On process modelling in Scandinavian municipalities

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Abstract. Establishing contact centres in municipalities is a contemporary issue. Many municipalities started establishing contact centres as the municipalities face towards the environment. A problem often neglected is the integration of the contact centre with the other administrations of the municipality as the focus in the first phase lies on being customer friendly. This article describes the problems, both theoretical and empirical, that can be encountered when introducing a contact centre. A focus lies on establishing common processes in the municipality for ensuring a common information flow between the contact centre and the administrations. Derived from the empirical data, the authors present a model with the purpose to reduce conflicts between the contact centre and the administrations. A focus is on the use of naming and tagging matters. The model is based upon the use of ontologies of the clerks working with a matter in a workflow. One characteristic of this model is that three of four kinds of ontologies are developed in close cooperation with the clerks.

Key words: process modelling, municipalities, contact centres, ontology.

1 Introduction

Sweden has 290 municipalities. The median size 31st Dec 2009 was 15 282 citizens. 74 municipalities has less than 10 000 inhabitants (Statistics Sweden 2009). This means that many municipalities have to co-operate in order to manage their duties. Modern SOA-architecture supports co-operation within the IT-field, the problems in many cases are to make the administration realise the need. Usually the uniqueness of the municipality is overestimated.

A big problem for the customers is to come in contact with the clerks in the municipality. About 50% of all calls are answered and within the social sector it is only about 20% (Flensburg, Nåfors et al. 2009). This is due to the fact that telephone time is usually introduced in order to give the clerks time to do their work in the other time. Many municipalities agree that introducing a contact centre could be the solution, but it takes an awful long time to do so and requires at least two real enthusiasts, one within politics and one high manager. The big issue is resistance from administration, feeling threatened by this new prospect. One fear is processing of requests from the citizens will not be done in the correct way if performed outside the administration. According to an investigation, done at one of the municipalities it was also clearly determined that co-operation over the borders in the organisation was the key issue to success (Mattsson 2009). In this paper we investigate the design of the processes between administration and contact centre.

1.1 E-services and municipalities

For a long time it has been said that municipalities should use e-services to a much higher degree. One reason is to reduce costs, but the primary reason is to provide better service to the citizens (SOU 2005; Regeringens proposition 2010). However, the IT-departments in the municipalities realised that e-services must fit into an overall IT-strategy and especially a strategy towards the net, e-strategy. Usually you talk about three areas for e-strategy:

1. E-democracy
2. E-service
3. E-governance

A Swedish municipality describes its e-strategy as in figure 1. The three areas partly overlap and is realised in a couple of services to the customers. In order to provide the services an organisation is needed, the organisation needs processes, which needs information, which is created from data, all of it using a lot of technique. In order to provide all this an e-architecture is needed.

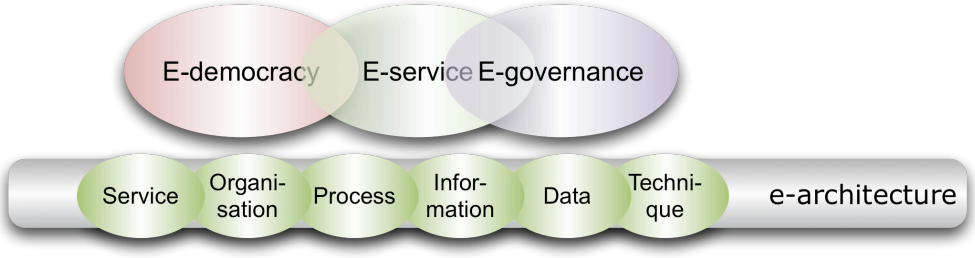

Figure 1: An example of an e-strategy

Increased use of internet leads to increase of communication channels such as e-mail, chat, forms and e-services. Hence, the municipalities also have to formulate a channel strategy for their citizens and enterprises to communicate with the administrations. Usually this strategy says that all channels should have equal weight and be paid equal attention. This causes problems, since the administrations usually don't have competence to handle all these channels.

There is also a more general problem insofar as the customers have to know which administration they should address for a specific problem. One example is where to apply for getting permission for serving beer during a local festival. We have found the following versions:

1. Environmental administration
2. Social administration
3. Street administration
4. Leisure administration

This is not easy for the customer to know. We also see that the four administrations might decide upon the permission in very different ways, emphasising different aspects.

There is also an increasing demand from the customers of having good service from the municipality. They will reach the municipality all the day and not only for two hours in the morning. They will have their matter treated as fast as possible, preferably immediately. The number of rules and regulations also have a tendency to increase, thus the turnaround time for each matter increases. A solution to this dilemma is to implement a contact centre taking care of frequent matters and questions, thus relieving the administration for 70-80% of their transactions (Figure 2). However, very often the administration is unaware of the number of transactions.

When introducing a CC the customer has only one point to access. CC also takes care of all channels and handles about 70-80% of the matters coming in. The rest is transferred to the

administration. According to transaction cost theory it is extremely important to define an exact transfer of a transaction between two organisational units (Nurminen 1990). In order to do a proper treatment the administrations and CC have to make an agreement about a) Which matters CC should take care of and b) How they should take of them. In these negotiations the above-mentioned controversies to preserve the work domain occurs.

2 Problem and method

The year 2009 a research project about contact centres in Swedish municipalities was started. It was called Innoveta (Flensburg P 2008) and was financed by VINNOVA. One problem we saw was co-operation problems between the administrations and contact centres. This is a well known problem noted among others by Orre (2006). Usually these problems are explained in social aspects (Grundén 2009; Grundén 2010). In this paper we will look at it from a design perspective and try to elucidate the question: *How can the processes between administration and contact centres in Swedish municipalities be designed in order to avoid controversies between them?* The method we use for this investigation is a combination of case study/action research for getting empirical material and design science in order to come up with a solution to perceived problems (March and Smith 1995; Hevner, March et al. 2004).

We use the research framework of March & Smith (1995) presented in figure 2. They distinguish between four research activities and four research outputs. Since our study is design oriented we stay in the "build" activity. We also focus on constructs, models and method. March & Smith define the research outputs as follows:

> *Constructs* constitute a conceptualization used to describe problems within the domain and to specify their solutions"… A *model* is a set of propositions or statements expressing relationships among constructs. In design activities, models represent situations as problem and solution statements …
> *Method* is a set of steps (an algorithm or guideline) used to perform a task. Methods are based on a set of underlying constructs (language) and a representation (model) of the solution space … An *instantiation* is the realization of an artifact in its environment ... Instantiations operationalize constructs, models, and methods. (March and Smith 1995).

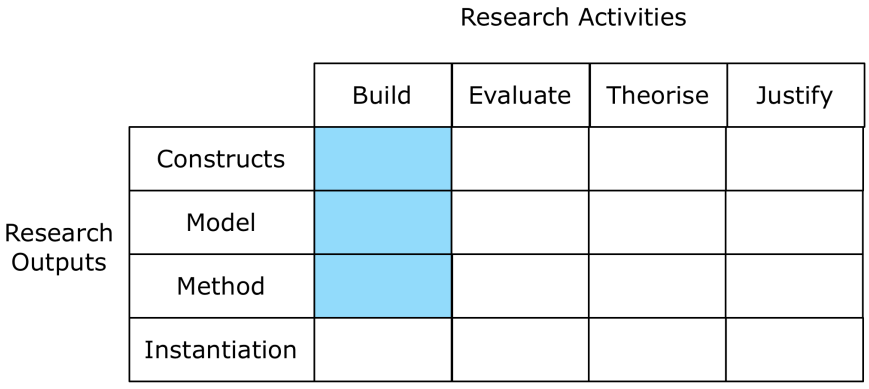

Figure 2. March & Smith research framework ((March and Smith 1995)

The paper is organised as follows: First we give a short definition of the concepts we are using. Then we describe some theoretical factors related introduction of contact centres in municipalities, then we describe some issues we have found during the investigation of some contact centres in use

and under development. We conclude that one critical issue is the relation between contact centres and administrations. The relation is usually described as "preserve controversy". We suggest an interpretation of this based upon "process preservation" in the administrations and suggest a way of minimising these controversies by ontology-based process modelling.

3 Concepts used

4. **Administration**: A department in a municipality dealing with specific matters, such as streets, water, schools etc.
5. **Call centre**: An organisational unit answering standardised questions from customers in a standardised way. Often outsourced to low wages countries.
6. **Contact centre**: A department receiving questions, commissions and matters from customers. Abbreviated CC.
7. **Customer**: A body, either a person or a company, who contacts the municipality in certain matters via a contact centre.
8. **Matter**: When a request from the customers requiring decision-making is processed in an administration it is a matter.
9. **Preserve controversy**: A fight between the organisational units about who are to treat a specific set of matters.
10. **Request**: Question or issue in which a customer addresses the municipality in order to get it answered or treated.

4 Background

In this chapter we will present some relevant theories and facts related to the problem area.

4.1 Transactions

Transaction costs was first mentioned, if not in words so at least in spirit, in an article in the journal "Economica" by the 1991 Nobel Laureate winner Ronald Coase (Coase 1937). Later it was reintroduced by Williamson (Williamson, Winter et al. 1991; Williamson and Masten 1995) who also got a Nobel Laureate (in 2009). Applied to IT-systems the transaction cost theory is very comprehensive explained by Nurminen (1990). He introduces three levels: The *market*, the *bureaucracy* and the *group*. The ideal market has a number of well-defined products to well-defined prices and customers who have a well-defined need. In this case we have market transactions. In the bureaucracy the products are not that well defined, neither the prices nor the needs. At the group level the transactions are so complex and ambiguous so the members of the group simply have to rely upon each other. Examples of such transactions are agreements where some of the personnel always help the customer, somebody always answer the phone etc. This type of transactions is not possible to regulate in contracts or money transfer.

Transactions in municipalities are not market transactions; they are at most bureaucracy transactions. In CC:s the transaction from the customer seems to be quite clear and obvious, but many times they end up in group transaction where members of the CC and the administration discuss how to do. In one municipality they have tried to regulate the processing in detail and there we might think of bureaucratic transactions. Sometimes payment is involved, it can be direct for executing a process (building permit) or indirect (school, financed via taxes) but payment is never

the key issue. In short: there are rules and regulations making transactions in public organisations much more complex than business transactions.

4.2 Processes in municipalities

We can distinguish between the following types of processes in administrations:

1. Information
2. Guidance and counselling
3. Administrative preparation
4. Routine and rule based administration and decision-making
5. Investigations
6. Assessing administration

The classification is developed by a consultancy company, Rungekonsult, and has been used for finding the matters that should be treated by CC. The first four classes can be handled by a CC but the last two requires professional administration.

If we look at a single process it is often described as a transformation from input to output. What are often forgotten are, however, the control information and the resources needed to carry out the process (figure 3).

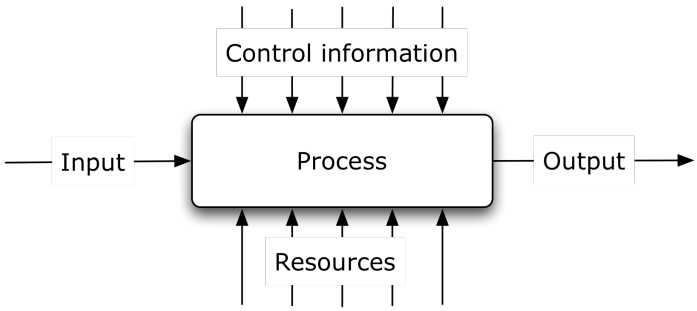

Figure 3: A process and what is needed to carry it out.

The control information is here seen as the description of the process, the conditions for it to start and finish and the requirements on it. It can be very simple, for instance the arrival of an input triggers the process but it can also be very complicated; a lot of different information concerning different circumstances. In the management of matters in public administration this is often the case and that's one reason for public management being more complicated than ordinary business transactions.

A very important information needed in processes is to explicitly mention who is responsible for it and who has actually done the specific exemplar of the process. We see similarities with work flow composition and work flow enactment. A workflow is enacted once only and it is a combination of ontologies that determines the actual enactment (Norta 2007; Mosnik 2010). Since traceability is a requisite in public management it is a must to record this. In Figure this information is to be found in the resource information.

We shall now describe how we investigated the processes in a Swedish municipality within the frame of the Innoveta project.

4.3 Controversies and conflicts connected to CC

Our investigation of three municipalities in Sweden (Flensburg, Nåfors et al. 2009) indicates the above mentioned controversy problems. It was said among the CC management that this was the most serious problem. We saw the same phenomenon in another municipality (Grundén 2010; Mosnik 2010). Seen from a work organisation perspective a CC is "*the industrialisation of the service, characterised by monotonous, highly controlled work and standardised procedures performed in an old-fashioned Tayloristic spirit*" (Andersson Bäck 2008). If this was applicable in the investigated municipalities we should have noticed it in out investigation. We did not, except for some small indications in one municipality. This indicates that the municipal CC:s are organised in other ways. We think the key issue is *professionalism* (Mintzberg 1983). In CC the profession is spelled "service"; they are extremely eager to help the customer in every possible way. In the administration the profession is bureaucracy. When service meet bureaucracy a conflict is almost inevitable. In order to handle the potential conflict a very sharp demarcation line has to be drawn between CC and administration. We base this assumption on transaction cost theory (Williamson and Masten 1995).

Since the administration owns the process, they have to decide which parts are to be performed by CC. They also have to realise that it will be a relief in their work. In the beginning they don't realise this, especially in the social sector, where there is most need for fast service. But over time, in this case up to one year (Flensburg, Nåfors et al. 2009), the administration see the usefulness of the CC and the resistance and controversies are fewer.

We have also noted that some matters are forgotten between the CC and administration. This was due to an unclear delivery between CC and administration. The investigation at the municipality showed that the BIG problem is to define when a matter is given from the CC to an administration respectively a matter is transferred from one administration to another (Mosnik 2010). There is a need to be very accurate with this, as it also shows who is responsible at what stage in the process. A predefined definition of responsibilities of sub-processes and stages in the process prevents the "I am not responsible"-problem. Another problem the municipality was very anxious about was, if possible, a group is responsible for sub-processes and stages in the process, in case a clerk is on vacation, gets sick or is tied up with another matter.

5 Design ideas - Constructs

One of the authors investigated processes at a municipality in Sweden (Mosnik 2010). The municipality introduced a CC in 2009 and needed help with the survey of processes, both internally at the CC and between the CC and the administrations. The situation was special as it was not only about an investigation but also help for surveying and mapping processes within the municipality.

The author's tasks were to give recommendations how the CC could work homogenous as well as what possibilities the CC had in cooperating with the administrations. The author did a deeper investigation at the administrations to find out of how they work today and what they emphasis in cooperation with a CC. The investigation was based on the method of Gappmaier, Hopkins et al (2001) and the participatory process prototyping. For getting an overview three simple questions were asked at the administrations 1) "What are your tasks?" 2) "What can the CC help you with?" and 3) "What tasks do the administration want to do themselves?"

In general it can be said that the result of the investigation showed that all matters that are routine and easy to answer should be taken by the CC whilst the administration wanted the matters they are specialised in. The matters the CC should take were mostly just information providing.

These matters are a major part and time consuming. For the other matters where a further processing of the administration is necessary, they wanted the CC to take the necessary information for the matter from the customer and forward it to the administration. A focus was in this case on the "necessary" information. This information was different from administration to administration. When it came to social administrations, the social number of the persons involved in the matter was for example one of the necessary information. When it came to the technical administration for example addresses and GPS-coordinates were the necessary information.

When the administrations were asked about their tasks and how they accomplished them they emphasised that they are the specialists and know exactly how to handle a matter they are specialised in. This gives the indication that they know very well about their internal processes and how to handle a matter. Other comments indicated that cooperation with outside the administration is seen as a problem. The social administration for example mentioned that they have problems with forms from customers coming in via the Internet. Another department of the social administration mentioned the difficulties in cooperating with other public authorities. A system administrator for a matter handling system at the municipality gave indications that the administrations are very isolated divisions, concentrating on their core business. He said that matters that span over several administrations are divided into sub-matters for each of them; giving each administration the part they have to solve.

The question coming up is how to survey and design processes for a whole municipality when every administration is acting as an isolated division? According to the wishes of the municipality it has to be more customer friendly, and thus the new processes have to enable the administrations to solve matters over the border of divisions. Especially the role of a CC in a municipality is built upon the idea of collecting incoming matters at one point and distributes it to the according administration to handle it (figure 4). It is not the idea that the CC has to receive matters from one administration that have to be directed to another administration. With other words, the flow of a matter is from incoming at the CC to the according administrations and when handled the decision has to be reported to the customer.

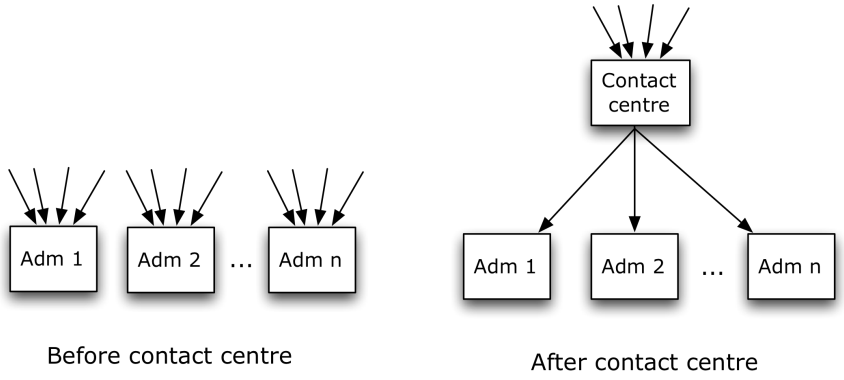

Figure 2: Contact centre acting as a buffer between customer and administration and reducing communication with administrations

The major question in our investigation was how the cooperation between the CC and the administration has to be handled, without losing the focus on the customer. Rather early the municipality wanted to find a kind of hierarchy for classifying their incoming matters. The purpose is to have the matters as consistent as possible. The importance of having a consistent naming was seen as a primary goal in the start of the investigation as people working at the CC have different backgrounds from different administrations within the municipality. Before the investigation the clerks at the CC used free text, which lead rather fast to different naming of the same things.

Another drawback is if the matter had to be sent further to the administration, an inconsistent naming has a negative impact as it could lead to confusion at the clerk at the administration.

The result is a description of matters, having three levels (Figure 3). The first level is the level of function for direction, the second level is the type of matter and the third level is a tag describing the matter more precise. An example is a customer calling in, as her garbage bin was not picked up. The clerk at the CC classifies it as a matter belonging to the technical administration, "department garbage". The matter name itself is "garbage " and the tag is "bin not picked up". This makes it easy for the clerk at the CC to classify a matter according to predefined ways of registering a matter as well as it is easy for the clerk at the administration to immediately see what matter is about and the associated information.

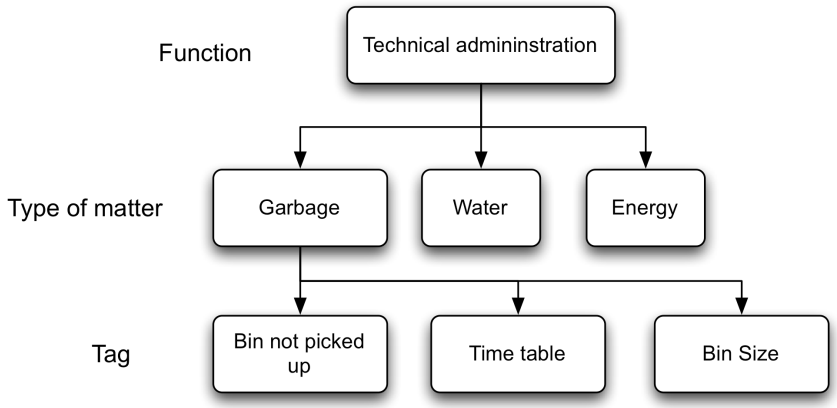

Figure 3. Description of matters in three levels

Other information is necessary as well, which helps to process the matter, as for example which house number or if the garbage can was at the predefined place when the garbage truck was there to collect the garbage. In the end one can say that we have two different kinds of information, one for *classification* of a matter, and one for *processing* the matter. Cf figure 3.

The next task was to find both the classification and the processing information. The classification information is to be found in all the matters already done by the CC, meaning to go through thousands of matters and see how they can be classified. The processing information on the other hand could only be defined by the administration, by asking them what information they need to be able to process a certain matter. A second step was to find patterns in this processing information for every administration. The result showed that a major part of the processing information is the same for an administration and only minor parts of information are matter specific. On the other hand the investigation showed that the patterns between the different administrations could vary tremendously. For example the technical administration is often dependent on a location where something happened and something has to be fixed, while the social administration is dependent on information about the person, e.g. social security number, for being able to process a matter.

The main result of the investigation was that administrations work isolated. They tell freely about their work, and what process information they need to accomplish their work. They are on the other hand very particular on what matters they want to process themselves, their core processes. At the same time they are willing to let the CC process standard matters that are the big mass and thus time consuming for the administration. The administrations are mostly not willing to let someone

from the outside survey their processes, this is one task they want to accomplish internally. The main reason given is that they know best what they are doing and thus can best survey their core processes themselves. One problem the administrations encounter is though the cooperation with public authorities sometimes other administrations.

6 Design ideas - Model

The three levels described in figure 5 are implemented in the IT-system supporting the Contact Centre. It can be put in the framework of figure 3 as type of control information (figure 6).

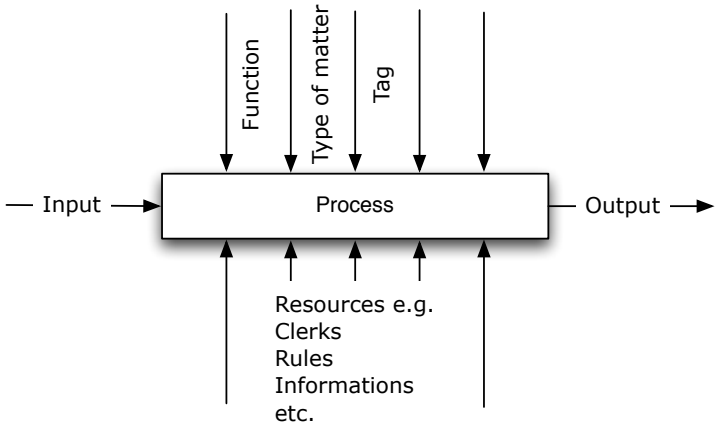

Figure 4. Description of the process at a municipality

The hierarchy is here implemented as a line from left to right. The more to the right the line is, the lower in the hierarchy. Parts of the resources are also captured in the IT-system such as it is noted who has received the request and which group in the administration the matter is assigned to. But they are implemented in the same structure and classified as tags. In fact the information associated with each type of "flow" is structured as an "information object structure", indicated in figure 7.

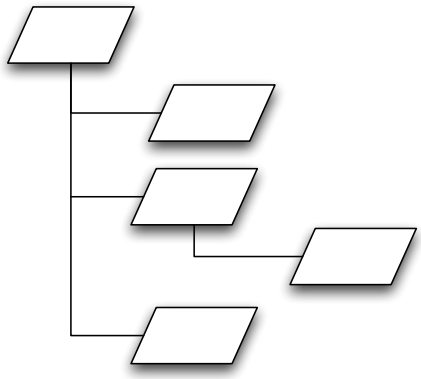

Figure 7. Information object structure

We always have a step 1 in which the request is classified and a decision is taken if it is to be pass over to the administration or if the CC should process it. If the latter is the case, a sequence of

steps is carried out. Let's take the example with the garbage bin and describe it in this model. The citizen call the CC saying her garbage bin has not been picked up. This is enough for the CC-clerk to classify the matter. A screen is then displayed by the system asking for the address. Based upon this the system can provide information about the reason, it might be a brake down of the garbage car, it could be new rules for how to place the bin etc. Finally a request for an extra pick-up is issued.

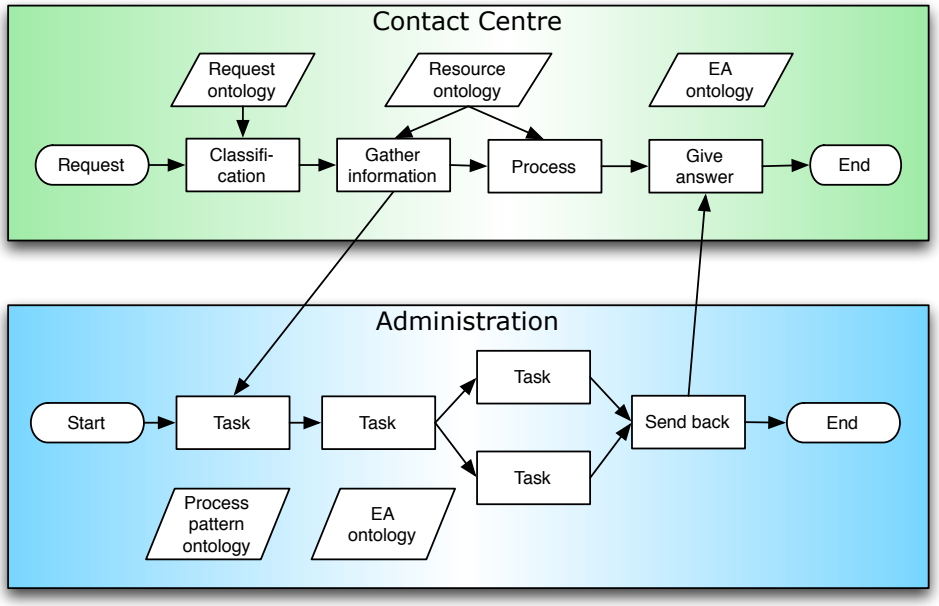

Figure 8 Contact centre as a coordinator for the citizien interface

With this model the contact centre will act as a coordinator for all contacts with the citizens. In figure 8 this role is schematically described. CC receives all requests for all channels. Their first task is to classify the request, using a list of possible requests. The next task is to gather the information needed for processing the request. It is described in resource ontology. Dependent on the type of request it is either further processed in CC or it is sent to the administration with the required information. The administration has a process pattern ontology describing the processes and ensuring no deadlocks occur. Both CC and administration might need to interact with the enterprise systems, here indicated as an enterprise architecture ontology.

6.1 Ontologies

Before introduction of CC the interaction was primarily with forms, where the customer was supposed to provide needed information. Often these form are not easy to understand, since they use a very specialised language. When a CC is implemented they often take the same forms and just fill them out on the screen or even worse: Provide to the link to the form or send it in surf-mail. Here are huge possibilities for increased efficiency. In one of the municipalities we investigated the time for manage an application for day-care was reduced from 26 min to 5,8 min (Flensburg, Nåfors et al. 2009).

We also note that the processes in many cases are standardised ("Get information", "Receive information", "Ask for information" etc.). This indicates these processes can be designed generically and in the execution of the process the actual information is supplied from an

appropriate ontology. The process might be similar to the enactment of a workflow (Mosnik 2010). We can identify the four ontologies in the global architecture described by Grefen (2005).

In figure 9 we have modified Grefen's suggestion to the area of collaboration between CC and administration. It starts with classification of the request from a customer. This is done with help of request ontology, containing a description of each request type. Dependent on the needed competence for processing the request a clerk allocation is done. This is today done based upon the function of the request. A generic process is formed, based upon pattern ontology. The process further executes and if needed, integration with legacy systems in the municipality is done. This is done with help of the enterprise architecture ontology, which describes the integration of the systems in the municipality and the support system of CC.

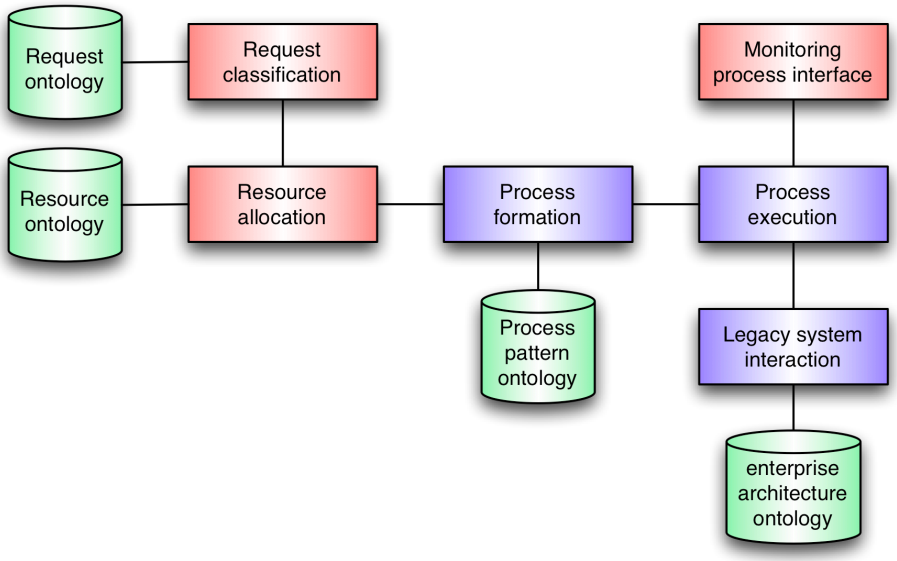

Figure 9. A global architecture for contact centres and adminstrations

7 Result and discussion

Will the model proposed reduce the controversies between CC and administration? We believe so, since the interaction between is minimised (figure 8). The big work is to develop the request and resource ontologies. In this work the administration must take a very active part, in fact we have to apply a user oriented development process in good Scandinavian style!

This method does not eliminate resistance towards change or the power games usually played, but it makes them hopefully more transparent, since the stakeholders know what the system is about and how it works.

A problem we have seen in our collaboration with the municipalities is the naming of a specific request. For instance the administration wanted to call a parking lot for "available infra structure area". A way with asphalt on the surface is "hardmade", "day-care" is called "pre-school" etc. It might take quite some effort to persuade the administration to allow another word. Using a translation between the two ontologies can easy solve this problem. A similar problem is to

understand what the customer means, since they use everyday language. But this problem is solved in the interaction with the clerks in the CC.

The idea described in figure 9 is based upon the result of an EU project called “Crossworks” (Fessl K 2003). It was geared towards the European automotive sector, with the intention to create a prototype for workflow formation and enactment for the networks producing cars, but the final product was in fact a generic process formation and enactment system. By changing the ontologies the domain of the system could be changed rather easily. In this context, the clerk ontology and the process pattern ontology is rather easy to construct. The infra ontology requires more resources, especially for those system which have no open interface. The big problem is to develop the request ontology. We have started that process by collecting requests from customers at a municipality and will try different methods to generate the corresponding ontology. The framework for this is based upon Mosnik’s general 4-level ontology model (Mosnik 2010). A first draft can be seen in figure 10. It must be developed further and efficient methods generation must be developed.

A specific problem is mapping the words of the customer with the defined ontology. In traditional attempts to ontology engineering (Noy Natalya F and McGuinness 2001; Gómez-Pérez, Fernández-López et al. 2004) you start with a set of known concepts and from them you build the ontology. Here we try to use a bottom up approach and start with the spontaneous concepts used by the clerks in the CC. Initially it is a lot of manual work, but hopefully we end up with a useful ontology!

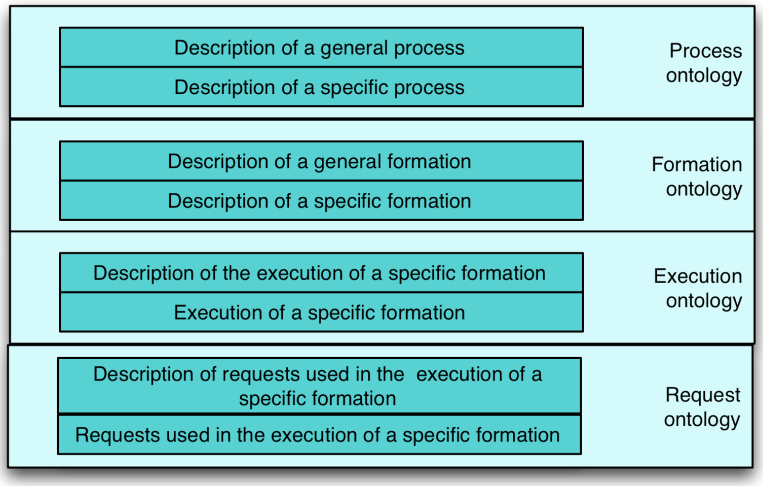

Figure 10 A four level ontology for processing customers requests in CC:s (Mosnik 2010)

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