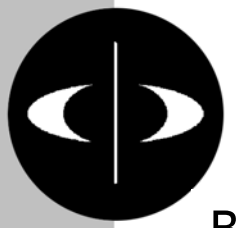

Building CRM Analytic Applications

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This white paper covers the detail in CRM Decision Processing, to show how you can develop a set of integrated CRM analytic applications using the components of a Decision Processing solution. Once we cover this, we can then see how to integrate CRM analytic application packages that we buy with in-house built CRM analytic applications using a common business model (common metadata), Extract Transformation and Load templates and common business views. Having done that, we can then integrate relevant unstructured business information into the CRM decision processing solution using an Enterprise Information Portal that allows access to all of CRM information and applications via a single user interface.

Building Integrated CRM Analytic Applications

One of the challenges in CRM Decision Processing is to build a set of integrated CRM analytic applications. The first step in doing this is, of course, to define a set of the analytic applications during business analysis that are required by the business. Examples of these might include

- customer segmentation analysis
- customer churn prediction,
- customer loyalty analysis,
- customer service effectiveness analysis,
- customer service analysis,
- customer profitability analysis,
- channel effectiveness analysis,
- sales analysis e.g. call centre sales analysis, e-commerce sales analysis etc.,
- campaign performance analysis
- analysis of the effectiveness of previous decisions on business performance etc.

Once this has been done, the order that they are developed in, needs to be decided upon by the business, most probably based on greatest business benefit first. From then on, coordinated development of these analytic applications needs to be managed via a common business model (common metadata) consisting of common names definitions and business rules. This is the key to integrating CRM analytic applications.

For *each* CRM analytic application defined during the business analysis, develop a dimensional data model that includes the required dimensions, measures and dimension hierarchies. The model components for the first analytic application form the first iteration of the Common Business Model. When developing the second and subsequent CRM analytic applications, the objective, during modelling, is to first look to re-use data model components (dimensions, measures and hierarchies) already defined in the Common Business Model (CBM) and then add any new dimension and measure definitions to the model that are not covered in the CBM. These new components are then themselves added to the CBM to incrementally develop it. The idea here is that as the CBM grows, more and more model components (dimensions, measures and hierarchies) become available for reuse in the next and subsequent analytic applications

to be developed thereby improving productivity every time. This is shown below in Figure 2 where three CRM analytic applications are depicted:

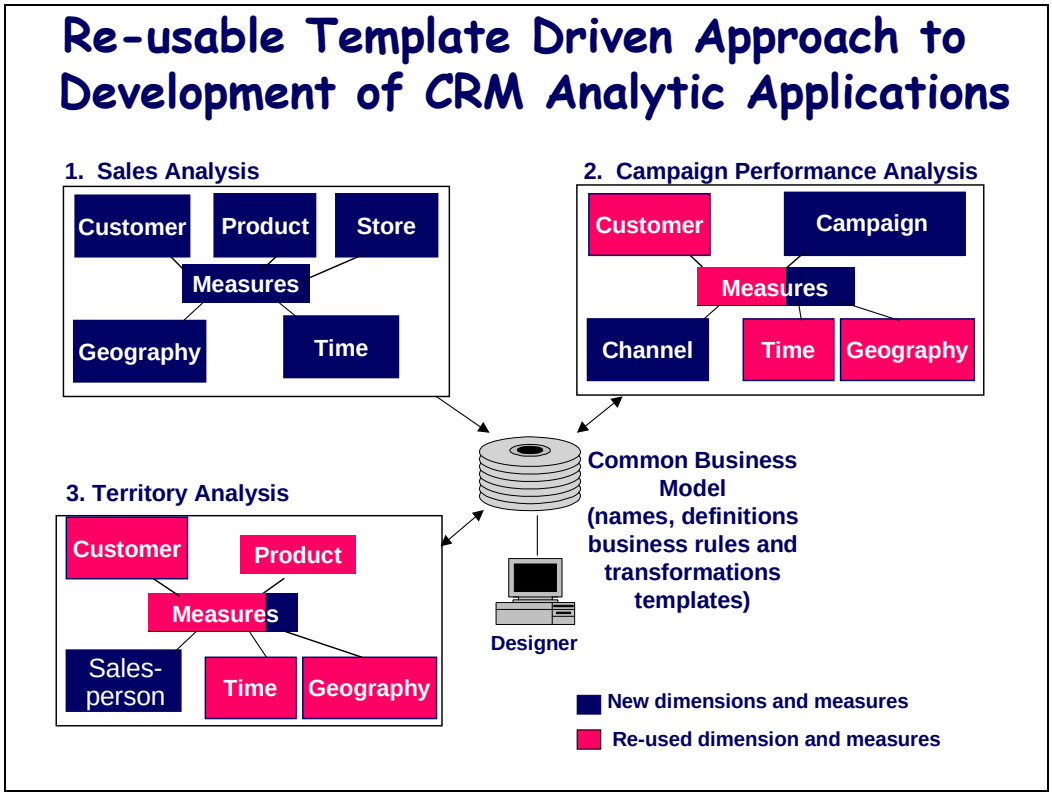

Figure 2

Note that here, the reuse causes integration and consistency across applications as well as improving development productivity.

Once design has been defined, the next thing to do is to physically deploy these models into an environment with a back end RDBMS and a hybrid OLAP tool. This results in part of the data being on the back end RDBMS and part being in the OLAP server.

Next is to design and develop and Extract Transform and Load (ETL) subsystem based on the use and re-use of common subject oriented extract and transformation templates. Examples of subjects include Customer, Channel, and Campaign etc. Subject oriented ETL templates in this context mean designing ETL processes by associating extracts and transformations with each subject e.g. the extracts and transformations for Product or the extracts and transformations for Campaign. This introduces a common business context to the ETL process and guarantees consistent and efficient supply of data across multiple in-house developed CRM analytic applications (and any purchased CRM analytic application packages for that matter). Such templates become part of the CRM common business model (common metadata) that is shared across multiple analytical projects to cause integrated development of an end-to-end CRM Decision Processing solution.

Part of this ETL process is to design subject oriented Staging Areas to stage data during extract, transformation and integration from multiple source systems and to hold

complete and integrated data ready for loading to one or more data stores in a CRM Federated data warehouse.

Figure 3 below shows the template driven ETL process to help show what is meant by the above points

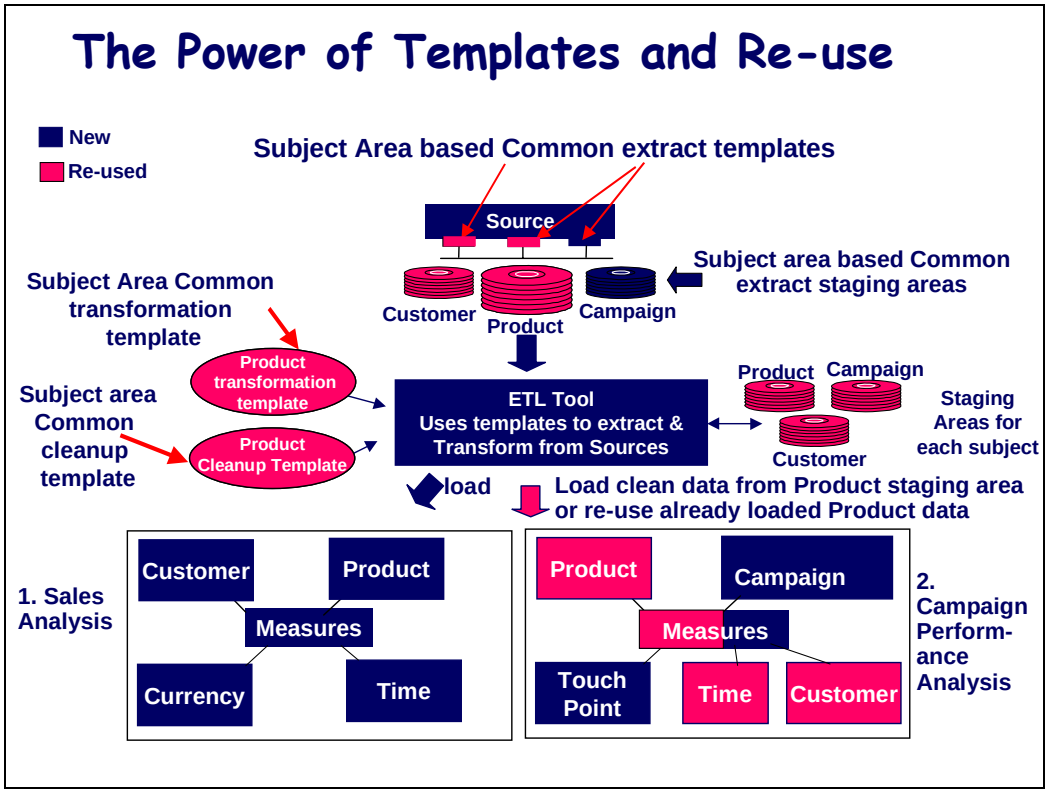

Figure 3

Here it can be seen that common ETL templates increase the integration across multiple projects by allowing data to be extracted and transformed once, then staged. From here the stages data (or any subset of it) is available for loading into any of the CRM analytic applications.

Having used an approach that incrementally creates common metadata, and that ensures that multiple analytic applications are integrated during design and during ETL via the use of common metadata, the next step is to adopt a strategy for providing common business views across BI tools that access this data so as to guarantee consistent understanding of what is being looked at across the user base. The objective here is that the business views (e.g. a Business Objects Universe) of all tools involved, are also be built from the common names and definitions in the Common business model. Doing this should ensure that a common understanding is achieved when looking at reports and analyses via different BI tools. This is because each tool should refer to the same measures the same way using the same names and data definitions.

Web Access and the Information Portal

Web enablement of BI tools that access and analyse CRM business information and business metadata (e.g. what reports, queries, analyses, other information are available) is next and this can be done via the web version of BI tools. Once this is done, business intelligence from analytic application packages and in-house built analytic applications (accessed via BI tools), can be integrated through an information portal. This portal should be customisable to show information that each user wishes to see. Unstructured information on Customers and competitors can then be integrated into the portal to provide a complete set of information needed for CRM decision processing. This information may come from collaborative systems such as office information and groupware information, from content management systems such as text databases and from internal and external web sites as well as business intelligence tools. All should be visible via a single information portal web interface.

An example of the portal option is shown below in Figure 4

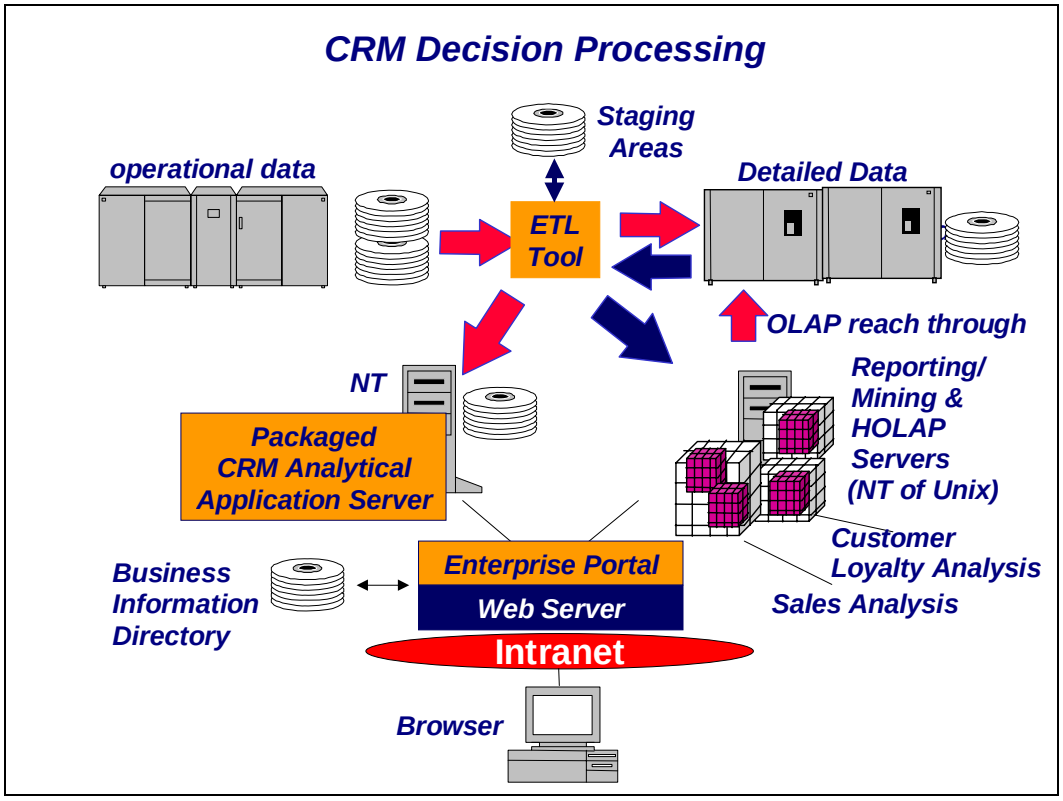

Figure 4

What Figure 4 shows is an integrated set of CRM analytic applications (only 2 are shown – loyalty analysis and sales analysis) based on common metadata and built on the same hybrid OLAP server that has reach through into a back end RDBMS (examples include NCR Teradata and TeraCube, Oracle 8I and Express, IBM DB2 UDB and DB2 OLAP Server) so that drill down from summary data in a cube to detailed data in an RDBMS can occur. The point here is that the dimensions in the Hybrid OLAP (HOLAP) Server are in sync with the dimensions in the RDBMS and both are deployed together. Secondly the suite of built applications have been built on the same HOLAP server to keep development simple and repetitive as well as to help integration. Finally,

the in-house CRM analytic applications can be integrated with the packaged analytic application shown via supplying both with data from the ETL staging areas and integrating the front end via a portal to provide access to all CRM information via a single user interface. Note that unstructured information from office systems, groupware systems, content management systems and web sites could all be added to the same portal.

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