Management Applications
PDM – ADP – CC
System description
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What are Management Applications?

Fuel consumption and the associated costs are an important issue in both small and large buildings. However, it is not easy to get an overall view of these and to take suitable steps. Changes of building usage and restructuring are taking place more frequently. This makes data storage and systematic reporting with conventional spreadsheet programs very hard or even impossible. Our Management Applications take on this task.

The Landis & Staefa Division of Siemens Building Technologies offers a software package which helps you manage costs, comfort, and environmental stress.

Data management

PDM Process Data Manager
CC Consumption Control
ADP Advanced Data Processing
DataMove Interface to Maintenance Management | SPAN-FM/VISONIK
SPAN-FM Automated facility management system by Peregrine Systems Inc.
Database Oracle or Sybase SQLAnywhere
BAS-x Numerous building automation and control systems
**CC Consumption Control**

CC processes information on energy and other types of consumption along with the corresponding costs to produce characteristic patterns and graphical summaries. In this way, changing reference levels, weather conditions, and seasonal variables (e.g., heating degree days) are accounted for.

**ADP Advanced Data Processing**

ADP processes data with resolutions down to a single minute or event-oriented data into meaningful reports. Microsoft® Excel can be integrated as a report generator.

**PDM (Process Data Manager), common interfaces, and data storage**

CC and ADP are based on a common structure for both interfaces and long-term data storage (PDM). CC and ADP can be used independent of each other either in single or multiple user configurations (client-server architecture). Additionally, they can be used either in conjunction with a building automation and control system or else as stand-alone programs.
PDM (Process Data Manager)

PDM provides the interface between the PDM database and the building automation and control system, and at the same time, takes over the server function for data administration in the integrated database. PDM offers an archiving function and manages the user access rights and the associated software license.

**General functions**

PDM takes process data from the building automation and control system, from manual entries as well as from imported data, and systematically files it in the database. Existing entries can be corrected. A Quality Attribute (QA) is stored for every entry together with the value and its associated time stamp. This attribute provides information on the reliability and history of a value.

Various features are supported depending on the origin of the data. If data needs to be changed, this is noted in the QA and recorded in the database's journal of transactions. As a result, changes to the data are traced and can be undone.

If changes to basic data are made, any derived (compressed) data is also corrected automatically. This ensures data integrity.
Data integrity on validated plants can be completed by means of the Oracle "Audit Trail" option. This option allows for tracing and recording all transactions and changes to both the contents of the database and its configuration. This procedure—accepted by recognised institutions—considerably simplifies validation of an ADP installation.

Validation is a special procedure pertaining to handover and inspection. In the pharmaceutical and food industries, this procedure covers all technical equipment used in the processes for part- and end-products, manufacturing, storage, or logistics. In principle, the FDA (US Food and Drug Administration) regularly inspects (sometimes without announcement) such installations.

Data series are sets of values in the PDM database. Each data series contains the values for a set of measurements, e.g., the measured values of a temperature sensor. The data series form the basis for reports and further calculations. They can be given meaningful, freely selectable names:

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<thead>
<tr>
<th>Name</th>
<th>Function</th>
<th>Interval</th>
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</thead>
<tbody>
<tr>
<td>Room temperature</td>
<td>Sampling</td>
<td>10 Min</td>
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</table>

Freely selectable name of a data series

Data management
Depending on the requirements for reports and/or long-term data storage, raw data from the building automation and control system can be compressed into mean, minimum, maximum and difference values. The following compression functions are available:
- Sampling
- Mean
- Minimum
- Maximum
- Difference, and
- Sum

The original data are stored unaltered in the database for an individually defined storage time. A cyclical process compresses the data into new data series with the selected functions and intervals (e.g., daily mean from 10 minute values).

The data remains in the database for a specified time, from where it can be retrieved for processing and reports. Older data no longer needed is automatically deleted. External data (data which does not come from a building automation and control system, e.g., manually-entered figures for precipitation, the number of building occupants, or the number of patient nights) is stored in external data series. These data series are equivalent to all other data series types for the purposes of processing and presentation.
**Calculated data series** contain the addresses of other data series as well as a formula with which the corresponding values are mathematically linked to one another. As a result, a calculated data series allows for storing the results of other linked data series in the database as a data series in its own right. The values are only calculated when requested (when calling up a report) and are then transferred to the report generator. Data series can also be linked in the report generator (report formula) or for example in Microsoft Excel. Maintenance of such linked data series is much more demanding, as these values are normally used in more than one report.

**Automatic operation**

All routine tasks requiring no other input can be run automatically. This helps save time for other activities such as the study and analysis of reports. Of course, all automatic actions can also be carried out by hand.
Archiving

Most data, especially if compressed, must be stored for extended periods of time, sometimes for several years. It is thus sensible to store this data safely away from the active areas of the database, in other words to archive it. The data can then be re-imported into the database as required. When working with validated plants, this process (which represents the last step in an electronic database) must be documented, organised, and trained based on special requirements. In this regard, special attention must be paid to the technology of the storage medium such as long-term storage.

Data backup

Backup of configuration and data is a part of the routine standard tasks. Standard database and operating system tools are used for backing up the data. In validated plants, this process must satisfy any special requirements on documentation, organisation, and trained staff.
ADP (Advanced Data Processing)

ADP helps create meaningful reports from the data series saved in the PDM database in any combination and for requested time periods. The reports can be displayed on screen or, if preferred, printed either manually or automatically. Compared to other trend applications on the market, ADP offers the following additional features:
- Automatic data management
- Comparison of time periods
- Many different display formats
- Fully automatic operation
- Integration of Microsoft® Excel

**General functions**

When calling up a report, the required time period is specified with a simple selection as shown here:

A **job** allows for combining multiple reports. It can be started automatically at a chosen time or by a few mouse clicks. A job allows for representing business patterns such as: "Mr. Smith needs five reports every Tuesday morning to prepare for a regular meeting".

The time period can be individually defined for each job using one of the four options shown in the illustration to the right.

The start times for day, week, month, and year are defined in the advanced properties of a job. This means for instance that a business year which starts in October can be defined.
Report data series

A report data series is one which is included in an ADP report. The report data series can be given a different name in the ADP report. This is useful for example, when a report is intended for someone who is not familiar with the technical names of the original series.

To compare data series values of different time periods (this month – last month – two months ago), time offsets or a reference year can be defined for the report data series.

Report data series can be shown or hidden. This function is useful for calculations between report data series when it is more important to know the result of calculation than the data of the individual series.
Data analysis with ADP

PDM data can be displayed and analysed using various methods. The tools for this are designed in such a way that the user does not need to be familiar with the database in order to make an analysis.

The TREND function for on-screen data analysis was designed to resemble the similarly-named function in the DESIGO™ INSIGHT building automation and control system.

The Trend screen

The most important features of Trend are:
- Display \( y/t \) of up to 10 curves with cyclic or event-oriented data
- 1 or 2 \( y \)-axes
- Alpha-numeric display
- Continuous or stepped curve characteristics
- 2D and 3D display
- Legend
- Zooming of time bar
- Division of \( t \) and \( y \) variables
- Title and axis texts
- Saving of settings in template files
- Configuration of display with drag and drop from the PDM Explorer

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Siemens Building Technologies
Landis & Staefa Division

Management Applications
ADP reports

ADP reports consist of a graphical template such as Microsoft® Excel, a set of data series, and some additional attributes. The data can also be displayed with a time offset, e.g., to compare two time periods of a data series. Pre-defined ADP reports with a freely selected name are stored in the PDM Explorer in a freely defined file structure.

When calling up a report, only the time range and the output parameters must be indicated.

ADP recognises four display types: **List**, **Table**, **Excel**, and **Trend**. Display types are pre-defined styles of data presentation. With the help of the spreadsheet functions, values can be supplemented in the “table” and “Excel” display before the report is produced. Additionally, extensive processing, calculations, and changes to displays can also be carried out. The offset function (for comparison of values across several time periods) is supported in all four display types.

In addition, ADP has an export function for transferring data to Microsoft® Excel.

Microsoft® Excel licenses are not included in the delivery of ADP.
List
Alpha-numerical listing of values from the database.

Table
The "Table" display type corresponds to the spreadsheet program **Formula One** supplied with ADP Landis & Staefa pre-sets most reports of this type. A report’s design parameters are defined, on the one hand, by the settings in the *.ini* file and, on the other hand, by the Formula One Designer. This Designer software is only available in English.
Excel interface to Microsoft® Excel

In the Excel display type, Microsoft® Excel is started. The values are read into a Microsoft® Excel table from the "Raw Data" table. Then, the "Autorun" macro is run. With the aid of this macro, the entire report can now be created from the imported values of the "Raw Data" table.

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Values transferred from the database's "Raw Data" table

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</table>

Temperature values from 04.10.96 00:00 until 04.10.96 23:59

Microsoft® Excel report (excerpt)
CC (Consumption Control)

CC is the perfect tool for optimising energy consumption, costs, or comfort in buildings and complexes. It indicates with minimum effort where there is a need for action and where it makes no sense to invest time and money. Additionally, CC is ideally suited for allocating costs and energy consumption to cost centres, real estate assets, profit centres, etc.

Consumption Control is a Microsoft® Windows® application which typically runs on a single workstation or over a network with a server. The data which the program converts into reports is stored in the PDM database.

ADP reports measuring results with sampling intervals down to a single minute.

Unlike the CC reports based on daily values, those with weekly, monthly, and annual values can be compressed.

Both user interface and operation are based on Microsoft® Windows® with all common functions found in context menus by pressing the right mouse button.

The example here shows how a right-clicking the desired structure initiates a CC report.
Before completing the CC report, the drop-down list box shown here can be used to define the name of the report, the preferred view, the time resolution, and the time period.

The data stored in CC is organised in **structures** with various points-of-view. The structures can be freely selected and are geared to meet user requirements.

Thus, structures such as geographical ones (building, floors, rooms) or commercial ones (cost centres) are possible.

Furthermore, new structures can, if required, be added at any time (new buildings, or extensions to existing ones).

Illustration of a geographical structure
Reports produced by CC cover graphics, charts, and tables. Scaling and labelling are done automatically. The format of a report can be very easily adapted to personal requirements. The reports which are produced can be exported for additional handling with Microsoft Excel if required.

Several different views are available for each CC report, showing the same data in different ways (e.g., as chart, in table form, etc.). Additionally, Microsoft Excel templates allow for adding to the table header details such as a company logo.

Views are either created for each project by Landis & Staefa or can be selected from a collection of existing views. All views are calculated at the same time and are then available from a drop-down list box. Statistical variables such as the mean, standard deviation, maximum or minimum can be shown or hidden. Changes to the display are possible without re-calculation (e.g., changing from a line to a bar chart).
Two types of **budget** can be used:

- Budgets that depend on variable quantities such as heating energy in kWh/day, depending on the median outside temperature (energy signature).
- Date-dependent budgets such as the electrical energy consumption in kWh/day based on the current month.

Dialog boxes for parameters help setting the parameters. The result of any parameter setting is shown simultaneously on a graphic. The budgets also allow for differentiating between working and non-working days. The basic structure of a comparable object can be copied so that only the new object-specific details need to be entered. A valid time range can be defined for each budget.

The **energy signature** establishes a relationship between the heating energy consumption per week and the associated median outside temperature for the week.

The budget values depending on the outside temperature are calculated on the basis of empirical values, design defaults for new buildings, etc. A budget for working days as well as for non-working days can be defined.

Date-dependent budget for electrical or water consumption. Budgets for working and non-working days can also be defined here.
Referenced forecast

Tables with reference values allow for estimating the costs or energy consumption at end of a reporting period, provided the weather pattern and/or consumption correspond to the values of the reference table.

Consumption Control can be used not only together with building automation and control systems and automatic transfer of data in the database. Data can also be entered by importing data or by hand in the meter dialog box.

The meter data are combined into data sets with a fixed validity range. A new validity range is set up if a meter is changed.

The data set is characterised by its name, the meter’s physical address, membership to a storage group to apply budgets and forecast models, membership to a price model, the meter type (main, consumption, submeter or other), the units, and the pulse value for consumption meters.

Any meter exchange or resetting of meter readings are compensated for to avoid discontinuity in the reports. The values of a data set can be displayed in the meter report or directly in a simple layout in the meter dialog box. A time stamp is assigned to meter exchanges or changes to the pulse value.

Looking at the quality attribute, it is always clear whether one is dealing with original or modified data. The history of modifications to values can be traced.
Meters in a building are not normally fitted on every floor, or in every room to measure the corresponding energy consumption. To be able to classify energy consumption or costs, regardless of buildings, cost centres, or other structural models, it is possible to allocate these quantities based on customised, predefined reference variables.

Depending on the location of a meter within the structure, CC supports the following functions:
- Top-down allocation of recorded values within the structure
- Bottom-up consolidation of recorded values within the structure

In both cases, the allocation occurs by means of a distribution key. A customised reference variable can be selected as the distribution key, e.g., net floor area in m².

The report output can be automated. To do this, the program “AutoTask” is used (see also “Automatic operation” in this system description).
Getting the best from your investments

There is an influential name on the way from the proposed building to the completed project: Landis & Staefa Division. Under the umbrella of Siemens Building Technologies, we do everything to ensure that your particular building automation and control project is a financial success. We get the best out of every type of building by putting the best of everything into it.

We take pride in innovative research and development.
We protect your investments with a comprehensive services package offering a services program tailored to your building’s needs.

Wherever you are, you will always find us nearby. For all these reasons, we appreciate customers who expect high-level productivity—not only from their buildings, but also from us.