Chapter 5

The Specialist Profile System – The IT Process

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In the »Agreement on Specialist Profiles for the Advanced IT Training Organisation Procedure« the business organisations agreed on the determination of 29 specialists as advanced training profiles for specialised workers in the IT sector. In the areas of software development, development coordination, solution development, technology, administration, as well as customer and product support IT specialists are being offered a wide variety of advanced certification and specialisation opportunities.

The Specialists are characterised by characteristic work processes, typical activities, and specific fields of the IT sector, and the corresponding fields of IT application. Their incorporation into the general IT process explains the similarities, interfaces, and boundaries between the profiles. Thus, it is possible for companies and organisations, as well as for the specialists themselves, to identify and select appropriate specialist profiles.

The IT Process: The System of Work Activities

The IT process generally describes the manufacture and use of IT products. This includes the entire life cycle of the product as intended by common quality assurance models[1]. This has several benefits:

1. Information technology is omnipresent in modern companies and organisations in the form of software, hardware, and communication technology. Therefore, the IT process includes not only the development of IT products, but their use, as well. This includes not only software and systems, but also hardware and networks.
2. Process orientation in businesses guarantees customer and employee satisfaction, high product quality, and allows for constant improvement. The business and work processes are integrated into the description of product life cycles in the IT process. They can thus be systematically derived from the IT process and explained in detail.
3. The incorporation of the specialist profiles in the overall process, their characteristic activities, as well as their interfaces with other profiles, can be easily recognised in the IT process.
4. As a model, the IT process offers support for businesses and employees in identifying appropriate Specialist profiles adequately related to employment. It can supplement or integrate process models or software development procedures already in use in companies.

[1] ISO 15504, »SPiCE,« in particular was taken into account, which integrates many older models [e.g. CMM, bootstrap]. cf. Stienen, H.: »Nach CMM und BOOTSTRAP: SPiCE Die neue Norm für Prozessbewertungen«, Informatik 6/1999, S. 16-22

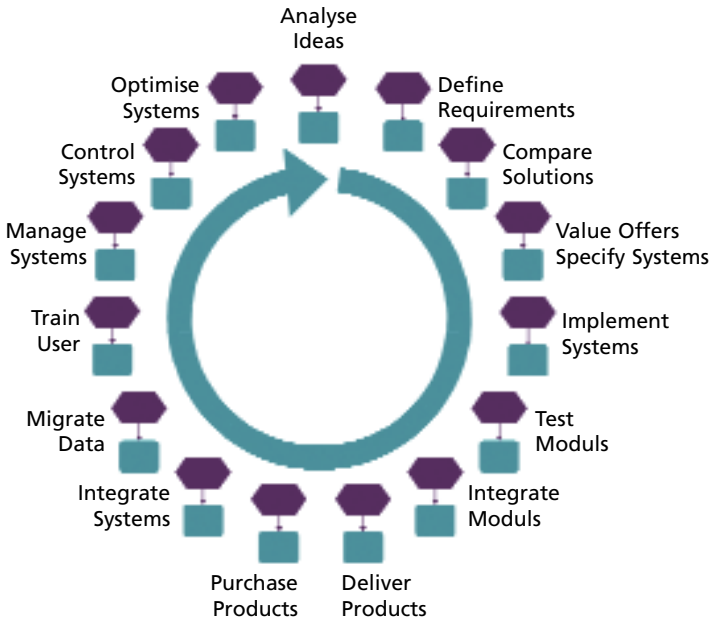

Fig. 1: The IT process

At the beginning of the IT process there is an idea or a demand.

- After a rough analysis of the idea, the requirements are formulated that must be fulfilled by the new system or product.
- Suggested solutions are compared from technical, organisational, and financial standpoints.
- Whether a product should be bought or a new system should be developed is decided based on whether supply are evaluated or systems are specified in the next step.
- The system specifications that are developed serve as the basis for the following developmental process.
- The implementation of the system, generally in the form of individual modules, is a rather extensive activity, and finishes with the testing of the finished module and its integration into [part of] systems.
- Once the system has been generall tested and it works , the product can be shipped.
- The customer receives and inspects the product.
- The adaptation of existing and new systems and data migration are the next step, which often occurs in a pilot phase.
- This phase comprises of the training of various users [users and administrators] of the new system.
- Once the system is finally installed, configured, and adapted, it switches to normal operation and thus into the phase of continual monitoring and maintenance.
- Optimisation, according to the requirements of operation, is the last part of the IT process.
- If the product or system no longer meets the requirements, the new needs must be analysed,

at which point the IT process has arrived once again at its starting point.

The above listed steps of the IT process take into account both the side of the developer and of the user. This enables the identification of typical activities and central tasks on both sides and shows interfaces, points of transition, and common functions.
The steps of the IT process are broad and complex work processes. Operation, monitoring, and optimisation of systems, e.g., are continuous processes, which must be carried out continually. The implementation of a system can take many man-months, and even transfer to the customer is often a multi-level process.
The IT process summarises such activities and processes at an abstract level and depicts them in compressed form.

The IT Specialists: Work Processes in Businesses

Certain typical sections of the IT process form the core of the work of each IT specialist. Based on these core activities, IT specialists can be divided into six groups:

- Software Developers,
- Coordinators,
- Solutions Developers,
- Technicians,
- Administrators, as well as
- Advisors.

Software Developers

Software Developers analyse requirements, designs systems or modules, and carries out the implementation. They develop systems architectures, programmes, databases, user interfaces, and much more; they are thus usually located on the manufacturing side. The Software Developers group includes IT Systems Analysts and IT Systems Developers, as well as developers specialised in software, databases, user interfaces, and multimedia.

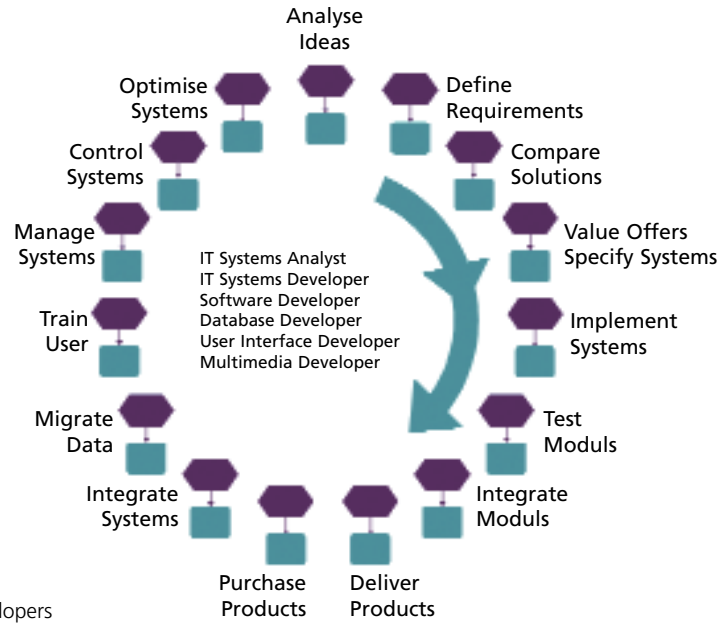

Fig. 2: Software Developers

The analysis of requirements and business processes, as well as the drafting of complete systems, are the field of activity of IT Systems Analysts and IT Systems Developers. The requirements of future users of the systems are the basis for the specification of the software to be developed or procured and the necessary hardware.
The proposed solutions and their formal representation in the form of system design or system architecture are implemented by the software, database, user interface, and multimedia developers.
The subsequent integration of the modules developed in the development process into a total system and their adaptation to the needs of the customer are also tasks of IT Systems Developers.
Software, database, user interface, and multimedia developers derive the necessary fine tuning of the modules to be developed by them from the system design. These modules are then implemented in close coordination with all participants in the development process. The responsibilities of the developers in the IT process end with module testing and system integration support.
Software, Database, User Interface und Multimedia Developers differ with aspect to their particular areas of specialisation.
The activities of multimedia and user interface developers run throughout the entire development process, as both the integration of the various types of media and the design of user interfaces are an essential part of the system.
On the other hand, database and software developers often programme individual software components that will only later be integrated into a system.

Coordinators

The development process of systems and software and the work of the developers must be coordinated and supported. This is task of the coordinators', who are also located on the manufacturing side. IT Project Coordinators, the coordinators specialised in IT configuration

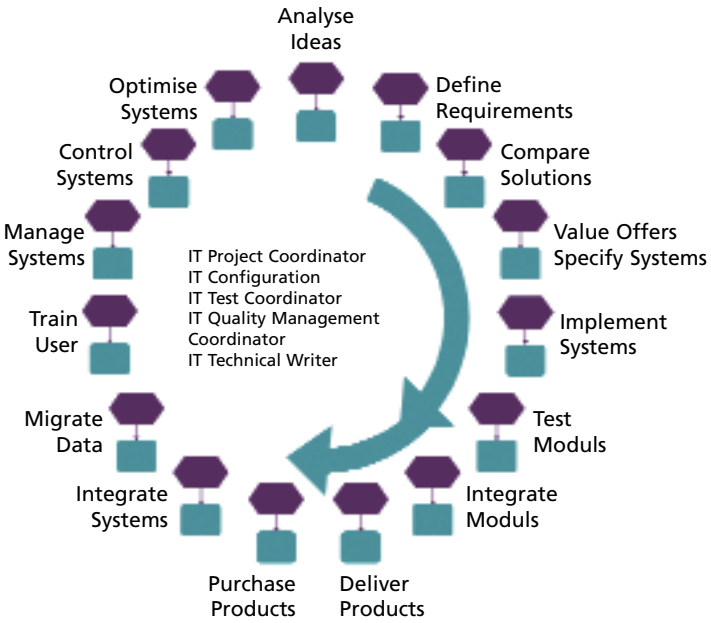

Fig. 3: Coordinators

and testing, as well as IT Technical Writers and IT Quality Management Coordinators, support development processes. The management and coordination of small projects is the occupation of IT Project Coordinators. They are familiar with the financial, technical, personnel, and organisational aspects of IT projects, and manage them.
IT Configuration Coordinators, IT Test Coordinators und IT Technical Writers support the development process from requirement analysis to receipt of product and inspection and the entire life cycle of products and systems from specific viewpoints . In configuration and change management, it is important to have up-to-date, functioning modules or [parts of] systems available throughout the entire development process, in which all changes have been documented and can be easily understood. The design and implementation of tests for the modules, partial, and complete systems, including hardware developed in the development process, is the responsibility of IT Test Coordinators. IT Technical Writers create and maintain documentation in the development process, and for customers and users.
Quality assurance in the development process is the core task of the IT Quality Management Coordinator. In addition, IT Quality Management Coordinators can be responsible for the creation, implementation, and inspection of general quality concepts related to development or business processes.
The coordinators carry central responsibilities in the development process and are members of the development team. In addition, they support products and systems in their life cycle, and must maintain an overview of large and complex solutions, as conceived by the solutions developers.

Solutions Developers

Requirement analysis and solution comparison, system adaptation and data migration are the characteristic responsibilities of Solutions Developers. In contrast to developers, who produce, a Solutions Developer buys an existing system or product on the market and adapts it to the special needs of his/her own company. Thus, solutions developers are on the user side of the IT process and have in-depth knowledge of a specific area of application in addition to IT knowledge.

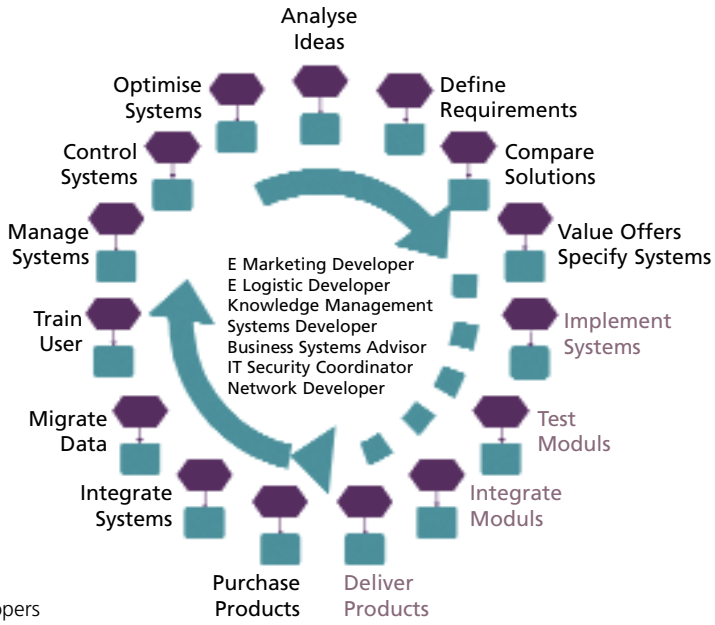

Fig. 4: Solutions Developers

The developers specialised in E Marketing, E Logistics, knowledge management systems, and networks, as well as IT Security Coordinators and Business Systems Advisors, are Solutions Developers.
They specialise in the areas of marketing, logistics, knowledge management, networks, IT security, and business applications. The primary responsibilities of Solutions Developers include the analysis of company-specific requirements, design of IT solutions, and the adaptation of systems and products. Additionally, they train users.

Technicians

Technicians are responsible for solution development for industrial production with hardware components and in security technology.
In addition to demand analysis, typical responsibilities are solution comparison, and system adaptation, hardware-related programming, as well as the development and integration of hardware. Technicians analyse requirements, draft systems or components, and implement and integrate them. In doing so, technicians assume typical developer responsibilities, which differ from software development, e.g. in standard prototype development, but also in the use of totally different protocols, interfaces, and programming languages.
Security Technicians, Industrial IT Systems Technicians, and Component Technicians are basically Technicians.
Component Technicians draft, implement, and test hardware components. Concepts and solutions for security systems [e.g. surveillance cameras or fire detection systems], as well as their connection with the IT infrastructure are the responsibilities of Security Technicians.
Industrial IT Systems Technicians design, implement, and maintain industrial automation and process management systems, such as robot controls in the automobile industry or laboratory systems controls in procedure technologies.

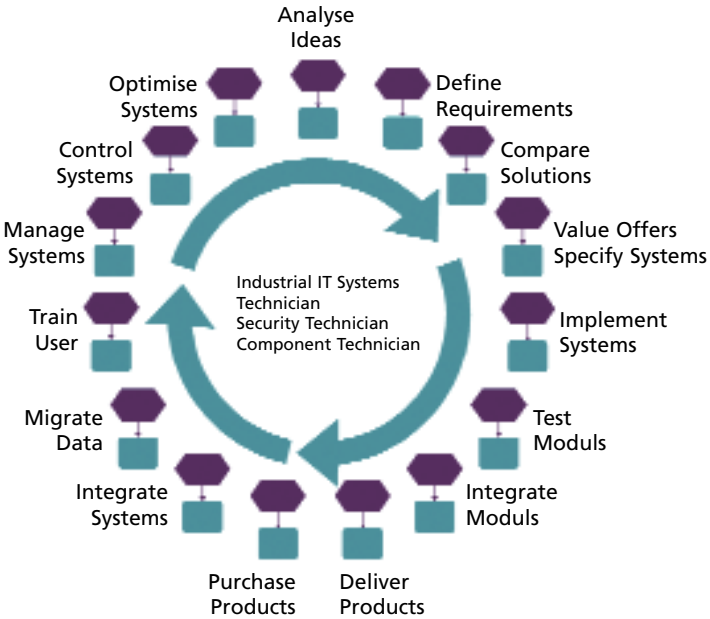

Fig. 5: Technicians

In contrast to all other specialists, technicians – according to area of activity and company – must carry out all activities of the IT process, including systems and solutions maintenance.

Administrators

Operation, monitoring, and optimisation of systems and networks are the core activities of administrators. They take care of existing systems and infrastructures on the user side. Continual processes, which must be carried out again and again, differentiate the activities of administrators from the project-related responsibilities of other specialists.

The Administrators group is made up of those administrators specialised in networks, IT systems, databases, and business and web applications.

They configure, operate, monitor, and optimise networks, IT systems, databases, and business and web applications.

Each of these administrators has specific central responsibilities and areas of knowledge.

For example, the IT Systems Administrator administers hardware and hardware components, operating systems, and application software, but must also have knowledge of networks.

The administration of networks is the central task of Network Administrators, but they must also have knowledge of operating systems and applications.

Databases are the basis of every business application, so that Database Administrators and Business Systems Administrators often work with the same systems – the Database Administration at database or middleware level, and the Business Systems Administrator as key user.

Being responsible for change management and monitoring, Web Administrators carry out similar tasks like any other administrator, but primarily manage the company's website.

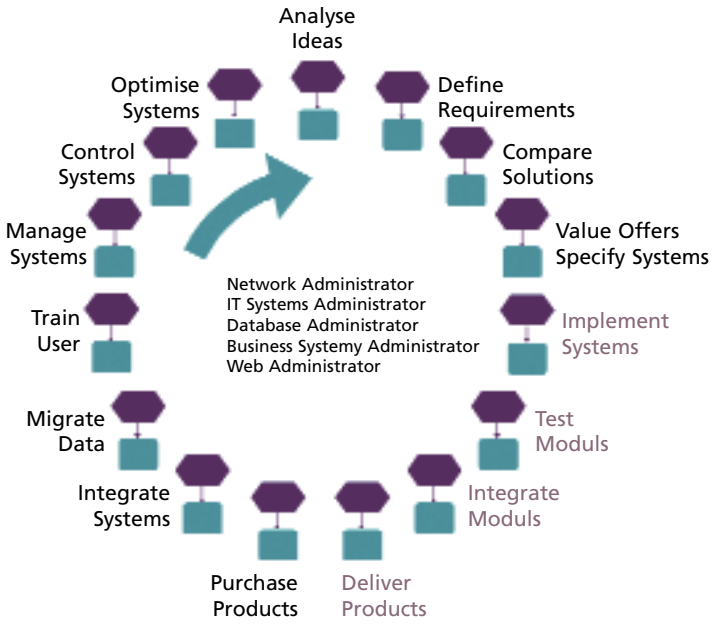

Fig. 6: Administrators

Advisors

The Advisors are situated at the interface of various processes and activity profiles. They make the connection between manufacturers and users in the technical or commercial area. Typical areas of activity are, therefore, demands analysis, shipping, and receiving and inspection of products, as well as user training and support.
IT Service Advisors and IT Trainers provide technical support for customers; IT Sales Advisors and IT Product Coordinators are active in the sales area.
IT Service Advisors solve user problems and provide support for products and systems [software, hardware, network]. Since they are external, IT Service Advisors come into contact with diverse, varied, and heterogeneous applications. In this way, they differ from Administrators.
Introducing users to new products and training them to work with software and hardware is the core task of IT Trainers. Classical training, personal consultation, and innovative E Learning are only a few of the possible slopes this training can take.

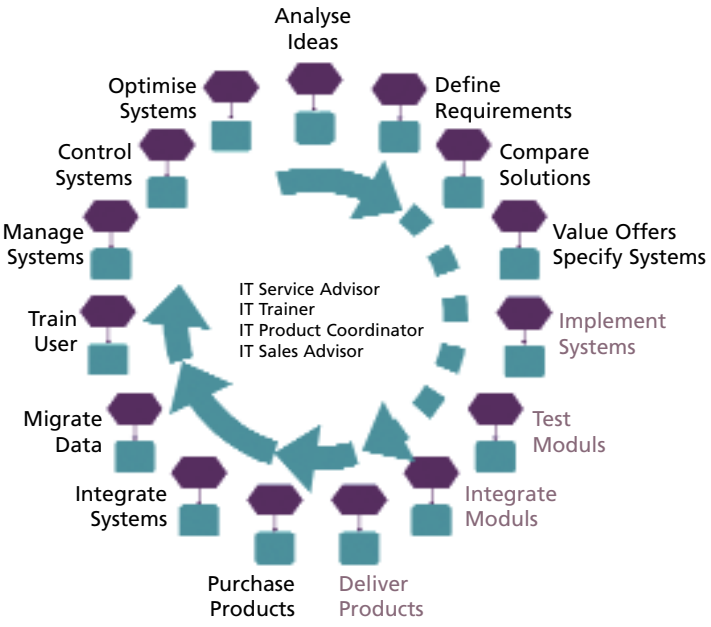

Fig. 7: Advisors

Good customer relations are the sine qua non for IT Sales Advisors and IT Product Coordinators. While IT Sales Advisors advise customers and offer individual solutions, IT Product Coordinators are responsible for developing hardware, software, and systems that meet the market's needs.
Commercial support providers provide support for products and projects throughout their entire life cycles, and act as liaisons for customers, as well as for manufacturers and developers.

The Specialists' Areas of Competency: Basics and Specialisations

Typical work processes and responsibilities facilitate a division of the Specialists into groups along the IT process.

Fig. 8: Division of the Specialists into groups

This division is reflected in the areas of competency, in which a specialist must have knowledge, proficiencies, methods, and tools.
Areas of competency are the nameable elements of professional competency of the specialists. The synthesis of specialised, methodological, social, and personal competencies constitutes the professional competence[2] of a specialist. Areas of competency are, therefore, integrated areas of comprehensive professional competence and include work experience.
Engineering processes, methods, and tools of software development, as well as development and quality standards, are typical areas of competency necessary for work in the software development area. Software Developers and Coordinators must have these competencies.
While Software Developers also place emphasis in systems analysis, the strengths of Coordinators lie in project planning and management, as well as in presentation and conflict resolution.
Solutions Developers, too, must be able to apply design methods to systems analysis and integration. Since they are experts for specific areas of application, network-based thinking is essential for them in order to create IT support for specialised needs.

2 Cf. Ballin, D., Brater, M. 1996: Handlungsorientiert Lernen mit Multimedia. Lernarrangements planen, entwickeln und einsetzen. Nürnberg: BW Bildung und Wissen

The areas of competency of bus systems, protocols, and interfaces, as well as hardware analysis differentiate the group of Technicians from the other developers, with whom they share several areas of competency, such as engineering processes and development and quality standards. The Administrators are less closely involved in the development process; their strengths lie in the areas of operating systems and networks, security monitoring and data security, as well as user-oriented problem analysis and solution..
Finally, network-based thinking, user-oriented problem solving, customer-friendly consulting, and service orientation are characteristic of Advisors at the interface between manufacturers and users.
It goes without saying that the specialists of the various groups can differ as far as their area of specialisation is concerned. Project monitoring, risk management, team formation, as well as conflict and crisis management are areas of competency of the IT Project Coordinator, who must have a working knowledge of these areas. IT Test Coordinators also belong to the group of Coordinators. However, they specialise in test strategies, test management, fault management, and statistical procedures. IT Service Advisors and IT Sales Advisors, in the Advisors group, are another example. While IT Service Advisors have similar areas of competency to Administrators [networks, operating systems, system components, protocols, interfaces], product-specific knowledge, market relationships, commercial and corporate law, as well as models of financing and economic feasibility analyses are essential for IT Sales Advisors.

Despite all these classifications and differences, IT specialists have certain areas of competency in common that are typical for the Specialist level in the Advanced IT Training System:
These include problem analysis and solution, communication and presentation, conflict recognition and resolution, foreign-language communication in English, project organisation and cooperation, economic decision making, data protection and data security, documentation and quality assurance.
By combining knowledge, abilities, and tools and the integration of specialised, methodological, social, and personal competencies that result in comprehensive professional competence, the specialists are able to work systematically and in a target-oriented fashion in processes and are able to successfully solve problems in the complex field of information technology, and are also excellently equipped to meet future challenges.