



Architecture

Functions

Applications

LISA

Laboratory Information
and Management System

LISA
the lims

POWERED BY
ORACLE

T&P
Software is our profession



- ▼ Software development
- ▼ Training
- ▼ IT consultancy
- ▼ Data warehouse
- ▼ Internet computing
- ▼ E-commerce

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Efficient Laboratory Management with LISA

High output – low Cost

Considerations of profitability are increasingly becoming the basis for forward-looking decisions. Especially laboratories are feeling the squeeze: on the one hand they face demands to minimize costs while on the other they are required to raise safety levels, improve the quality of their findings, and cope with a steady increase in order volumes.

When an information system is implemented rationalization effects are expected partly in terms of quantity, such as increases in output and cuts in expenditure, and partly in terms of quality, such as improvements in results, faster responses to customer demands, and swifter, direct delivery of information to the parties involved.

The researcher as manager

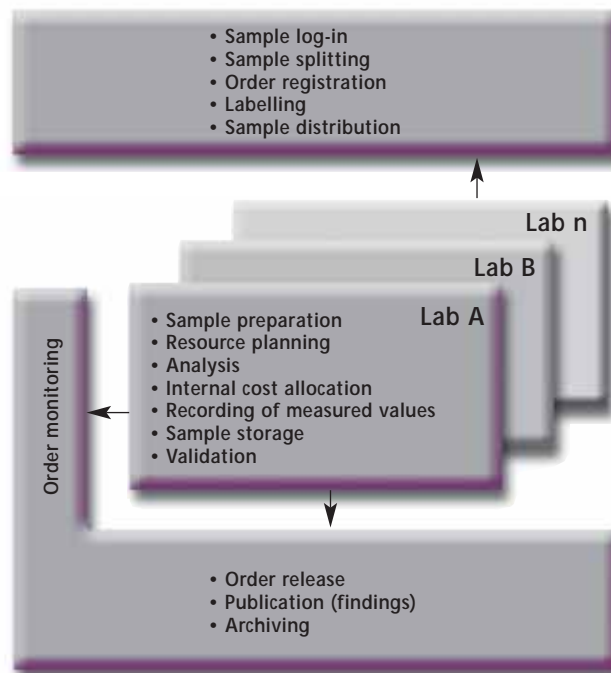
Increasing workloads, growing specialization and the division of order processing by task in the laboratory mean that, besides requiring a high level of expertise, lab managers are faced with new tasks and challenges concerning

- ▼ Administration and management
- ▼ Planning and checking

- ▼ Specialist advice
- ▼ Information management

The lms specialists of **T&P** set out to design a system giving laboratory managers and their staff the best support possible to deal with these new challenges. They developed **LISA** – an internationally acclaimed laboratory information and management system.

Order processing



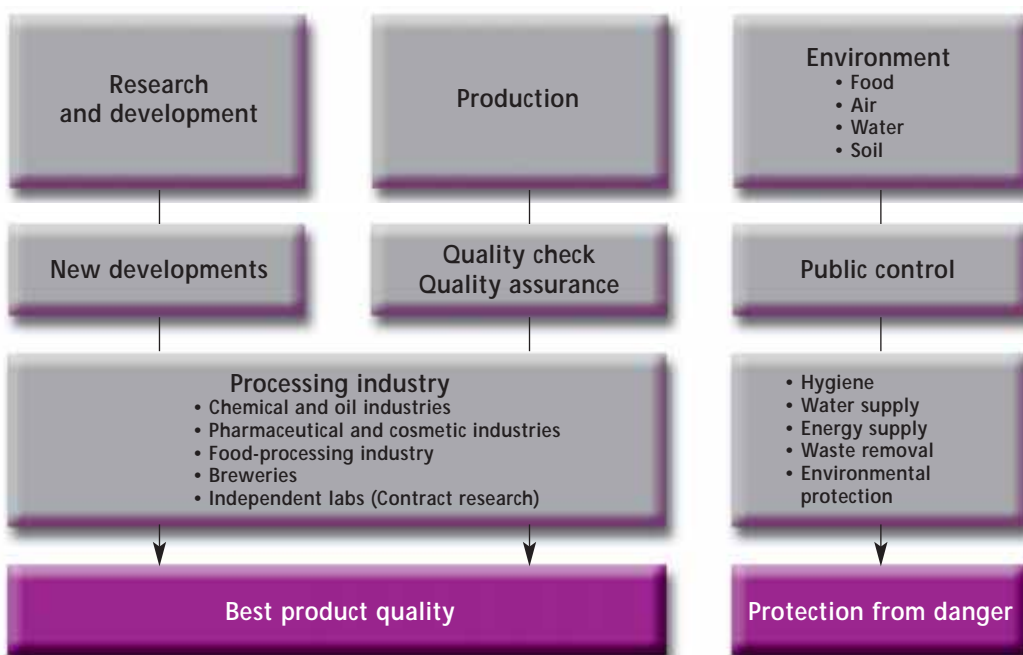
T&P conceived **LISA** as a holistic system offering administrative functions as well as support for lab management when organizing, planning and handling sophisticated processes. **LISA**'s individual system modules optimize the following areas, among others:

- ▼ Planning of sampling
- ▼ Registration of orders and samples
- ▼ Distribution of samples to analytical workstations
- ▼ Documentation of sample-accompanying data
- ▼ Scheduling and checking of order flow
- ▼ Technical and human resource planning
- ▼ Recording and processing of measured values
- ▼ Plausibility check and monitoring of limit values
- ▼ Result validation
- ▼ Preparation and automatic distribution of reports
- ▼ Invoicing and internal cost allocation for laboratory services
- ▼ Sample storage and archiving of findings
- ▼ Organization of information flows

LISA in administration and management

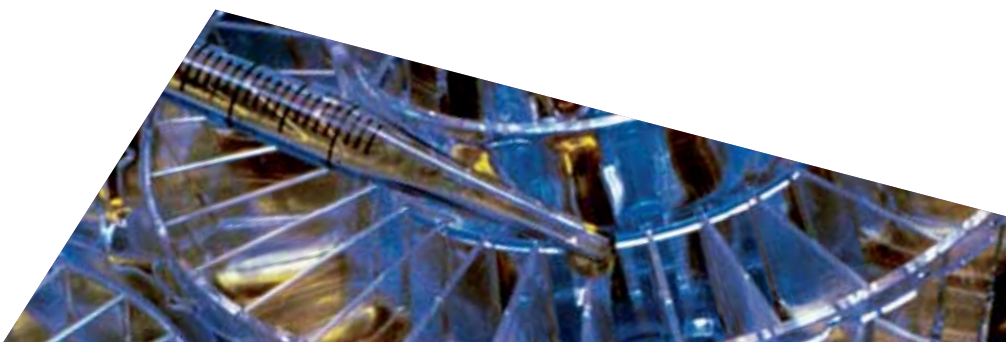
LISA is used in the chemical and oil-processing industries, some segments of the agrochemical and food industries, and the pharmaceutical industry. Further users are government labs for chemical analyses, supervisory authorities, water-supply companies, environmental protection services, power plant operators and energy utilities.

Cross-sectoral solution



LISA's deployment areas

LISA administrates required information and results centrally, using the advantages of existing information systems. By integrating the individual analytical workstations and tools in an over-arching concept **LISA** creates an effective communication infrastructure for analytical operations.



The LISA System Architecture

A functional framework brought to life by data

As a data-oriented and object-oriented information system, **LISA** provides a functional framework which is brought to life by the data of the application. Rigorous adherence to this new philosophy during the development of **LISA** led us to deploy the ORACLE® relational database management system (RDBMS). **LISA** builds on the standards of this relational technology:

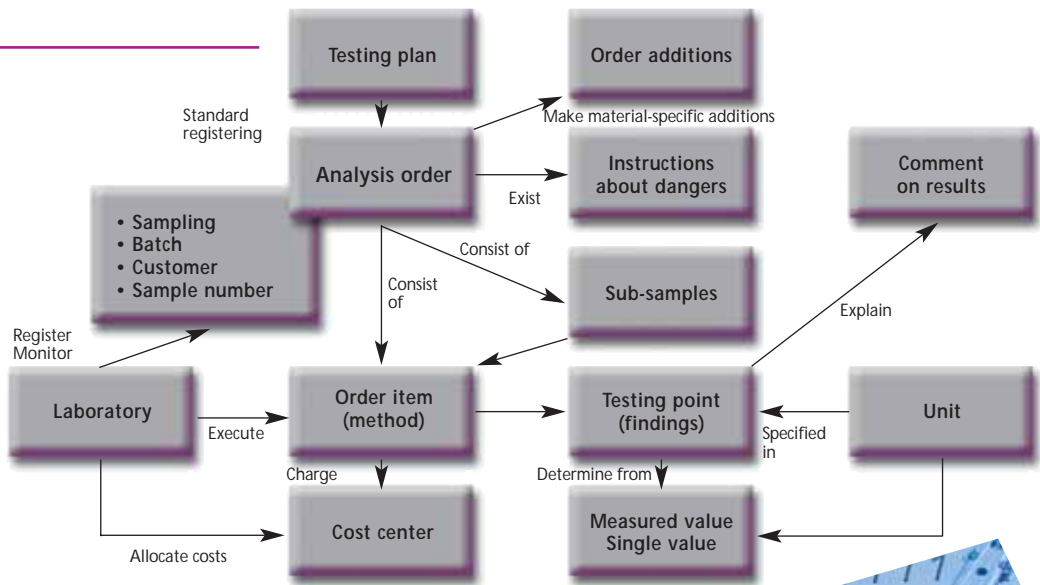
- ▼ SQL Structured Query Language
- ▼ FORMS® – a development tool for graphical user interfaces
- ▼ REPORTS® – a development tool for flexible reporting

LISA was realized with ORACLE® development tools and runs on individual PCs, PC networks and various UNIX systems (LINUX, HP/UX, IBM AIX, SUN SOLARIS etc.). The solution is based on a central database server for all data. The **LISA** application runs on the application server that users access via their browser (e.g. MS Internet Explorer). The underlying system has a multi-tier (3-tier) architecture:

- ▼ tier 1: a database server (db server) (scalable)
- ▼ tier 2: one or more application servers (scalable)
- ▼ tier 3: thin clients (local LISA clients via browsers)

LISA fulfills today's strict requirements concerning data security and data consistency as well as demands on software for transaction-oriented dialog, availability and portability. The relational model enables implementation of a data model that shows the objects (entities) of a company and their mutual relationships (relations). The user interface itself is multilingual, so every employee who logs on to **LISA** can select masks and report fields in the language of his or her choice. Even personal language preferences and internal nomenclature (e.g. "charge", "batch" or "lot") can be presented this way. Navigation is done within the individual **LISA** applications via menus and tabbed dialogs.

Relational model:
Order for analysis





Integrated Solution with Connectivity to Standards

Today many laboratories use various, more or less “intelligent” supporting devices for analysis and testing, ranging from simple pocket calculators to highly sophisticated analytical equipment. Each of these tools delivers measured values (raw data) and findings which in some cases today are still stored locally. Summarizing, interpreting and evaluating these findings often calls more for organizational rather than analytical talents, though. **LISA** enables integration of these tools and separate sources to create a comprehensive information system.

Integration of supporting devices



LISA mask with user-specific menu selection: **LISA**'s architecture and menus are based on the way humans think and work.



The LISA System Modules

- Master data management

Master data management. A laboratory's vital capital

The ever increasing importance of data within a company has been a key factor in designing the **LISA** architecture. **LISA** presents all relevant types of data and their mutual relationships.

Organizational data

- Labs working with **LISA**
- Employees of individual labs
- Integration of employees in the lab hierarchy
- Responsibilities, authorizations and validation stages
- Cost centers and performance data
- Technical resources, equipment, subsystems

Analytical data

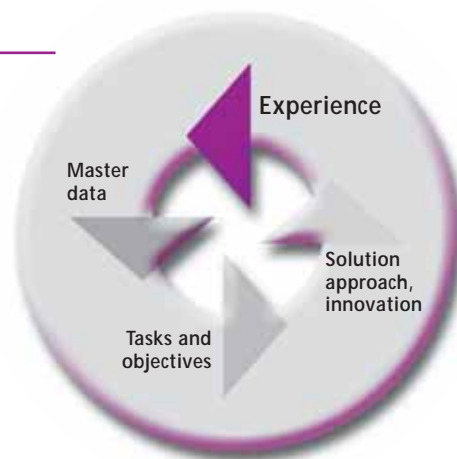
- Measurands, testing points, components, and parameters
- Analytical procedures
- Analytical regulations and programs
- Job instructions
- Algorithms for calculating results
- Dimensions and units

Sample and order data

- Sample origin and identification (material, product, sampling point)
- Testing plans and programs
- Customer
- Specifications and limit values
- Sample retention and storage (location and duration)
- Processing times
- Competence structures for administration, processing and release of samples
- Responsibilities
- Report types, recipients, distribution channels
- Maintenance and calibration plans

Changes concerning working methods, organizational forms, expansion of production, analytical procedures etc. do not require a change of software. They are shown in the master data tables. The system derives its flexibility and adaptability from consistent data collection and inputs that reflect the user's experience and "view of the lab world".

Experience breeds functionality



- Planning of sampling

Foreseeable recurring orders can be planned according to two approaches: the scope of analysis and/or organizational and timing aspects. These routine orders that always follow the same pattern are generated automatically by **LISA**. Operational calendars coordinate the planning of sampling and production. **LISA** generates the orders on the basis of plan data, such as the duration of execution, the analysis to be carried out, the time cycle in which the orders are expected and the recipients of reports. All relevant information can be called up or printed even before actual sampling.

Routine planning of recurring orders

- ▶ Sampling instructions
- ▶ Necessary containers (bottles etc.)
- ▶ Sampling log / field log

LISA plans exactly to the minute for any period, also for future jobs. Without further data input these orders can be accepted at the responsible registration office, at the production level, or in the laboratory.

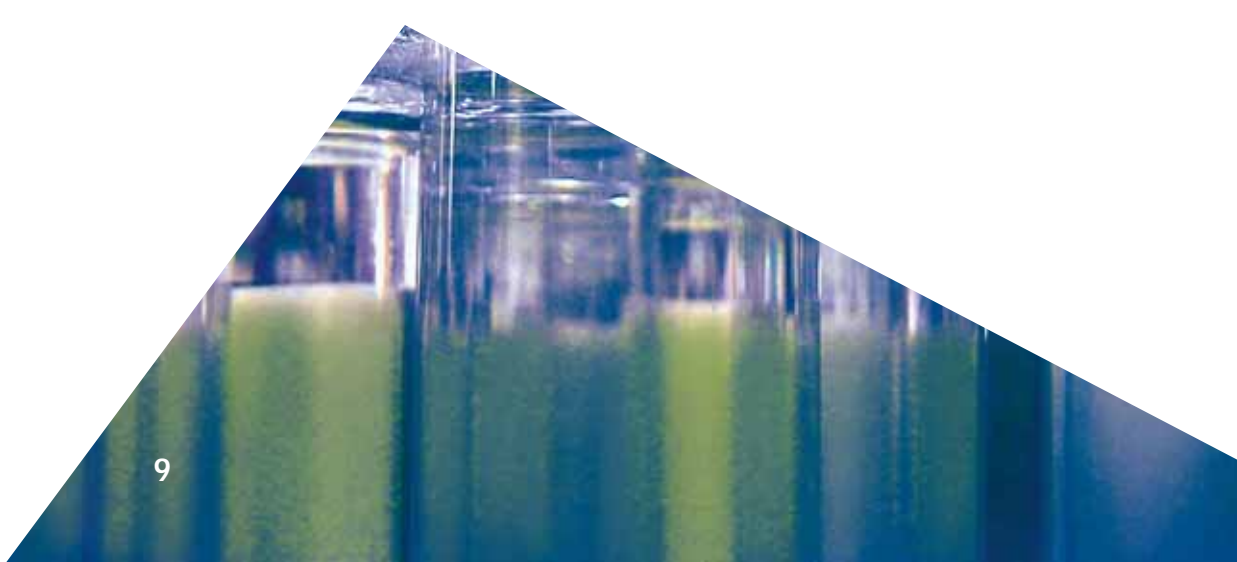
The Planning of sampling module also supports stability tests. Based on the relevant ICH guidelines **LISA** administrates testing cycles and storage conditions and generates the required samples at the times specified.

Material	Origin	Sampling	Sample No.	Test area	Status
LIVESTEAM	ME-C	HE-FD	22.08.2008 18:00	14308	DB-3
CONDENSATE	ME-C	HE-FD	22.08.2008 18:00	14311	DB-1
CONDENSATE	ME-C	OPTIKHARA	22.08.2008 14:00	14312	DB-3
CONDENSATE	ME-C	PAH-B	22.08.2008 18:00	14313	DB-3
FEEDWATER	ME-C	HALKO	22.08.2008 18:00	14314	DB-3
FEEDWATER	ME-C	HE-FD	22.08.2008 18:00	14315	DB-1
FEEDWATER	ME-C	HE-ZU	22.08.2008 18:00	14316	DB-1
FEEDWATER	ME-C	HE-FD	22.08.2008 18:00	14317	DB-1
SPRIGAL	STW	HEAP	22.08.2008 19:00	14807	DB
RYTICAL	STW	HEAP	22.08.2008 21:00	15188	DB

Planning mask: sample overview

In addition, every laboratory handles orders that come in at random or as a result of a particular event. The scope of analysis and methods to be used vary from case to case. While the problem-solving approach for routine analytical procedures is already well defined, the scope of analysis for additional or special orders will often only be determined during the course of actual processing. Depending on the extent of preliminary planning, though, in these cases existing structures can also be integrated and re-applied. Irrespective of the type of order, service or routine, it is even possible – observing GLP requirements – to change analytical scope, administrative, processing and organizational classifications as well as plan data during order execution.

Flexibility for dynamic analytical procedures



The LISA System Modules

- Resource planning

Pre-planning enables rationalization

Significant rationalization effects can be achieved especially by pre-planning routine and in some cases regularly recurring sampling jobs. **LISA** manages the extensive planning of sampling in terms of administration, analytical scope, order processing, scheduling, reporting, and cost accounting. Possible pre-planning features include:

- ▼ Sampling date or cycle and reason for order
- ▼ Sample origin and mandatory specifications and limit values
- ▼ Analytical scope and methods (analytical programs)
- ▼ Competence structures for order registration and project responsibility as well as execution of analysis
- ▼ Organization of sample flow through the individual labs with sample splitting and processing steps (sample preparation and solubilization)
- ▼ Release competence and report security
- ▼ Type, number and distribution of reports
- ▼ Type of labelling
- ▼ Costs and cost allocation
- ▼ Scheduling of order processing
- ▼ Duration of sample storage and retention

Modifications and additions

Order registration is very simple, safe and fast, even without detailed background knowledge. Besides, **LISA** allows user-friendly, flexible ways of modifying and extending laboratory orders. Worklists that can be generated automatically control and distribute incoming orders according to methods or equipment, lab teams or individual workstations. Ad hoc overviews of plan specifications, order volume, working progress and capacity utilization enable the laboratory management to deploy technical and human resources in the best way possible at all times.





- SAP interface

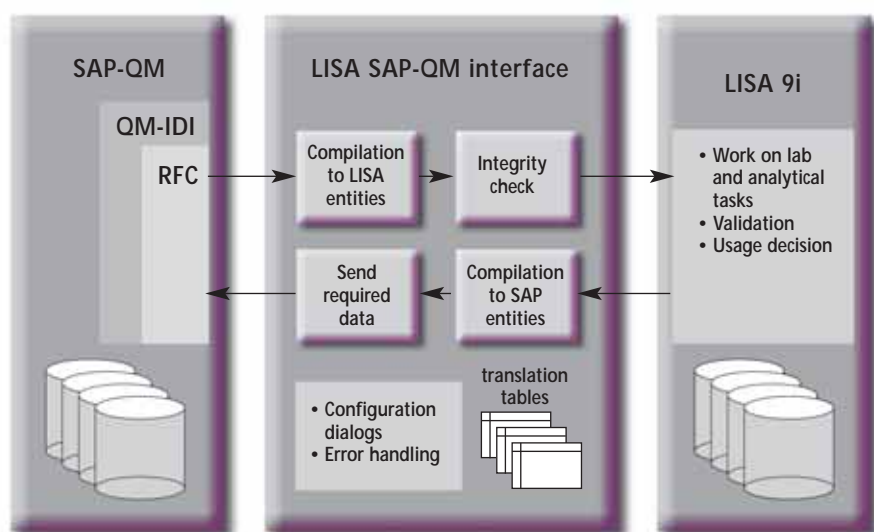
LISA has a QM-IDI interface certified by SAP AG offering direct connectivity with SAP R/3 systems. It enables fully automatic exchanges of test specifications and test results between **LISA** and SAP's QM (Quality Management) module.

LISA generates samples using the test specifications transferred in the form of SAP inspection lots. They can be specified completely or in part by SAP QM. In any event, **LISA** runs a check to compare the data provided by QM and those required for the analysis. For example, **LISA** can automatically add necessary sample preparations or solubilizations without the respective test procedure having been stored in QM in detail. Translation tables can be integrated into the transfer procedure to ensure proper communication of the data in question (parameters, methods, materials etc.). These samples are then analysed using the normal **LISA** processing functions. Following processing and validation of the samples **LISA** reports the test findings and/or the usage decision to SAP QM.

The interface can be configured in such a way that several SAP QM systems are able to communicate simultaneously with **LISA**. Orders of different business units or clients are thus integrated automatically and transparently into the laboratory workflows.

Automatic data check

Communication with several QM systems



Dialog between **LISA** and SAP QM



The LISA System Modules

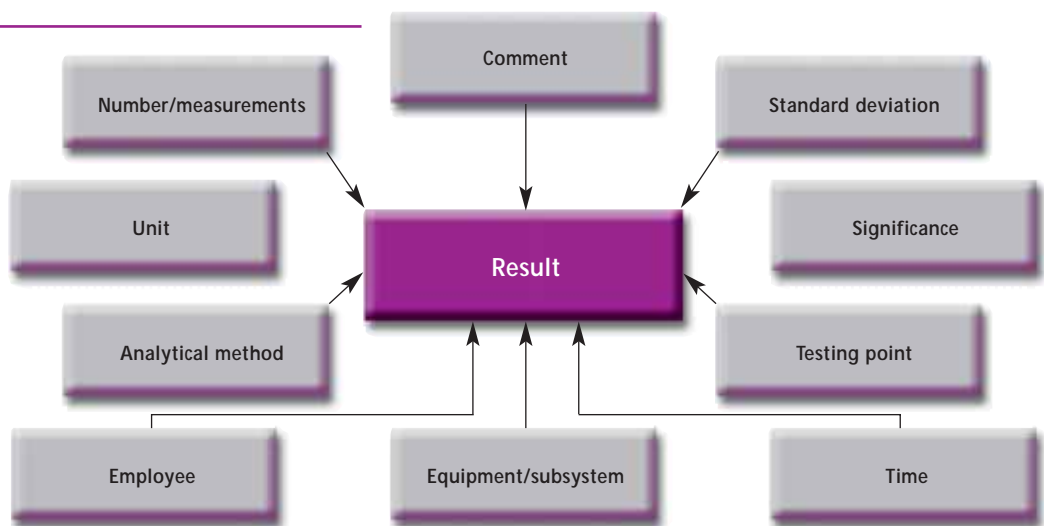
- Processing of measured values

Simultaneous recording and testing

LISA supports the recording of measured values through interactive dialog and online connections for measuring equipment and subsystems. Not only individual values and whole series of measurements but also raw data with corresponding logic algorithms can be recorded for calculations. The recording of measured values is geared to analytical methods or parameters and tables. The recorded raw data, calibration data and constants can be combined with calculation formulas and algorithms which depend on the analytical methods chosen. Findings from other analytical procedures that have already been validated can also be incorporated into this calculation to carry out overriding plausibility checks. While the measured values are being recorded, there are simultaneous tests on the individual values and results:

- ▶ Product-dependent and operation-dependent monitoring of nominal and limit values
- ▶ Method-dependent checking of application area
- ▶ Statistical checking of multiple measurements
- ▶ Calculation of the mean value, standard deviation and variance range

Result identification features



Detailed description of results

The data description of a result includes the origin of the value (equipment and/or person), information about the accuracy of the numerical value, the number of measurements taken to determine the result, and possibly additional text descriptions and comments. The quality of subsequent evaluations hinges on how precisely and completely the result is described. Every change in the result is logged and filed in GMP-compatible form. Changes may only be made by authorized persons and the values overwritten have to be documented properly stating the reason for the change.

- Online data registration

Online data registration with **LISA** requires intelligent subsystems. Local intelligence pre-processes values and findings which are then transferred using appropriate communication modules. The integration of local, proven workplace solutions into the **LISA** network is of major importance. Depending on the system it must be ensured that both software and hardware enable communication and networking or programming.

Data acceptance can be either unidirectional or bidirectional using assignment lists. With bidirectional connections, the samples are set up for automatic analysis. **LISA** fills in the sample tables of the subsystem on the basis of the assignment list. With both types of connection, **LISA** accepts and checks the indicated values after the analysis process. Further calculations are possible at this point. Depending on the test result and preset values, either individual results or all the results of an assignment list are presented for further assessment.

As a supplement to online data acceptance **LISA** offers a pre-processing module enabling autonomous processing that is not dependent on the actual **LISA** software and database. With this module, findings and raw data are first collected and then sent to **LISA** only when they are complete. The module especially supports automated analytical procedures which, depending on the concentration of a substance, require further processing steps such as dilution etc. in order to comply with individual specification limits.

Unidirectional
or bidirectional
data acceptance

Pre-processing
module for
autonomous
processing

The LISA System Modules

- Dynamic automation of the workflow
- Archiving

LISA automates the workflow. On the basis of one or several findings **LISA** automatically expands the scope of sample testing, adds commentaries or texts for a case assessment, and/or initiates other actions, such as renewed sampling.

The triggers for such an action are:

- ▼ violations of limit values induced by a test result
- ▼ predefined conditions that the test result fulfills or does not fulfill (comparison with a preset value or value range)

Follow-up actions are:

- ▼ to add an analytical method to the scope of sample testing
- ▼ to add a testing program (grouping of several analytical methods) to the scope of sample testing
- ▼ to generate a commentary
- ▼ to send an e-mail
- ▼ to call for renewed sampling

LISA allows simple definition of the trigger conditions and of the resultant follow-up action. During sample processing **LISA** checks whether conditions have been predefined for automatic follow-up actions on test findings. **LISA** then automatically starts the related actions and procedures.

Active filing in online archive

When orders are completely processed and released they are initially stored in an online archive together with their relevant administrative data and the findings of the analysis. The data is directly accessible for further selection and evaluation in the form of statistics, tables, graphical representations etc., subject to access-protection regulations. Archiving the data in dedicated areas ensures optimum response times for ongoing laboratory orders.

After a period of online availability, which can be specified individually, the data is transferred to suitable external storage media (optical disks, archiving systems etc.). The data can be transferred back for online use at any time.

All reports and results and their history of changes can be reproduced under GMP conditions.





• Reporting

LISA administrates and processes raw data, converts it into high-quality analytical results and passes these results on to the appropriate business units. Upon completion of the analytical work, **LISA** automatically makes findings and supplier assessments as well as usage decisions for raw materials and finished products available for further processing.

Automated forwarding of reports

LISA focuses on three basic features when issuing a report:

- ▶ Recipients of reports (data ownership)
- ▶ Distribution of reports (data communication)
- ▶ Types of reports and layout (data presentation)

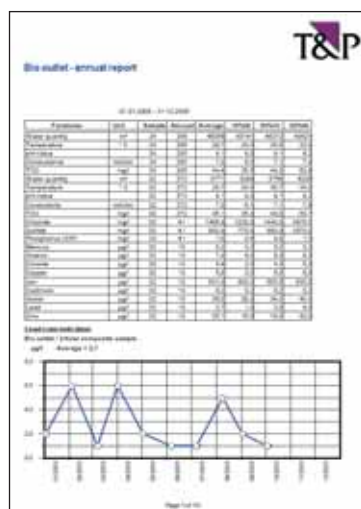
Reports are delivered to every recipient in the form and by the distribution channel desired.

LISA provides flexible tools and interfaces to enable efficient integration of a company's existing infrastructure. Reports and findings are not "just printed out" but distributed electronically using different types of media and formats (PDF, RTF, HTML, DOC):

- ▶ E-mail
- ▶ Telefax
- ▶ Printer
- ▶ Direct connection to other systems
(e.g. process control systems, geographical information systems)



Report prepared by **LISA**:
Recommended fertilization plan



An easy-to-use report generator (ORACLE*REPORTS®) and predefined views of the results help **LISA** users to draw up reports that go beyond the implemented standard reports. The same tools are used to set up worklists, labels, business evaluations, result interpretations etc. Results can be directly imported into WINWORD and EXCEL via predefined interfaces.

Individual reporting with report generator

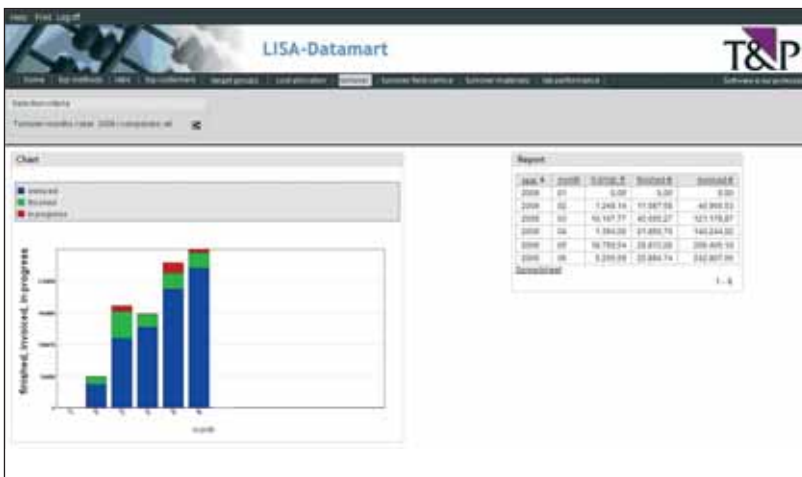
- Costs and controlling

LISA records the costs of an order where they arise. For internal or external accounting, costs occurring in steps at all order levels are charged to the appropriate cost centers. For external settlements, **LISA** offers an invoicing function.

The cost situation of the laboratory is shown from all major perspectives in various evaluations and summaries. Costs are presented according to different criteria (detailed or cumulated for certain periods and organizational units) in relation to orders, costs centers or cost-center categories, methods, testing points or cost units. The data is presented in the form of lists or files which can be retrieved for further processing or forwarded to other systems (e.g. SAP).

Besides cost accounting, other evaluation processes also ensure transparency in laboratory operations. These include order turnaround times in the individual laboratories, statements about order processing times, capacity utilization of individual laboratory areas etc.

Cause-related
cost allocation



Detailed turnover
information with
drill-down

The LISA System Modules

- Administration of retained samples
- Administration of chemicals

Differentiated,
user-friendly
administrative
functions

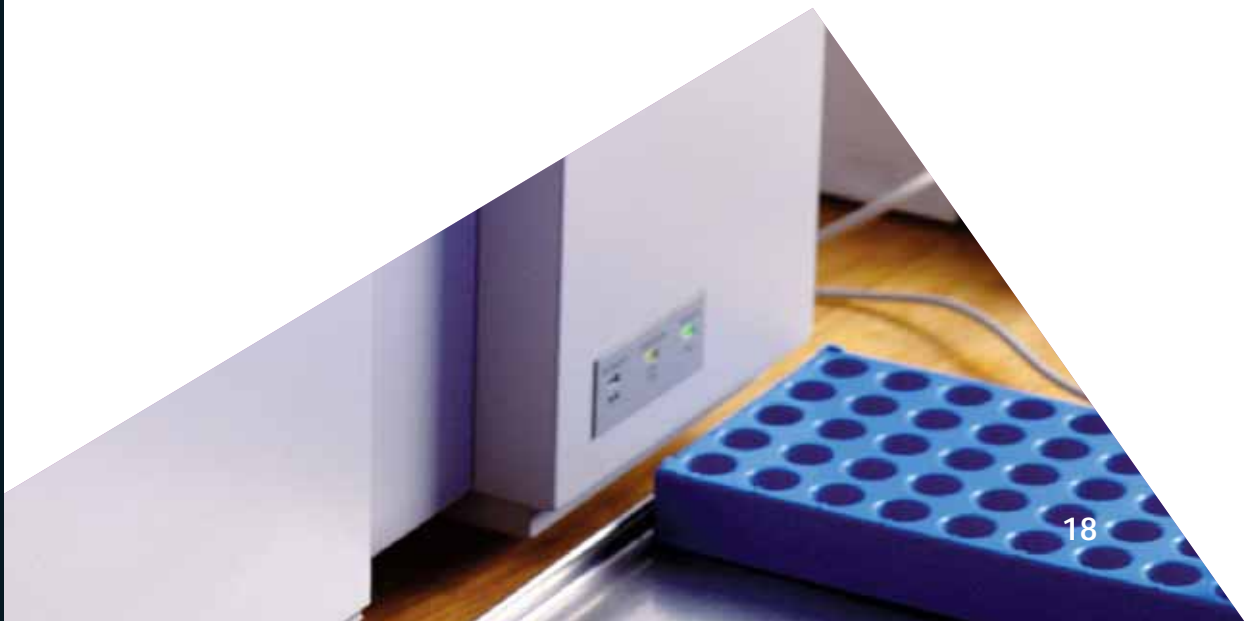
Upon completion of the analytical process in the lab, samples are set aside for long-term storage. **LISA** supports this task by providing simple, user-friendly administrative functions indicating which samples still have to be put into storage, which samples should be disposed of and how, and which material is to be returned to the customer after the storage and best-before periods have expired. With simple functions for storage administration **LISA** offers an exact overview of the stock of retained samples and of their precise location at all times, adapting to the respective storage organization. At regular intervals, **LISA** prints stock lists which can be passed on to supervisory authorities.

LISA also offers functions for transferring samples to external storage. The samples to be transferred, whose retention periods can be stipulated individually, are displayed or printed in appropriate fashion. User inputs are reduced to a minimum. Each individual action (putting into storage, transfer to external storage, disposal and return) is merely confirmed.

Chemicals:
support for
administration
and ordering

LISA supports laboratory logistics for reference materials and chemicals needed for analyses. In addition to information pertaining to specific materials, **LISA** administrates storage and ordering data for chemicals, responding quickly and precisely to queries about storage quantities and locations. At regular intervals, **LISA** prints lists of chemicals that have fallen short of a required minimum quantity so new orders can be initiated in good time.

LISA supports rapid chemical-ordering procedures. The system displays potential suppliers and their specific article and order numbers for every chemical required. In the process, **LISA** gives information on the scope and time/date of an order as well as on the scheduled time of delivery. Furthermore, **LISA** indicates when ordered chemicals have been delivered.





- Administration of testing equipment

Every laboratory uses a broad spectrum of analytical systems and devices, ranging from simple electrodes to sophisticated equipment consisting of numerous individually tailored components. These systems and devices are subject to extensive maintenance conditions and requirements. For example, hose connections must be checked for pressure resistance, electrical circuits must be examined regularly, and parts exposed to mechanical strains must be replaced or repaired in good time.

These activities, often attended to on the side, require detailed documentation, work instructions, and constant monitoring of the time factor. With **LISA**'s help, maintenance dates are planned and presented to the employees responsible. On the basis of checklists, the scope of maintenance is described and the contact persons are named. **LISA** administrates the individual analytical systems and provides information about their history, such as the components used and the course and results of the individual maintenance or repair work.

LISA also supports other activities which are necessary to run analytical operations properly. All the equipment and analytical systems that have to be calibrated at regular intervals or after a given number of operations are listed in a calibration plan. **LISA** arranges for the individual processes to be carried out on the basis of this plan. The calibration values are made available to the analytical laboratories for their common use. Old values are archived so the analytical workflows can be retraced.

Help for planning
and executing
maintenance work

Initiating
calibration
processes



The LISA System Modules

- Quality assurance

LISA supports operational quality assurance on three levels: production, monitoring of testing equipment and methods, and administration.

Level 1: Production

To evaluate test samples from production output, **LISA** offers an integrated control chart evaluation to prepare e.g.:

- ▶ Box-Whisker graphs
- ▶ Mean charts
- ▶ Difference charts
- ▶ Standard deviation charts
- ▶ Cpk values, CUSUM values

By indicating trends, warning levels and control limits, **LISA** supplies a sound information base for assessing the quality of a product. The statistical indicators and events are available not only as graphical visualizations but also as text-based reports.

Mean control chart



A critical assessment of results questions whether the method used with a particular analytical device delivers plausible findings. **LISA** secures result quality in two steps:

- ▶ **LISA** offers the possibility of determining key indicators with standardized evaluation procedures: validation of the calibration function by using linearity, outlier and variance homogeneity tests, establishment of the procedural indicators, and the calculation of detection, recording and quantitation limits in accordance with ISO 11843 and DIN 55350. This validation – required when an operation is started or a method is changed – can be renewed at set intervals.

Level 2: Monitoring of testing equipment and methods

▼ The quality of analysis can be assured by having **LISA** plan regular measurements of AQS samples. This delivers a continuous picture of the condition of the testing equipment. Visualization and evaluation follow the same procedure used for test samples from production output, i.e. by means of control charts. In addition, it makes sense here to evaluate blank value and retrieval charts.

From version-guided documentation of methods, testing equipment, testing plans and specifications up to archiving of the qualification measures for employees, **LISA** supports the user in the area of quality management.

All in all, this makes **LISA** a valuable auditing and documentation tool for certified and accredited laboratories. Equally, **LISA** can be deployed to achieve effective support for QM projects (GLP, GMP, ISO 9000ff, ISO 17025).

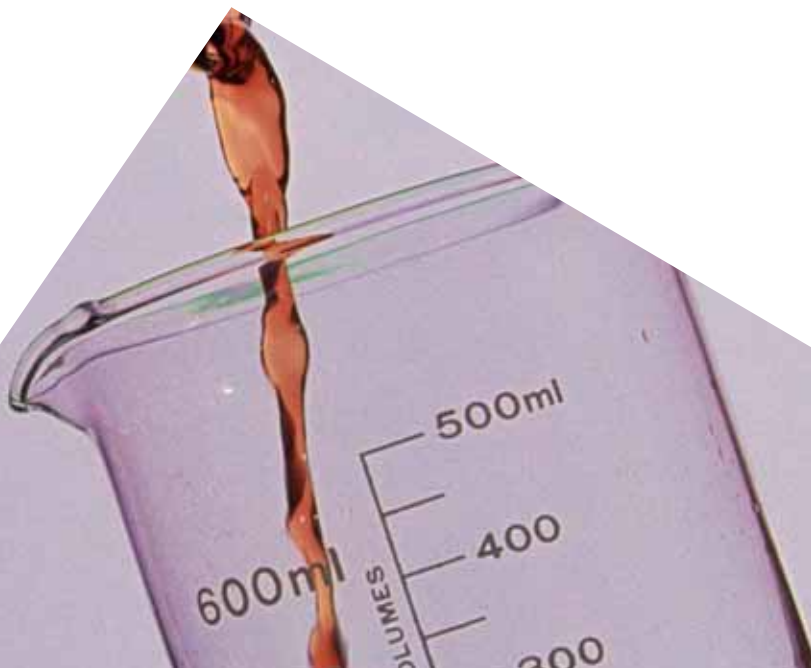
- Project processing

A modern analytical laboratory has to deal with queries and requirements that often extend beyond the routine and medium-term processing of individual samples and orders. This calls for overarching mechanisms which permit long-term, project-oriented processing of these queries.

LISA provides support for the planning of individual activities in terms of time and content and offers functions for assessing a project or study in terms of costs. The project structure can be broken down to the level of individual experiments. Of course, every single project and the related results are protected against unauthorized access. Plan data is monitored and checked by **LISA** during the course of a project. This includes cost accounts, comparisons of target, actual and remaining expenditures, as well as status, progress and result reports.

Level 3:
Administration

Support for
project planning
and assessment



The LISA System Modules

- Statistics and evaluation

Every evaluation of information is only as good as the data on which it is based. However, the different summaries and evaluations are frequently based on the same selection criteria and queries. These criteria include:

- ▶ Certain materials within a specified sampling period
- ▶ Selected testing points and result ranges
- ▶ Exceeded limit values
- ▶ Deviations from nominal values
- ▶ Certain customers
- ▶ Specific production batches
- ▶ Certain suppliers
- ▶ Production facilities and relevant sampling points

Automatic evaluations

LISA supports data selection, preparation and presentation by means of mask-guided dialogs. This means that a user requires neither a knowledge of the underlying data structure nor programming skills. Once an evaluation process has been defined it can repeatedly be carried out automatically or at regular intervals and the results distributed. Every user has access to general "public" evaluations or administrates his own evaluations and views of the result data. The tasks and objectives of the evaluation processes range from a tabular summary for production and facility monitoring to detailed presentations of different products or materials and supplier assessments. The selected data can be transferred to a wide variety of statistical and graphics packages or spreadsheets for further processing and display. Data is exchanged with other software packages by using either defined and generally applicable formats (e.g. XML, XLS, CSV, HTML) or direct SQL interfaces (e.g. ODBC, JDBC). **LISA** provides an extensive tool kit for this purpose.

Result data on the Internet and Intranet

Based on these evaluation definitions, result data can be visualized on the Internet and the Intranet via browsers such as Netscape Communicator or Microsoft Internet Explorer. These tools are particularly suitable for production and facility monitoring. Even sophisticated overviews of results can be updated within seconds. Requests for displays of detailed information on individual samples are only a mouseclick away.

Data of test results visualized online

Date	Sample	Material	Production	Supplier	Plant	Machine	Client
2002-03-01	101-2008-0001	A 11	48.40	0.00	0.00	0.00	1.00
2002-03-01	101-2008-0002	A 11	48.40	0.00	0.00	0.00	1.00
2002-03-01	101-2008-0003	A 11	48.40	0.00	0.00	0.00	1.00
2002-03-01	101-2008-0004	A 11	48.40	0.00	0.00	0.00	1.00
2002-03-01	101-2008-0005	A 11	48.40	0.00	0.00	0.00	1.00
2002-03-01	101-2008-0006	A 11	48.40	0.00	0.00	0.00	1.00
2002-03-01	101-2008-0007	A 11	48.40	0.00	0.00	0.00	1.00
2002-03-01	101-2008-0008	A 11	48.40	0.00	0.00	0.00	1.00
2002-03-01	101-2008-0009	A 11	48.40	0.00	0.00	0.00	1.00
2002-03-01	101-2008-0010	A 11	48.40	0.00	0.00	0.00	1.00





- Order administration and invoicing

LISA supports efficient order administration for laboratory services from offer to invoice. Furthermore, **LISA** provides functions for statistical evaluations of customer and order data (e.g. for market analyses).

LISA administrates all important order-related customer data (address, telephone and telefax numbers, contact person, terms of payment, type of invoicing and reporting, special customer agreements etc.). New orders can be registered quickly. Inputting the customer number automatically activates the import of master data with reporting and invoicing preferences. Data on new customers can be entered quickly and stored directly as master data when their orders are registered. Routine orders that are executed in the same manner at set intervals can be generated automatically. An order can consist of one or several samples for diverse testing programs. For further processing of the order, **LISA** provides functions to monitor the state of processing and, if necessary, to apply modifications (allocation of additional samples or tests). Samples from the same order can be validated and finalized individually or as a whole.

Data of orders that have been finalized is available for viewing or further use in statistics in an archive. Archived orders for which processing is to be resumed can be reactivated. For quick handling of customer inquiries **LISA** can provide a clear and comprehensive overview of order data. Information as to the status of order processing, findings and cost development can be obtained from the **LISA** call center directly on the phone, or called up directly on the Internet.

LISA supports the administration of price lists for analyses (from individual analytical parameters to complex testing) and other services related to order processing. For easy planning of campaigns and handling of price changes, prices are given validity periods. Furthermore, customized pricing for individual customers is possible.

**Administration
of order-related
customer data**

**Administration
of price lists**

The LISA System Modules

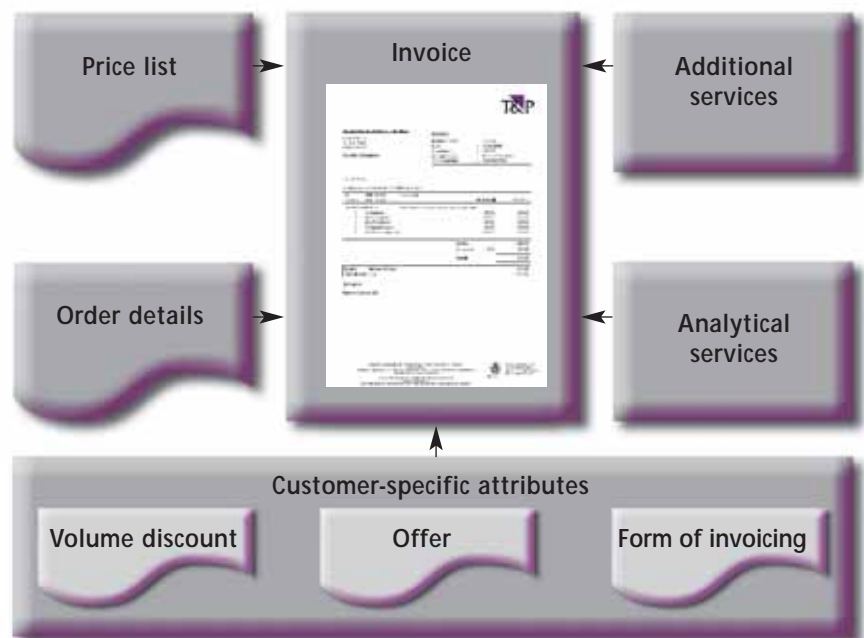
- Order administration and invoicing (continuation)

In addition to customized pricing in price lists **LISA** offers functions to draw up offers and monitor the status of their processing from a sales point of view. When the order has been placed and subsequently finalized, the agreed prices are automatically transferred from the offer to the invoice.

Automatic invoicing with flexible choices

Current price lists, offer prices, services rendered and any manual price adjustments are taken as the basis for invoicing completed orders. Invoicing functions can be completely automatic or partly manual, with the timing determined by agreements with the customer. Invoices can be issued at the same time as the findings (so-called individual invoices) or at a later point (so-called bulk invoices). Bulk invoices contain bills for several orders completed in a predefined period (month, quarter, 6 months, 12 months). **LISA** supports reassignment of orders from one invoice to another, cancellations and credits as well as reimbursements depending on turnover, various types of rebates and discounts, and different VAT rates. Of course, **LISA** can provide the needed degree of detail on the invoices. When setting up an invoice, **LISA** creates entry formulas that are passed on to general accounting systems.

Invoicing with **LISA**



Additional module:
LISA DataMart

With its additional module DataMart, **LISA** makes order and invoicing data available to the marketing and controlling departments for evaluation purposes. DataMart enables company-specific evaluation of turnover and profitability for individual laboratory areas and teams.

Service and Support for LISA

T&P offers extensive maintenance and service for both **LISA** and the ORACLE® relational database management system:

Hotline, remote maintenance, upgrades

▼ Hotline service:

The hotline service offers consulting on the use of **LISA** as well as support for system-related problems.

▼ Remote maintenance:

We use remote maintenance software that allows controlled and completely documented access to the customer's system. It is deployed to help the hotline service locate errors and problems online and to supply the customer's system with software updates directly.

▼ Quick reaction time:

If problems occur that impede operations with **LISA** (e.g. hardware, system software or network problems) **T&P** guarantees quick reaction times.

▼ Upgrades:

LISA's ongoing development is driven not only by **T&P**'s own ideas. It is particularly inspired by the suggestions, new demands and wishes of current and potential customers. Furthermore, existing framework conditions, guidelines and regulations are also taken into consideration. At regular intervals (about once a year) these developments are reflected in new program releases including related documentation that we offer free of charge. The fast changing market for system software (operating systems, databases and development tools) creates the need for additional updates and software adjustments which are usually delivered with the functional release. So from both a technological and functional point of view a **LISA** customer is always up to date!

LISA: Introduction and implementation

Project LISA

A lims system interacts with existing organizational flows and structures. Especially in cases where **LISA** is to support an organization company-wide, the beneficial effect greatly depends on the degree of thoroughness and care in planning the introduction and implementation of the system.

To this end, the **T&P** team offers a wealth of experience and a broad spectrum of control and support tools to accompany system implementation and integration. These efforts ensure that your project is always safely monitored and becomes a clear success:

- ▼ **T&P** is a manufacturer-independent software developer offering you the system solution that best suits your needs from an economic and quality point of view.
- ▼ **T&P** will always integrate overall company aspects and effects into their analysis, documentation and calculations.
- ▼ **T&P** offers workshops and trial installations to help you make your decision on solid grounds.
- ▼ **T&P** will, if desired, conduct necessary training on your premises. The first half of the training program will address general, theoretical and practical aspects. It will be followed by a hands-on phase during which you can gain more experience and confidence in using **LISA**. This phase can be expanded into an actual trial run. The second half of the training program deals with questions that cropped up during the hands-on phase, deepens the knowledge of the subject areas, and gives an introduction to more advanced subjects. All teaching material can be obtained from us for your own internal training programs. We can conduct both training phases using data selected by you. You then have the option of reactivating it later for further training purposes parallel to regular operations.
- ▼ **T&P** supports you in structuring and implementing your demands in the **LISA** master data and offers consultancy on all organizational and technical issues.

We look forward to accompanying you on your way to **LISA**!





LISA
the lims



T&P Business units

- ▼ Software development
- ▼ Training
- ▼ IT consultancy
- ▼ Data warehouse
- ▼ Internet computing
- ▼ E-commerce



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