



ArcFM™ UT Integrator Data Transfer

**Geographical Information Systems (GIS)
as Basis for Network Calculation and other IT Systems**

White Paper



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1 Introduction

By means of Geographical Information Systems (GIS), utility companies build up an up-to-date, comprehensive information source about the condition of their networks. These data as well as the IT systems with which they are connected are an important basis for various business processes. The functional range of network information systems, however, is not sufficient to meet all technical requirements, especially with regard to network planning and network operation. Therefore, it is necessary to carry out calculations in the different networks, in order to support the planning of network expansions under an economical aspect. This is the task of special network calculation systems, which are providing information about the current physical status of the network and its reserves. Other IT systems assume additional business process supporting tasks, like planning, optimization or network control.

To supply these systems with the required data can be, depending on the selected procedure, quite time-consuming and cost-intensive. Thus, the target has to be to provide data, which are already available as well as enough up-to-date and plausible.

In a network information system, exactly these data are available. Therefore, network information systems are an ideal basis as data supplier. As a result, through the integration of the NIS with other specialized IT systems, tasks within business processes can be carried out faster, more exactly and thus more efficiently. Through this, the planning of electricity, gas, water and heating networks as well as switching during network operation can be carried out in a better and saver way.

2 Integration concept

2.1 Involved systems

ArcFM™ UT

ArcFM UT is the GIS application software for graphical and alphanumerical network documentation.

UT Integrator EAI

UT Integrator EAI is the IT component which, departing from an interaction on an object in a certain IT system, passes this interaction on to other IT systems that are connected to the UT Integrator EAI. A network station, for example, which has been created in SAP/PM as Technical Place, can be automated via the UT Integrator EAI and created at the same time in the network information system

SAP/PM

With SAP/PM all maintenance-related network objects are managed as so-called Technical Places and Equipments. Based on this, the processes for maintenance reports and maintenance orders are carried out.

SAP/IS-U

SAP/IS-U is the component for the accounting of delivery services. It manages the customer specific information as well as all data necessary for the billing, like meters, consumption, etc.

STANET

STANET is the network calculation program for stationary and dynamic calculation of water, gas and heating networks.

NEPLAN

Network calculation system for electricity networks.

Power control system PSI

Power control systems are the basis for process-oriented control of supply networks of all branches. For the users, they provide the necessary overview of the network constellation, power flow and failures. With this, they are an important basis to carry out switching measures.

2.2 Solution strategy

There are different requirements to the integration of the various IT systems. Basically, these are determined by the tasks, which the respective systems have to fulfill within a business process. The integration requirements lead to different integration solutions in order to optimally achieve the desired targets. For the integration of network calculation, optimization and network control systems, the following functional attributes are required:

Requirement profile	Functional attributes	Solution component	Integration solution for
Exchange of large amounts of data upon request	<ul style="list-style-type: none"> Exchange of large amounts of data, primarily in one direction Possibly adding data from further data sources Transformation of the object structures Not time-critical requirements 	UT Integrator Data Transfer	GIS SAP/PM SAP/IS-U Network control systems Network calculation Planning systems Optimization systems Etc.

Table 1: Overview integration solutions

2.2.1 Integration solution based on UT Integrator Data Transfer

2.2.1.1 Basic functionality

The main performance feature of UT Integrator Data Transfer is the provision of available data from one or more source systems for one target system. The basic functionality is divided into the following steps (figure):

1. Start of UT Integrator Data Transfer and transfer of an amount of network objects for which data have to be provided.
2. Reading of the data to be transferred from the source systems (data import).
3. Storing the data in internal sub-tables (data storage).
4. If necessary, converting the data for the target system (data conversion).

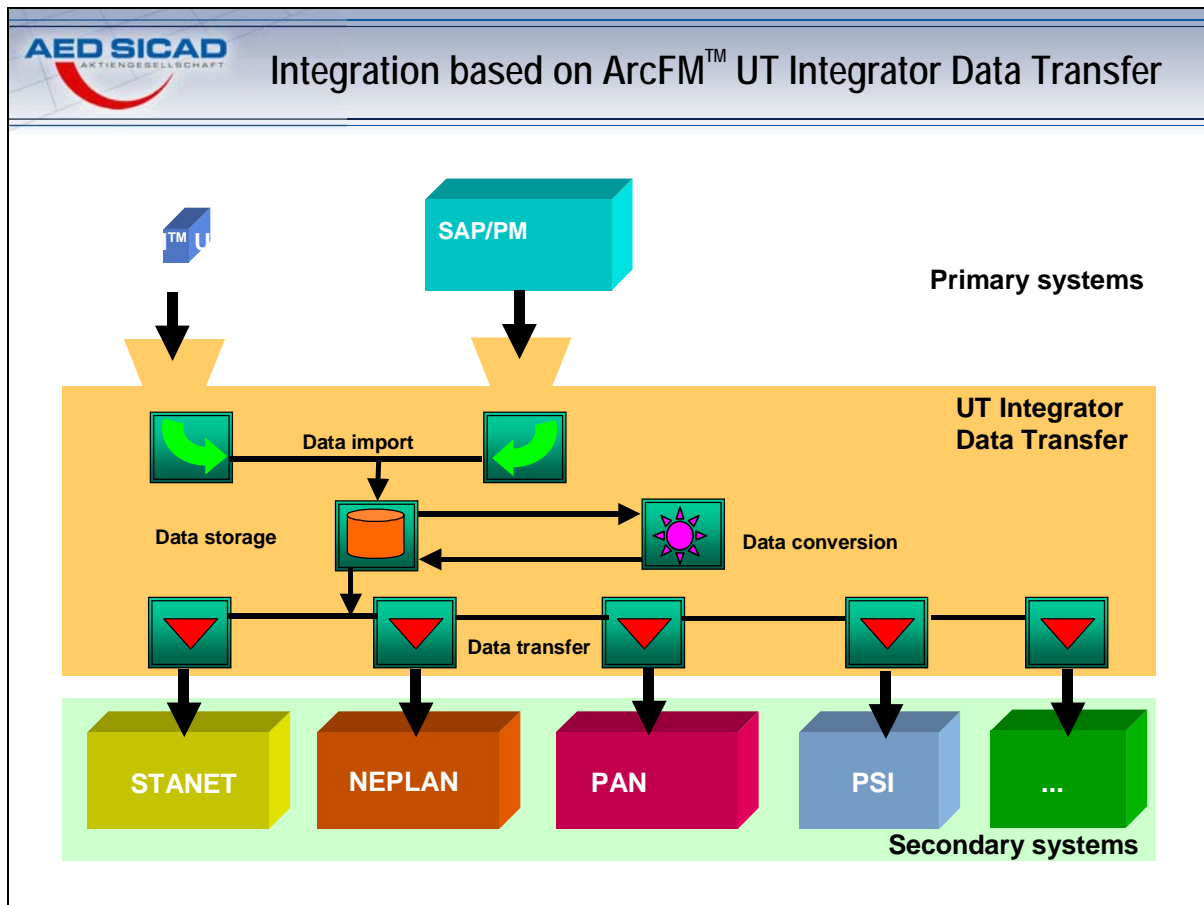


Figure 1: Basic structure of the interface

In practice, many different IT systems with company-specific distribution of data, manage the network information. Therefore, UT Integrator Data Transfer is structured in such a way, that various IT systems can act as data suppliers. However, there has to exist a primary source system, which assumes the start of the UT Integrator Data Transfer, including the handoff of the amount of network objects to which data are to be transferred. If this source system contains all network data, no further source systems have to be connected. However, if important data are stored in other databases, like e.g. SAP/PM or SAP/IS-U, these have to be integrated as further secondary source systems.

Basically, each supported IT system can act as source as well as target system. Like this, it is possible that the network information system ArcFM UT, in the role of source system, provides network calculation data for the network calculation system (target system). In contrast, if results from the network calculation system are to be transferred back to the network information system, the roles are reversed.

Which systems are integrated via the UT Integrator Data Transfer, which data are to be transferred and which data conversions have to be carried out for the target system, can be communicated to the UT Integrator Data Transfer by means of Customizing. As a matter of principle, however, all IT systems participating in the data transfer have to feature a corresponding UT Integrator Data Transfer Adapter.

2.2.2 Description of the sub-functions of UT Integrator Data Transfer

2.2.2.1.1 Starting UT Integrator Data Transfer

UT Integrator Data Transfer is started via a button or menu entry in the primary source system. This interface contains functions permitting the transfer of network objects from the source system to the UT Integrator Data Transfer. The number of network objects to be transferred restricts the amount of data for the transfer. The amount of network objects to be transferred has to be generated in the connected primary source system.

In ArcFM UT, the UT Integrator Data Transfer provides the icon bar “UT data transfer” for the network calculation. On this bar, there are the necessary tools for data export, data import, network selection and possibly for the transfer of type data into the desired target systems.

2.2.2.1.2 UT Integrator Data Transfer sub-function “data import”

The sub-function for data import refers to the result set of the network objects passed on to the UT Integrator Data Transfer. Depending on the distribution of the network data in the source systems, the describing data belonging to the network objects are read directly (for ArcFM UT directly via ArcSDE) or by using the corresponding reading services of the source systems (e.g. for SAP/PM via UT Integrator SAP and SAP BAPI). The reading service is offered via so-called Mapping Objects, which are created via parameter tables. These objects are familiar with the structures of the source data as well as the structures of the data memory. In addition, the network object classes to be transferred from the source system can be restricted via these objects.

2.2.2.1.3 UT Integrator Data Transfer sub-function “data storage”

The data that are read via the data import are buffered in a data memory. The data memory consists of various tables in the connected database. These tables are subdivided into standard tables of the UT Integrator Data Transfer and customer-specific tables, which buffer the data outside the supported standard range. The standard tables are provided with a basic attribution, which can also be extended by customer-specific attributes.

2.2.2.1.4 UT Integrator Data Transfer sub-function “data conversion”

The data, which are stored in the data memory, can be altered via different conversion functions. The conversion is divided in two parts:

- **Conversion depending on different source systems**

These conversions are used for adapting differences in the data models, which have their origin in the respective source systems.

- **Project specific conversion**

General conversion – The general conversion features functions for the conversion of units and for changing attribute values.

Conversion through software functions – These conversions can be used for solving special cases in the data model and user requirements within the respective project.

2.2.2.1.5 UT Integrator Data Transfer sub-function “data export”

The data, which after the conversion are stored in the memory, are converted into an import format supported by the target system (ASCII file, RDBMS tables, etc.) and provided there. The definition of the target system for the corresponding data export is stored in the parameter tables, depending on the branch. If different software systems are to be used for one branch, a system can be selected via a dialog control.

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