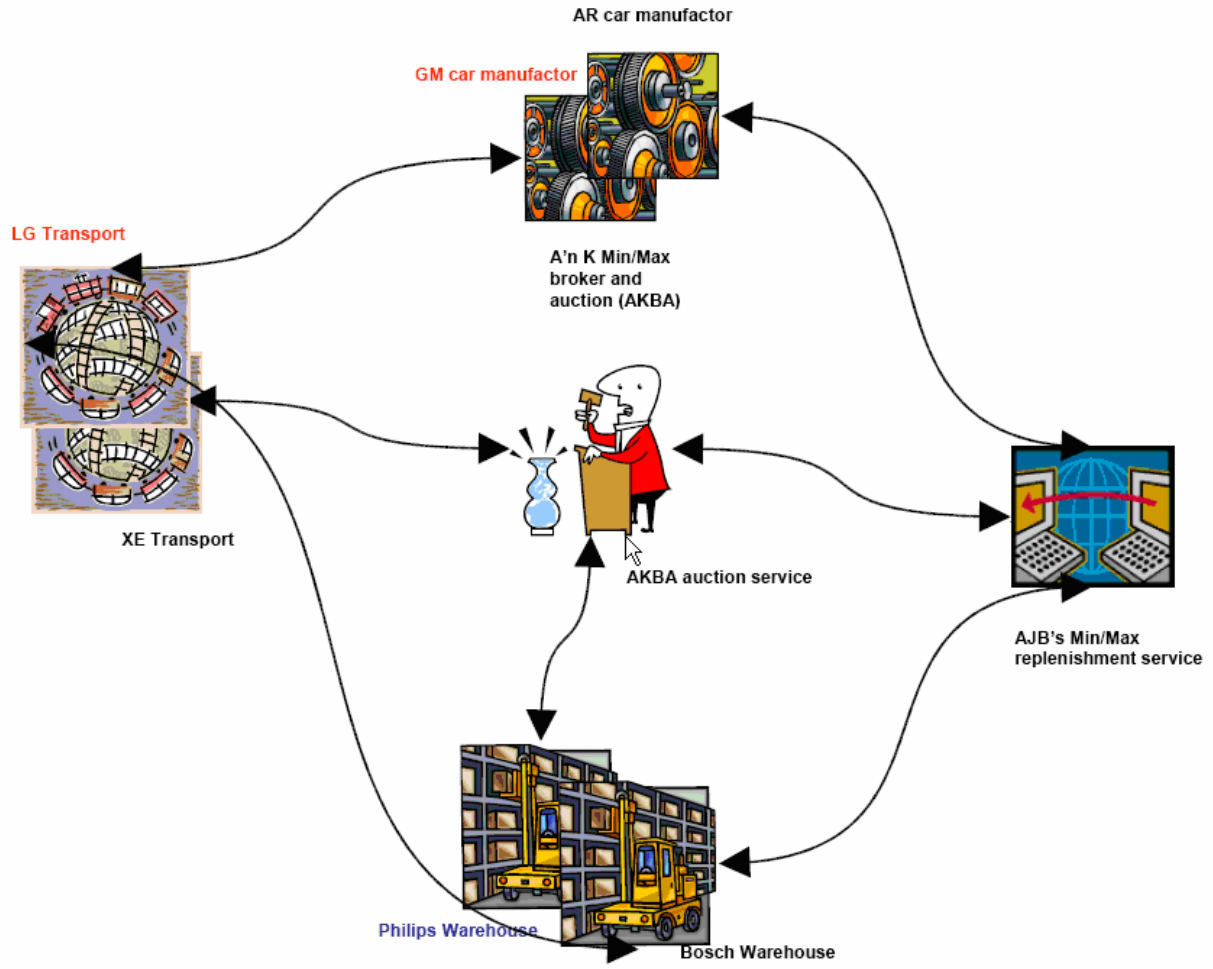
With an agreement in hand, the car supply team did a deliberate process to choose a software supplier. Some of their criteria were that the software supplier was willing to commit for a pilot case with low income, but with potential high income when the project is delivered. Next, the software supplier should have high revenue and they should have a lot of experience with developing software for supply chain management. The final candidate, that was chosen for this project was AJB software Inc.

Functionality

Min-max replenishment is a service were suppliers are allowed to view customer's inventory data, make decisions and support internal operations. Min-max replenishment service controls car manufacturers, warehouse and orders car parts for the car manufacturer. In this case AJB's min-max replenishment service registers contracts from AR and GM and probes the customer's warehouse based on the criteria defined in the contract. The criteria defined in the contract are the minimum maximum amount of lights in the customer's warehouse. If the minimum level is reached, an order is triggered and sent to a light producer (Bosch or Philips).

Overall, the main areas in the supply chain management are:

- order management
- materials management
- buy and sell car parts
- transportation by auction



Description of the Business Actors

- **AKBA** – AKBA is an auction service. AKBA auction buys car lights from most appropriate supplier according to the given car light criteria.
- **AJB** – short for AJB Min-max replenishment service. AJB offers a lookup service to car manufacturers. AJB's min-max service probes for current product level at the car manufacturer when a contract is set up. (See also description of supply management flow for more information about AJB.)
- **LG and XE Transport** – Offer service for transportation from light producers to car manufacturers. This service is registered at AKBA auction service.
- **Philips and Bosch Warehouse** – Stores the car lights.
- **GM and AR car manufactor** – the car manufacturers. One of their roles is to make an agreement with transport companies to supply them.

Description of the Supply Management Flow

AJB registers their service at the auction service AKBA. Car manufacturers searches for min-max services to set up a contract for car part delivery, in this case it is car lights.

When a car manufacturer has found appropriate min-max service they set up a contract for replenishment of car lights. AJB's min-max service probes for current product level at the car manufacturer when a contract is set up. If current level is out of contract range AJB min-max replenishment service buys lights by auction. Buying

car lights by auction is more like ad hoc shopping. Min-max service asks AKBA for the best supplier based on min-max criteria given. AKBA auction buys car lights from most appropriate supplier according to the given car light criteria.

When the warehouse (Philips and Bosch) receives an order it prepares the shipment and order transport from a transport service.

In order to transport goods from warehouse to car manufacturers, an agreement with a set of transport companies has been set up to supply the car manufacturers. This agreement gives the warehouse the opportunity to buy transport by auction, but it is vital that transport service don't delay the car production process. All transport companies registers their service at AKBA, furthermore warehouses probes for available and most appropriate transport service according to the given transport criteria. Thereafter, transport service receives the transport order and the transport company picks up delivery and transports the goods to the car manufacturer. Car manufacturer signs the dispatch note and the transport company delivers the receipt to the light producer. (When the light producer has received a receipt, they send invoice to the car manufacturer).

Each team, GM, AR, AJB min-max replenishment service, AKBA, Philips, Bosch, XE transport, LG transport focus on an iterative model driven development approach, which delivers early results to both car manufactories and car part suppliers. The pilot will be tested in May 2006, with user acceptance testing starting in June2006.

Project teams
The project is split into 8 sub projects each with 3-4 team members. The sub projects are GM, AR, AJB, AKBA, Philips, Bosch, XE and LG. Each team represents a company that plays an important role in the supply management chain. In order to accomplish the case each team must commit themselves to collaborate and publish interfaces. This means that the group must cooperate, and come to an agreement of the interfaces they make.

Common information
In order to replenish a car manufacturer's warehouse we have defined quality properties to be aware of during your specification.

<u>MinMax Service contract properties</u>
Minimum level: (product minimum level)
Maximum level: (product maximum level)
Duration of contract: (Specifies the duration of a contract)
Price: (specified price range)
Update frequency: (Time between updates of current level)

<u>Car Light order properties</u>
Producer: (Specifies producer of the car light)
Type: H1, H2, H4, H7 (Defined standards of Car lights)
Price pr item: (minUnit price)
Expected duration: (Tested duration of the car light)

Have a look at these links in order to specify order information:
http://docs.oasis-open.org/ubl/cd-UBL-1.0/
http://europa.eu.int/idabc/servlets/Doc?id=18083

Transport order Properties
Volume: (Measure in weight, cm2, cm3 etc.).
Price pr volume: (Pricing strategy, min – max price)
Date: (Delivery date)
Shipping duration: (Faster delivery will cost you more)

Have a look at this link in order to specify your transport and freight information.
(http://www.takecargo.no/pdf/transportXML%20dokumentasjon.pdf)

Common Infrastructure
All systems are connected to the internet
All services are published to a UDDI Registry and can be retrived by using a string containing a concatenation of the company name and the interface name.

Oppgaven

Hver gruppe skal gjøre følgende:

1. Lag en virksomhetsmodell og kravmodell
2. Lag en systemmodell (PIM)
3. Lag en plattformspesifikk systemmodell (PSM)
4. Generere programkode

For å gjøre dette må dere først lage et metoderammeverk. Metoderammeverket kan dere utforme etter systemutviklingsmetoder dere kjenner til fra før av, eller i henhold til de som presenteres i kurset (f.eks Comet). Det som er viktig er å utforme et rammeverk som støtter virksomhetsmodellering og systemmodellering for PIM og PSM. Deretter lager dere virksomhetsmodellen og kravmodellen i henhold til denne. Deretter kan dere gå videre med å modellere PIM. Fra denne modellen (PIM) skal dere transformere til PSM i henhold til en metamodell for wsdl (som dere selv skal lage). Til slutt skal det genereres kode fra den plattformspesifikke modellen.

For å gjøre modell til modell transformasjoner kan dere bruke ATL eller XMFMosaic, og for å gjøre modell til modell transformasjoner kan dere bruke MOFScript eller XMFMosaic.

ATL Transformasjoner – Fra PIM MM til PSM MM

- Definer en PIM metamodell
- Definer en PSM metamodell for Web Services (WSDL)
- Definer transformasjoner fra PIM til PSM med ATL
- Alternativ: gjør punktene over i XMFMosaic

MOFScript Transformasjoner – Fra PSM til kode

- Bruk PSM metamodell for Web Services (fra ATL transformasjonen)
- Definer transformasjoner fra PSM til WSDL/XML kode med MOFScript
- Alternativ: gjør punktene over i XMFMosaic

Leveringskrav

Lag et pdf-dokument som inneholder følgende:

- En beskrivelse av deres valg av modeller og metoderammeverk
- Modellene, presentert i henhold til metoderammeverket som er valgt
- Transformasjonsreglene for de ulike transformasjonene.

Lag en zip-fil (med navn INF5120_gruppenr.zip) som inneholder følgende:

- Prosjektfilene (alle modeller og kode)
- Pdf-dokumentet

Zipfila sendes til annemark@ifi.uio.no eller unnilol@ifi.uio.no innen 2.mai kl 23:59

Lykke til!