CEN Workshop ICT Skills

CWA

European ICT Professional Profiles

- updated by e-CF version 3.0 competences -

This CEN Workshop Agreement (CWA) defines a set of European ICT Professional Profiles;

- using the **European e-Competence Framework (e-CF)** as the basis for competence identification; and
- illuminating and structuring each ICT Professional Profile with a number of components including work outcomes or "**Deliverables**".

As a response to the huge number of ICT Profile Frameworks and Profile descriptions used today in European ICT Business and Qualification systems, 23 representative ICT Profiles have been created. The Profiles are structured in six Profile families and cover the ICT Business process.

The 23 generic European ICT Professional Profile descriptions reflect the top of a **European ICT Profile family tree**. The profiles may be used for reference, or as the starting point to develop further ICT professional profile generations, by European stakeholders.

To pragmatically support Europe-wide use of the 23 ICT Profiles, this CWA is structured as follows:

- **Chapter 1 provides an executive overview**, explaining the main vision behind the European ICT Profiles creation and benefits for target groups
- **Chapter 2 illustrates the methodological approach** of the ICT Profiles identification and description process
- **Chapter 3 is the heart of the CWA; it contains the 23 multi-stakeholder agreed ICT Professional Profile descriptions for Europe-wide reference**.
  Additional schemes reflect the Profiles from different perspectives (e.g. Working relationships, Business/ Technology orientation)
- **Chapter 4 provides some practical guidance** on how to adapt the Profiles to specific needs.

Published by CEN as CWA 16458:2012 , this document, initially based upon European e-Competence Framework version 2.0, has been updated by e-CF version 3.0 references in the context of the e-CF v 3.0 project (2012-13). No content changes have been made within the initially agreed ICT Profiles definitions, the main aim was to keep consistency between this European ICT Professional Profiles document and the current e-CF version 3.0 in use. All changes made across the entire document are marked in grey.

CONTENT TABLE

1. Executive overview

1.1. The European ICT Profile Family – CWA vision and rationale

The prime objective of this CEN Workshop Agreement (CWA) is to increase transparency and to continue the convergence of the European ICT Skills landscape by providing a set of **European ICT Professional Profiles**.

As a response to the huge number of ICT Profile Frameworks and Profile descriptions used today in European ICT Business and Qualification systems, it was decided to create a number of representative ICT Profiles covering, at their level of granularity, the full ICT Business process.

The profiles may be used for reference, or for the basis to develop further profile generations, by European stakeholders. Structured from six main **ICT Profile families**, these Profiles reflect the top of a **European ICT Profiles family tree**. The concept devised is broadly analogous to human genetics where the genes of one generation pass down to the next. In the same way it is envisaged that the core components of the 23 Generation 2 Profiles will pass down to profiles constructed to meet specific stakeholder requirements. The 23 Profiles constructed in this CWA combined with e-competences from the e-CF, provide a gene pool for the development of tailored profiles that may be developed by European ICT sector players in specific contexts and with higher levels of granularity.

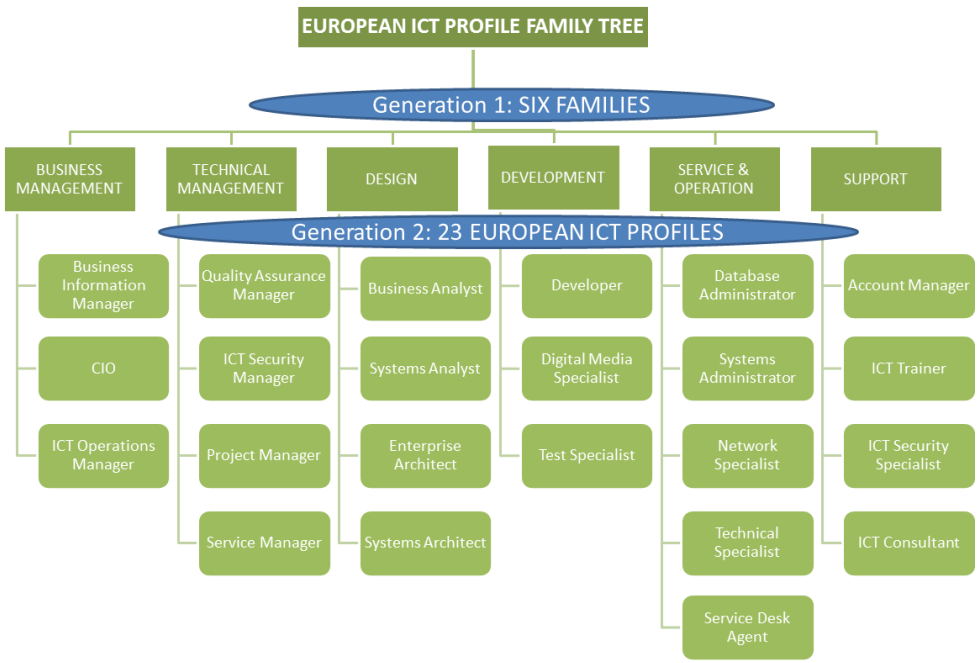


Figure 1: European ICT Profile Family Tree – Generation 1 and 2 as a shared European reference

The 23 multistakeholder agreed ICT Profile descriptions are based on the European e-Competence Framework (e-CF). European ICT Profiles and e-Competence are complementary concepts that can significantly support the development and management of a world class ICT professional community within Europe.

Applied at the same level of granularity as the e-CF, the European ICT Profiles provide generic skeletons of the most representative Profile prototypes currently used in ICT Business structures.

To add value, the European ICT Profiles must be adaptable to the employment environment. They are not useful if, on the contrary, the employer has to change practices to meet profile descriptions.

The European ICT Profile descriptions are therefore reduced to core components and constructed to clearly differentiate one from each other. Further context-specific elements can be added to the Profiles according to the specific environments in which the Profiles are to be integrated. Chapter 4 explains how the European ICT Profiles can be used and adapted by any European stakeholder from a business, qualification or from a research perspective.

The 23 Profiles cover the full ICT Business process; positioning them into the e-CF Dimension 1 demonstrates this. Figure 2 below illustrates this together with the ICT Profiles family structure.

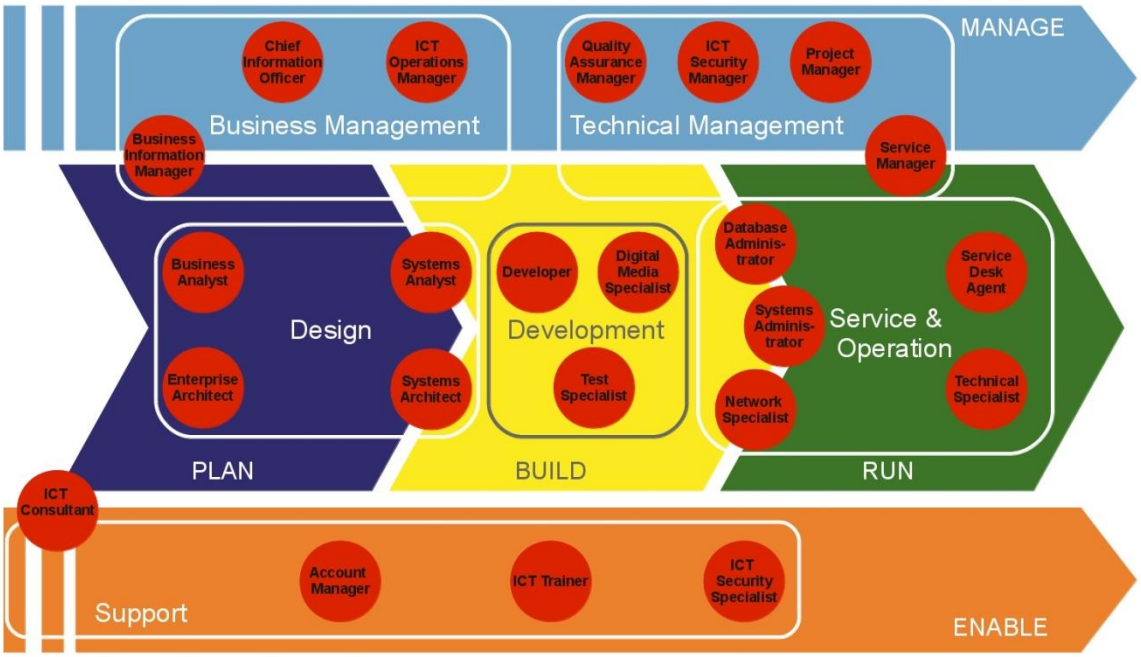


Figure 2: European ICT Professional Profiles structured by six families and positioned within the ICT Business Process (e-CF Dimension 1)

The European ICT Profiles build a consistent bridge between existing competence and profile approaches. In some European Countries, job profile creation is deployed as the traditional methodology for identifying and driving both organisational career paths and educational curriculum. Other countries deploy a competence-oriented approach, appreciating that the competence approach provides more flexibility.

In the European ICT Profiles development the advantages of both approaches have been combined: The European ICT Profiles present e-Competences in an operational context. e-Competences provide the European ICT Profiles with core content in terms of capabilities needed to successfully perform a role. This provides the flexibility to make Profiles applicable EU-wide yet usable in a workplace environment.

By embedding e-Competence within ICT Profiles, which can be readily understood by experts or laymen, the European ICT Profile Family provides a universally applicable solution for communication between stakeholders with interests in ICT skills, knowledge and attitude development.

The European ICT Profiles have been developed in the context of the CEN Workshop on ICT Skills. The underlying project "Towards European e-Job Profiles" has received EC/ EFTA[1] funding within the 2009 ICT Standardization Work Programme. This CWA reviews and replaces the "Career Space" CWAs (in particular CWA 14925 – published in March 2004).[2]

1.2. The European e-Competence Framework

The **European e-Competence Framework (e-CF)**[3] is another key achievement of the CEN ICT Skills Workshop. The e-CF is an early significant response to the need for standardization and guidance to ICT practitioners (students or experienced) in their performance, training and development Europe-wide.

The e-CF supports the definition of jobs, training courses, qualifications, career paths, formal and non-formal learning paths, certifications etc. in the ICT sector. In this way, local, national, European and global ICT vendor and user companies as well as qualification and certification providers have access to a shared reference.

[1] European Free Trade Association

[2] For the sake of continuity it is recommended to engage stakeholders to elaborate a cross-reference between both documents in the near future.

[3] Published for the first time in 2008 and updated by version 2.0 in 2010. See: www.ecompetences.eu

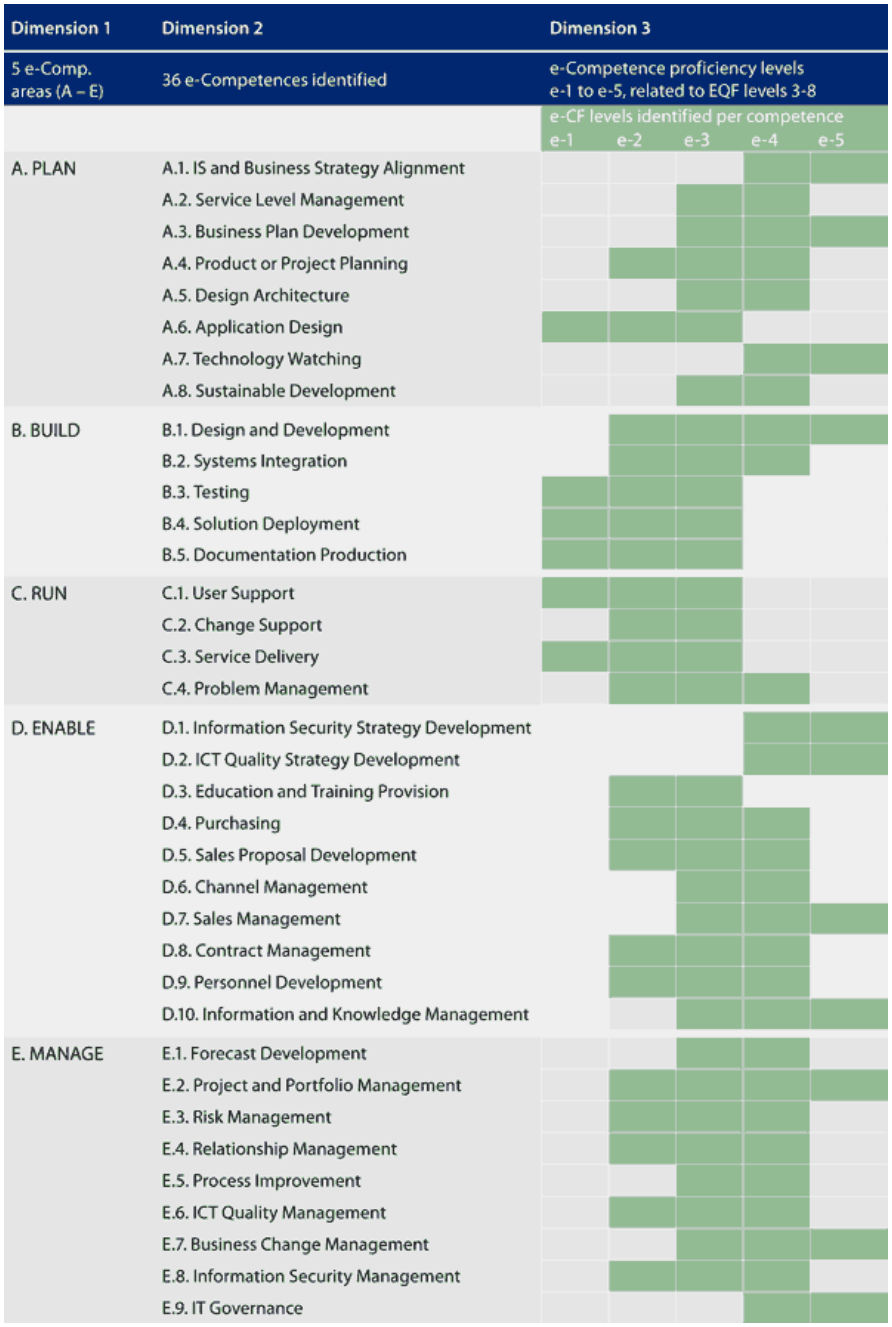


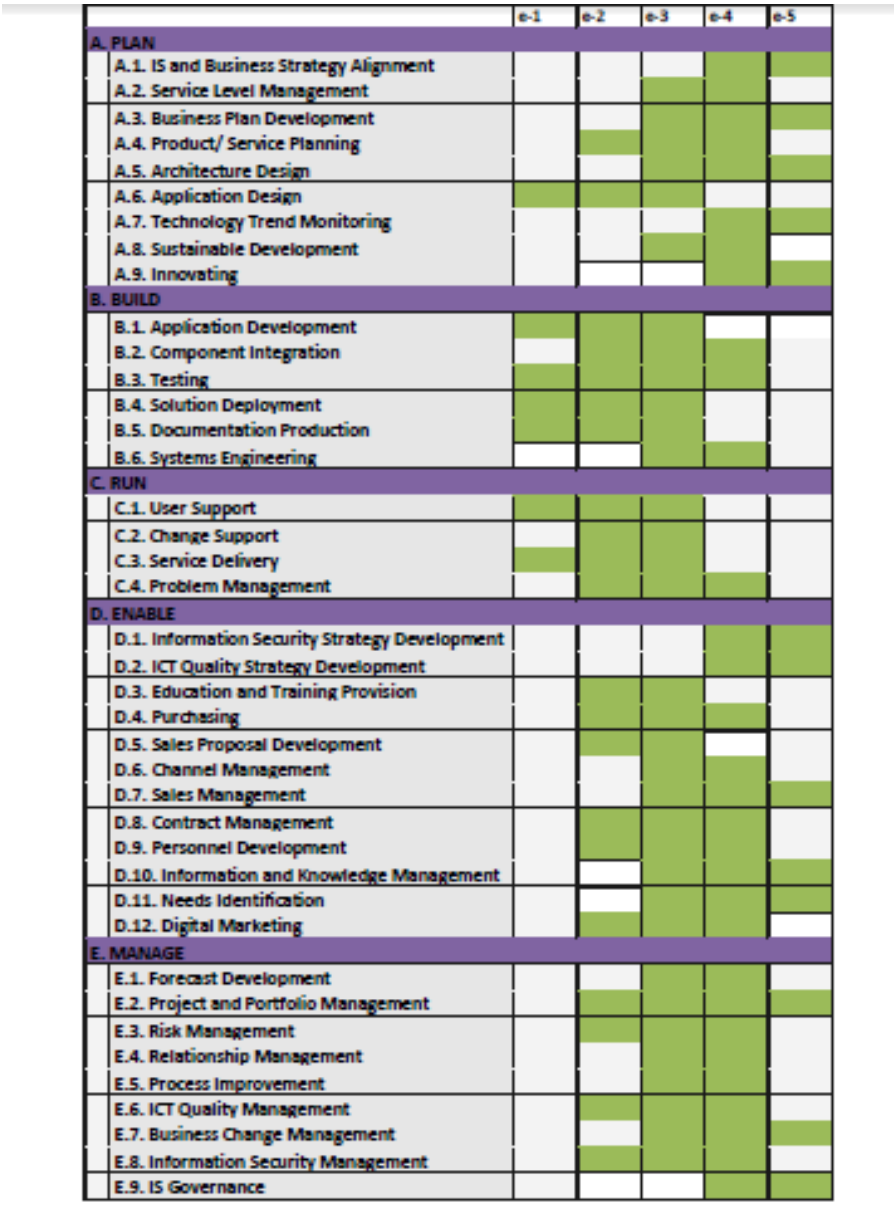
Figure 3a: European e-Competence Framework Version 2.0 (Overview) – a key input to the European ICT Profiles creation

Three years after first publication, the European e-Competence Framework has proven in practise to be a successful ICT workforce planning and development tool. Many companies and associations including National Public Authorities in Europe and abroad currently use the e-CF.

Consequently, the e-CF was a primary reference used in the creation of European ICT Profiles.

European ICT Professional Profiles update by e-CF version 3.0 competences

At the end of 2013, the CEN ICT Skills Workshop published version 3.0 of the European e-Competence Framework. To keep the European ICT Profiles in line with the current framework, an update of the Profiles has been provided in parallel to e-CF version 3.0 publication.



	e-1	e-2	e-3	e-4	e-5
A. PLAN					
A.1. IS and Business Strategy Alignment				■	■
A.2. Service Level Management			■	■	
A.3. Business Plan Development			■	■	■
A.4. Product/ Service Planning		■	■	■	
A.5. Architecture Design			■	■	■
A.6. Application Design	■	■	■		
A.7. Technology Trend Monitoring				■	■
A.8. Sustainable Development			■	■	
A.9. Innovating				■	■
B. BUILD					
B.1. Application Development	■	■	■		
B.2. Component Integration		■	■	■	
B.3. Testing	■	■	■	■	
B.4. Solution Deployment	■	■	■		
B.5. Documentation Production	■	■	■		
B.6. Systems Engineering			■	■	
C. RUN					
C.1. User Support	■	■	■		
C.2. Change Support		■	■		
C.3. Service Delivery	■	■	■		
C.4. Problem Management		■	■	■	
D. ENABLE					
D.1. Information Security Strategy Development				■	■
D.2. ICT Quality Strategy Development				■	■
D.3. Education and Training Provision		■	■		
D.4. Purchasing		■	■	■	
D.5. Sales Proposal Development		■	■		
D.6. Channel Management			■	■	
D.7. Sales Management			■	■	■
D.8. Contract Management		■	■	■	
D.9. Personnel Development		■	■	■	
D.10. Information and Knowledge Management			■	■	■
D.11. Needs Identification			■	■	■
D.12. Digital Marketing		■	■	■	
E. MANAGE					
E.1. Forecast Development			■	■	
E.2. Project and Portfolio Management		■	■	■	■
E.3. Risk Management		■	■	■	
E.4. Relationship Management			■	■	
E.5. Process Improvement			■	■	
E.6. ICT Quality Management		■	■	■	
E.7. Business Change Management			■	■	■
E.8. Information Security Management		■	■	■	
E.9. IS Governance				■	■

Figure 3b: European e-Competence Framework Version 3.0 (Overview) – reference basis for the ICT Profiles update by version 3.0 competences.

It is important to note that the aim of this ICT Profile limited update was to keep the profiles compatible with the current framework version 3.0. No content changes or further verification of profile content was undertaken, this activity is planned for a second release of the profiles anticipated by end 2015. All changes in this document, from the initial CWA, are marked in grey.

1.3. ICT Professional Profiles and e-Competences

European ICT Profiles and e-Competence are complementary concepts constructed to support the development and management of a world class ICT professional community within Europe.

There are many stakeholders who have an interest in the recruitment, development, education and training, certification and qualifications of ICT professionals. Each of these has a different perspective on the process of continuous professional development. The figure below illustrates the key stages of the ICT professional development cycle.

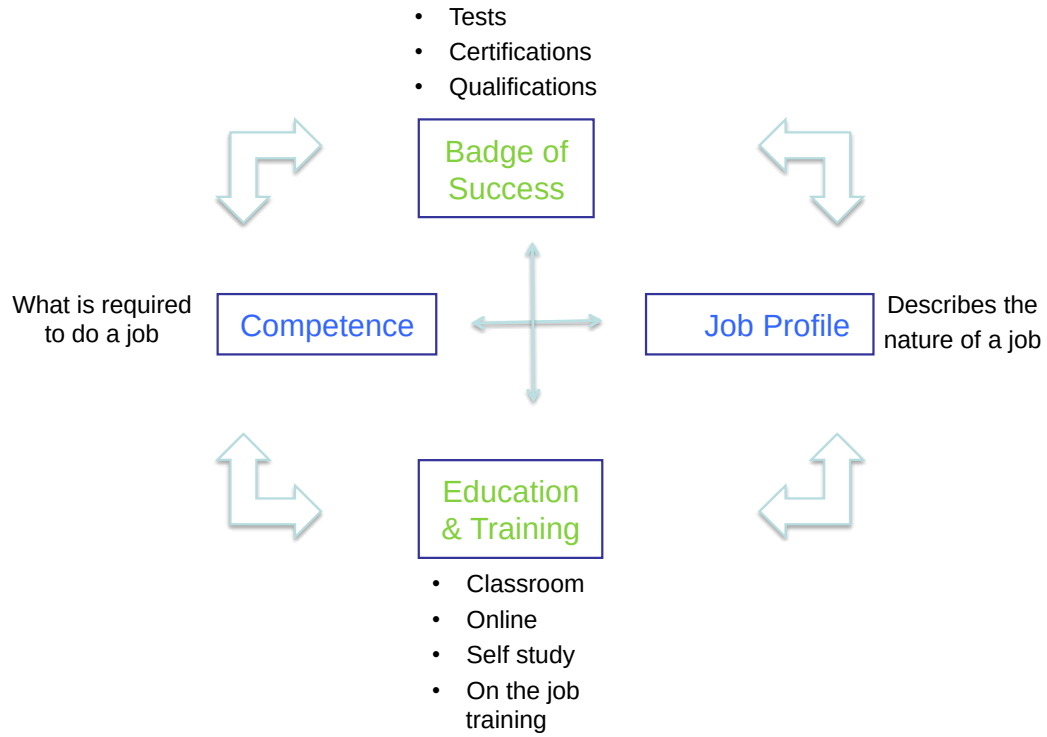


Figure 4: The key stages of the ICT professional development cycle

Job profiles, which sometimes are erroneously known as job descriptions, often provide a start point for employers of ICT personnel. The profile is likely to contain many components describing the essential elements of a job and how it should be performed. This "European ICT Profiles" CWA establishes a consistent structure and provides a set of rules for profile construction.

Education and training takes many forms, not least of which is on the job training. The objectives of employers who invest in and commission programmes of education and training are to enhance the

capability of individuals and in turn the organisation. Predominately the task of education is delegated to specialist private or public institutions.

e-Competence is a way of articulating the capability of an ICT professional and hence provides a way of recognising skills or knowledge gaps that may be needed to improve individual and consequently organisational performance. With the European e-Competence Framework Europe has succeeded to create a common e-competence language.

A **Badge of Success** is often provided to recognise the achievement of an individual following a period of education. Many awards devised by the public and private sectors are provided to indicate a level of achievement. Some are universally recognised some are specialised and are less well known.[4]

Employers often describe their staffing requirements in terms of job profiles and/ or e-competence. Educational Institutions are normally more familiar with education principles, in particular knowledge transference and badges of success such as certifications and qualifications. The creation of job profiles and the concept of e-competence are ways of communicating the skills and knowledge characteristics required by employers to other stakeholders such as recruitment agencies and education establishments.

Job profiles are popularly deployed in some European countries to provide a virtuous circle of job requirements through to education, competence development and qualification, as shown in figure 4. The benefits of a job profile approach are that extensive communications are necessary between stakeholders to set up this sophisticated development process and the consequent quality of output is high. The disadvantage of the job profile approach is a lack of flexibility and the time required to amend profiles in a fast changing technological environment.

A different perspective is taken in other European nations where e-competence is the focal point for ICT professional development. Competence units can be grouped together in clusters to enable clear articulation of education and training needs and can be readily restructured to meet changing needs. The disadvantage of e-competence is that it is still not a commonly understood concept and it needs to be put in context when applied to the workplace environment.

To gain maximum advantage and added value from both approaches, the “European ICT Professional Profiles” CWA has elected to bring job profiles and competence together, gaining ‘the best of both worlds’. By embedding competence within profiles, which can be readily understood by experts or

[4] Previous studies of the CEN ICT Skills Workshop have highlighted the large certification industry at IT Professional level: CEN, European Committee for Standardization: *e-Certification in action (CEN CWA 16052-2:2013)*

laymen, the ICT job profile family provides a universally applicable solution for communication between stakeholders with interests in ICT skills, knowledge and attitude development.

In summary the combination of profiles and competence enables individuals, organisations or nations with different cultures to address ICT professional skills development from a familiar perspective yet conform to a standard format recognisable by all.

1.4. Benefits for target groups

The multistakeholder agreed European ICT Profiles were developed for use by any European ICT Skills Players on the market. Specifically, they are addressed to

- **ICT managers**, providing organisational patterns of accountabilities, tasks, competences and controls between actors (ICT or not);
- **ICT practitioners and managers**, to define position descriptions, individual annual training plans and development perspectives;
- **HR managers**, to anticipate and plan competence requirements;
- **Education and Training managers**, to effectively plan and design ICT curricula;
- **Students**, to facilitate information and their professional orientation;
- **Market researchers and policy makers**, to use a common language for anticipating ICT job and competence needs in a long-term perspective
- **Procurement managers**, providing common definitions for effective technical terms of reference in national and international bids.

Furthermore, the up-to-date Pan-European agreed ICT Profile framework in line with the e-CF brings significant benefits to all sectorial players, for example:

- Many stakeholders are very interested in having a common European ICT Profile framework reflecting current ICT Business needs
- Applying the e-CF to ICT profile development, puts e-competences in context for stakeholders who are less familiar with the competence-based approach
- Consequently, the ICT Profiles presented facilitate e-CF application by companies and stakeholders familiar with job profile frameworks
- Europe-wide agreed ICT Profiles can also help to improve the communication of competence requirements between suppliers and customers.

Most national ICT stakeholders (representatives of government, trade unions, universities, big enterprises, training bodies…) need to reflect major ICT competence requirement changes during the past ten years by updating existing frameworks.

Based on the European e-Competences Framework, a European ICT Profiles Family structure facilitates further convergence and/ or interoperability of existing skills and competence frameworks across Europe.

1.5. Positioning with other European e-Skills achievements: Overview chart

The "European ICT Professional Profiles" CWA directly contributes to the implementation of the European e-skills strategy as defined in the European Commission's Communication on "e-Skills for the 21st Century: Fostering Competitiveness, Growth and Jobs".

Over recent years, significant efforts have been made by European and National stakeholders specifically working with the European Commission and CEN to drive forward e-Skills development in Europe. The following chart provides an overview of key organisations/ players and results achieved so far.

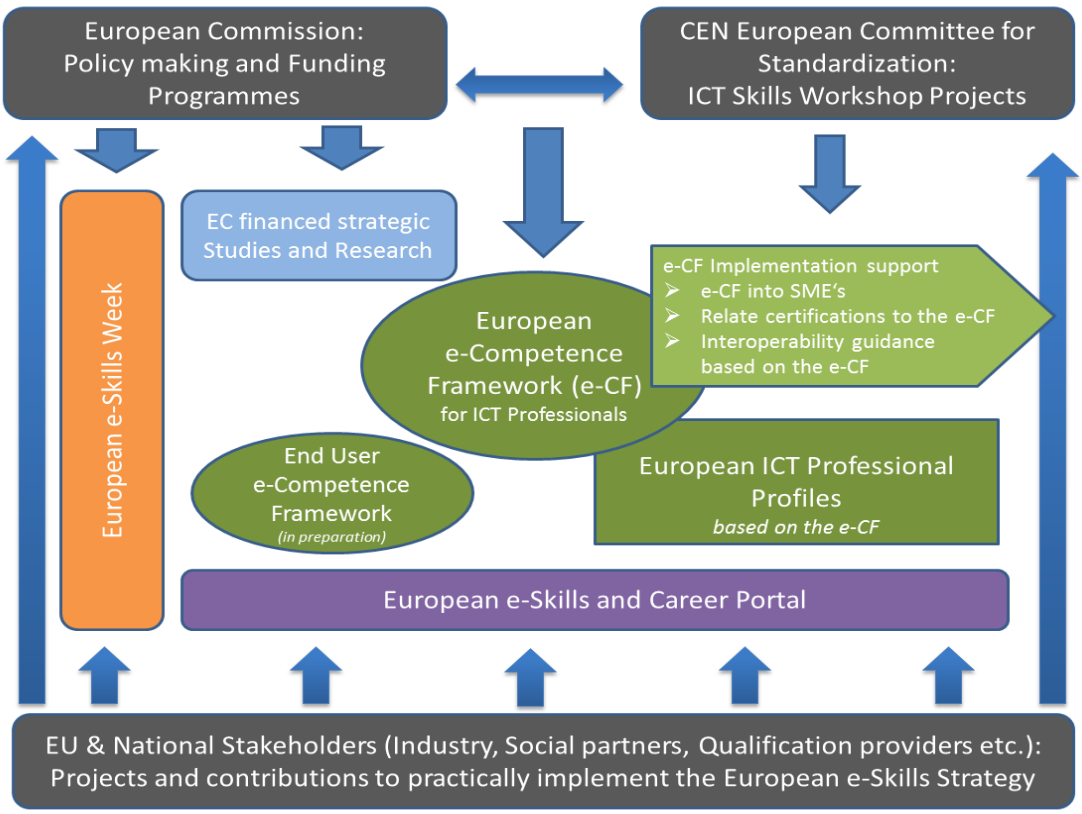


Figure 5: European e-Skills for the 21st Century – Key players, communication structures and Multistakeholder achievements

2. European ICT Professional Profiles basic principles

To support the European ICT Profiles Family construction, a systematic methodological approach was deployed combining sound methodology consistent with the existing e-CF and expert contribution based on practical ICT Business experience. The following chapter describes the ICT Profile identification and description approach; including the development of a generic template which in principle can be applied by any sector in detail.

2.1. European ICT Profiles identification

The mission of the CWA development was to define a generic set of ICT Profiles applicable on European and National levels and using the e-CF as the basis for competence identification. The related proposal recommended that approximately 20 ICT Profiles should be developed which are generic and relevant to all organisation types and sizes.

As a first step, a reasonable number of commonly used ICT Profile titles were identified. It is probable that over 1.000 job titles and derivatives are in use by organisations across Europe. A quantitative exercise was undertaken to identify the plethora of existing role titles.

The expert project team identified a non-exhaustive list of more than one hundred and forty titles from a variety of sources including corporate career paths, government advisory services, technical education pathways and SME representative structures.[5]

With this background of innumerable roles an approach was adopted which recognized the need to identify titles that are clear and easily understood by all stakeholders.

A multi faceted spread sheet was created which consolidated the range and scope of identified roles. This collective set was characterized by the presence of a range of granularity levels, from Packaged Application Specialist (a specialist proprietary job title) – Technician (a very general title).

Clearly a target group of approximately 20 ICT Profiles needs to be of consistent granularity. This was achieved by recognizing the essential connection with e-competences; the experts were able to use this e-CF relationship as a yardstick for granularity guidance.

In addition the frequency of title usage was taken into account to inform the final title selections.

[5] In particular, the following frameworks were analysed: Michelin, international level - EUCIP, European level - AITTS, Germany - Airbus, international level - CIGREF, France - an SME framework from UK - an SME company framework from Germany - UK Government framework - Microsoft Technet, international level - IBM, international level, IWA Web Skills Profiles, international level

Initially, 19 titles were selected which fitted the requirements of being,

i) easy to understand (plain English),

ii) generic and

iii) of similar granularity.

These essential characteristics were tested against the selected profiles. It was then verified that each of the originally identified (over 140) titles could be represented by the selected role title profiles; all be it at a more generic level. [6]

Given the challenge of condensing hundreds of job roles/ titles into a manageable quantity of approximately 20, it was inevitable that consistency of granularity would be compromised in some cases. This was a necessary trade off to ensure that the complete breadth of ICT job roles was covered. Recognising this limitation led to the concept of user generated/ tailored profiles in generation 3 which provide the opportunity to construct profiles of a consistent structure that relate to generation 2 and are of an appropriate granularity level (see the Application Guide in Chapter 4).

The outcomes of the expert work were presented to a wider stakeholder and expert community to seek further opinion and refinement of the profiles title selection.[7] As identifying titles is not an exact science, testing of the appropriateness and value of the selected titles was continued throughout the project life cycle.

The final outcome from the above described process and with multistakeholder agreement resulted in 23 Profiles. Taking account of the necessary low level of granularity, the profile descriptions can be seen as complementary and complete: They seek to cover the entire ICT Business Process.

The following table 1 gives an A-Z overview of the 23 Profile Titles together with their Summary statements. Column 3 of the table lists alternative titles currently used on the market for similar Profiles.

[6] See Annex 1 of the Interim report "Towards European ICT (e-Job) Profiles", April 2011 – ICT Profiles identification exercise
[7] See Interim Report: „Towards European ICT (e-Job) Profiles", April 2011

European ICT Profile title	ICT Profile Summary statement	*Alternative titles that may be found and used by the market for similar Profiles - Not necessarily accurate*
Account Manager	Senior focal point for client sales and customer satisfaction.	*Sales Advisor (AITTS)* *Customer Representative (General multi-sector use)*
Business Analyst	Analyses Information System for improving business performance.	*Business Development Manager (ICT Role, ACS)* *Business Intelligence Developer (Microsoft)* *Business/ Systems Analyst (ICT-Role)*
Business Information Manager	Proposes plans and manages functional and technical evolutions of the Information System within the relevant business domain.	
Chief Information Officer	Develops and maintains Information Systems compliant to business and organisation's needs.	*Head of Computing (Demand side title)*
Database Administrator	Designs and implements, or monitors and maintains databases.	*Database Developer (Microsoft)* *Database Manager (Eucip)* *Network Administrator (ACS)*
Developer	Builds/codes ICT solutions and specifies ICT products according to the customer needs.	*Component Developer (AITTS)* *Application Developer (ITA-J)* *Programmer (IBM)*
Digital Media Specialist	Creates websites and multimedia applications combining the power of digital technology with effective use of graphics, audio, photographic and video images.	*Front-End Web Developer (IWA)* *User Experience Designer (IWA)* *Web & Multimedia Master (Eucip)* *Web Content Manager (UK-Gov, IWA)* *Web Developer (Bring-IT-On, Microsoft, UK-Gov)* *Web Editor (UK-Gov)* *Digital Media Developer (AITTS)* *Multimedia Designer (Bring-IT-On)* *Multimedia Developer (ACS)*
Enterprise Architect	Designs and maintains the Enterprise Architecture.	

European ICT Profile title	ICT Profile Summary statement	***Alternative titles that may be found and used by the market for similar Profiles - Not necessarily accurate***
ICT Consultant	Supports understanding of how new ICT technologies add value to a business.	*Consultant (ACS)* *Consultant and Contractor (ACS)* *Enterprise Solutions Consultant (Eucip)* *Logistics & Automation Consultant (Eucip)* *Sales & Application Consultant (Eucip)* *Technical Consultant (Bring-IT-On)*
ICT Operations Manager	Manages operations, people and further resources for the ICT activity.	*IS Service Manager (Airbus)* *Service Advisor (AITTS)* *Computing Manager (Demand side title)*
ICT Security Manager	Manages the Information System security policy.	*Security Advisor (Eucip)* *Security Analyst (ACS)* *Security Service Personal (UK-Gov)* *Security Services Specialist (ITA-J)* *Security Specialist (aux, ICT Role)* *Security Technician (AITTS)*
ICT Security Specialist	Ensures the implementation of the organizations security policy.	
ICT Trainer	Educates and trains ICT professionals and practitioners to reach predefined standards of ICT technical /business competence.	*Technical Trainer (IBM)* *Instructor (multi-sector common title)*
Network Specialist	Ensures the alignment of the network, including telecommunication and/or computer infrastructure to meet the organization's communication needs.	*Network Engineer (Bring-IT-On, UK Gov)* *Network Manager (Eucip, UK Gov)* *Network Services Specialist (ITA-J)* *Network Support (ACS)* *Network Administrator (ACS)*
Project Manager	Manages project to achieve optimal performance that conforms to original specifications.	*IS Project Manager (Eucip)* *Project Coordinator (AITTS* *Web Project Manager (IWA))*
Quality Assurance Manager	Guarantees that Information Systems are delivered according to organization policies (quality, risks, Service Level Agreement).	*Quality Management Coordinator (AITTS)* *Quality Manager (SME)*

European ICT Profile title	ICT Profile Summary statement	***Alternative titles that may be found and used by the market for similar Profiles - Not necessarily accurate***
Service Desk Agent	Provides first line telephone or e-mail support to clients with technical issues.	*Help Desk Supervisor (Eucip)* *Helpdesk Professional (UK-Gov)*
Service Manager	Plans, implements and manages solution provision.	*Service Advisor (AITTS)* *IS Service Manager (Airbus)*
Systems Administrator	Administers ICT System components to meet service requirements.	*Network Administrator (ACS)* *Server Administrator (Microsoft)* *System Administrator (SME)* *Database Administrator (Microsoft)* *Enterprise Administrator (Microsoft)* *Enterprise Messaging Administrator (Microsoft)* *Web Server Administrator (IWA)*
Systems Analyst	Analyses requirements and specifies software and systems.	*Information Scientist (UK-Gov)* *Information Systems Analyst (Eucip, ACS)*
Systems Architect	Plans and is accountable for the implementation and integration of software and/ or ICT systems.	*Telecommunications Architect (Eucip)*
Technical Specialist	Maintains and repairs hardware and software on client premises.	*Computer Service and Repair Technician (UK-Gov)* *Consumer Support Technician (Microsoft)* *Service Engineer (general multi-sector use)* *Customer Engineer (IBM)*
Test Specialist	Designs and performs testing plans.	*Computer Games Tester (UK-Gov)* *Software Tester (SME)* *Systems Integration & Testing Engineer (Eucip)* *Test Specialist (ITA-J)* *Tester (AITTS)*

Table 1: 23 Profile Titles (A-Z) with Summary Statements and examples of alternative titles used for similar Profiles

2.2. Basic concepts: e-Competences and deliverables

The European ICT Profile descriptions are based on two fundamental concepts:

- **European e-Competence Framework**: for defining ICT Profiles a list of e-competences can be identified, to provide differentiation between profiles;
- **Outcomes/ Deliverables**
  - An ICT Profile is defined by a list of Deliverables, either in terms of accountable, responsible or in terms of contribution;
  - A Deliverable is a predefined result of a task in a working context;
  - One Deliverable can have only one associated accountable job but may have many contributors;
  - A deliverable may or may not be seen by users, may be intermediate or final, but must always be observable.

The European e-Competence Framework, its look and its principles are commonly known and can be read more in detail in the three basic e-CF related publications.[8]

The deliverables concept adds a second innovative element to the European ICT Profiles description. To ensure overall understanding of the European ICT Profiles approach, the following paragraphs explain in detail how the deliverables were identified and described.

Deliverables identification and description methodology

In general terms a 'Deliverable' is the outcome of an activity. Profiles can contribute in different ways towards the production of a 'Deliverable'.

Deliverables are an important attribute in Profiles definitions; using them we can direct mission, tasks and competences to illustrate observable results.

Deliverables must be "observable".

For example, the mission of the "Account Manager" is to "build business relationships", it is therefore a logical consequence, that "business relationships" are a deliverable. However, the

[8] See: European e-Competence Framework 3.0, e-CF User guide, Methodology documentation and Case studies for free download at www.ecompetences.eu

deliverables definition does not include quality attributes like "Good business relationships". Quality issues are meaningful only if they can be measured.[9]

A complete list of Deliverables was not required to meet the project aim, merely the identification of the most relevant ones, consistent with the overall level of granularity and applicable to the identified ICT Profiles.

Choices were made to identify relevant Deliverables which added value to ICT Profiles in order to better characterize their mission. For this application 'Deliverables' are selected to illustrate Observable Results, whether tangible or intangible.

To support the 23 Profiles the Deliverables list was limited to approximately 60-70 items.

The process for identifying Deliverables was inspired from three different sources:

i) e-CF 2.0 Framework
ii) Additional content from the Waterfall Development Process
iii) Role Profile Iteration

The following paragraphs describe in more detail how the three different sources were used.

i) Firstly a set of Deliverables was extracted from e-CF 2.0 Framework taking them from dimensions 2, 3 and 4. As more than one competence can contribute to a deliverable, so the same deliverable may be present in more than of one competence.
This extraction process guaranteed a high consistence with e-CF competence definitions.
49 Deliverables were defined using this process.

ii) The Waterfall Development Process is the most popular and stable ICT process used for describing how to organize the development of a System. It was therefore investigated to identify additional deliverables to be integrated with list i).
New deliverables were assigned to 1 or more of the 36 e-Competences of e-CF 2.0.
11 additional Deliverables were identified using the Waterfall Process.

iii) Further Deliverables were inspired through the Profile definition process. As missions and tasks were identified an iterative cycle was established between deliverables and role profiles.
New deliverables were assigned to one or more of the 36 e-Competences of e-CF 2.0.
6 additional deliverables was identified from this process.

[9] To equally address quality issues within the European ICT Profiles description it was decided to include KPI areas into the Profile definitions; from there context-specific KPI's (Key Performance Indicator) can be derived.

From initially 66 applicable deliverables identified, 52 Deliverables were finally used for profile description. Only the deliverables that substantially help to illuminate the role profiles were retained (part of the iterative cycle).

To facilitate common understanding of the deliverables, the following scheme provides a satellite view of the deliverables identified. In accordance with the ICT development process they can be regrouped generically by 7 types of deliverables through the categories highlighted in the blue boxes:

Figure 6 – Deliverables classes according to the general ICT process (satellite view)

To ensure maximum consistency with other important European e-Skills achievements, the granularity level of deliverables was predicated on the European e-Competence Framework. Nevertheless it should be noted that owing to the variance of ICT Profiles in terms of complexity and autonomy, not all deliverables identified can be of the same level of granularity. Whilst a high level deliverable such as “IS Strategy & Implementation” assigned to the CIO is very generic, others provided at a lower level of complexity and autonomy, e.g. “Audit Reports” assigned to the Quality Assurance Manager, are more specific and more detailed.

Figure 7 shows an overview of deliverables identified and classified according to the European e-Competence Framework.

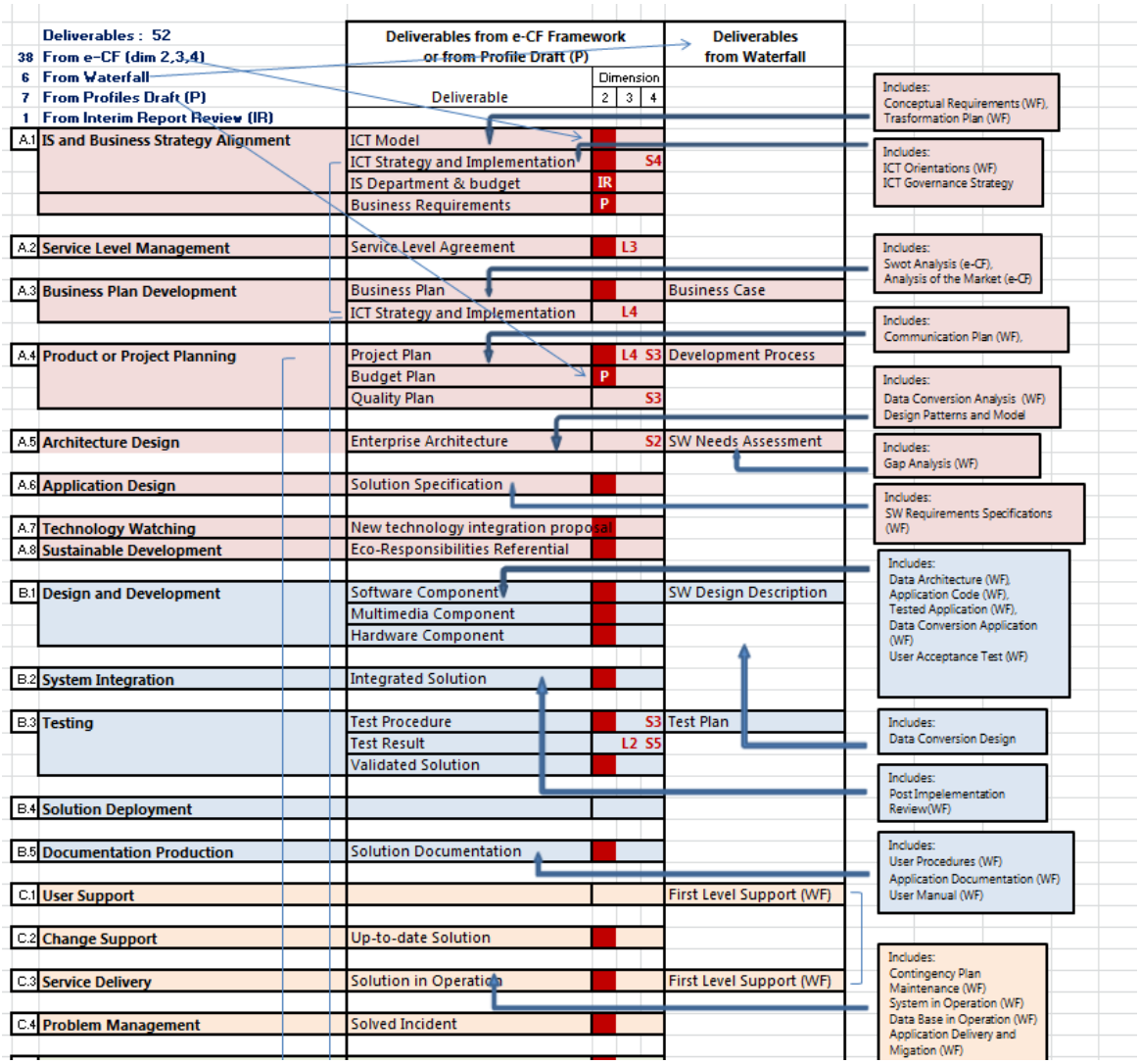


Figure 7 – Part I: Deliverables in the e-CF areas PLAN, BUILD, RUN (identified from e-CF v 2.0)

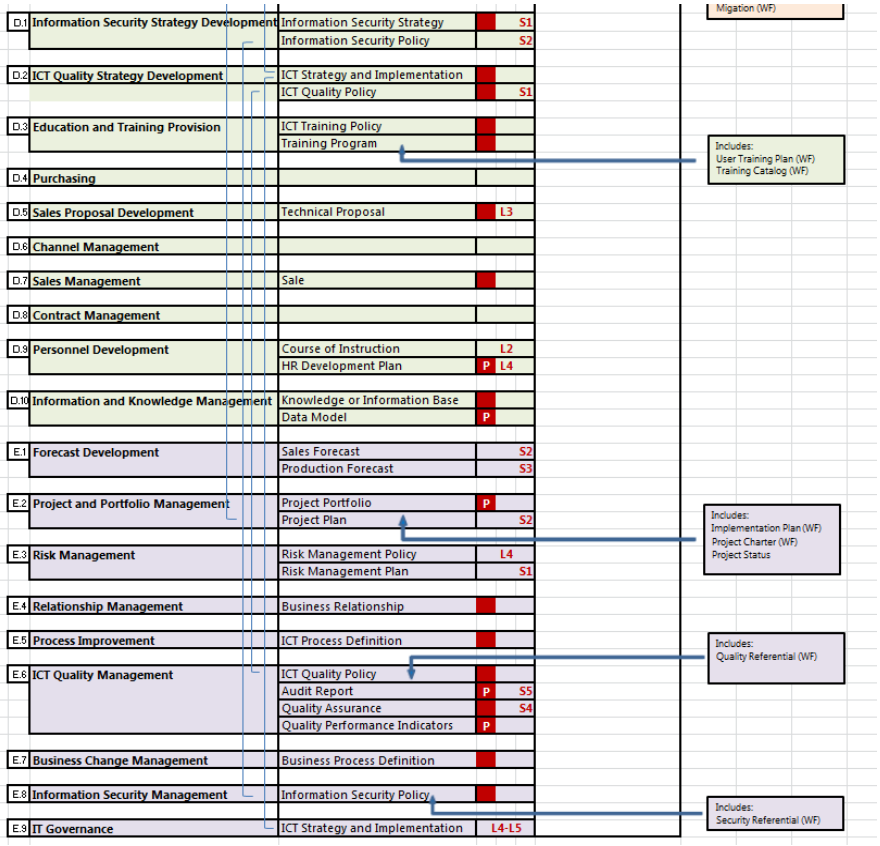


Figure 7 – Part II: Deliverables in the e-CF areas ENABLE and MANAGE (identified from e-CF v 2.0)

For ease in orientation, the following Table 2 provides a list of all deliverables used for the ICT Profiles description in alphabetic order, with a brief description of each deliverable. Furthermore, each deliverable is specified in terms of e-Competence area assigned (e-CF Dimension 1) and the accountable/ responsible/ contributor Profiles identified.

	DELIVERABLES	e-CF Dimension 1					DELIVERABLE DESCRIPTION	ACCOUNTABLE	RESPONSILE				CONTRIBUTOR		
		PLAN	BUILD	RUN	ENABLE	MANAGE									
1	Audit Report						Results of performed controls and actions that should be taken to correct wrong situations	16							
2	Budget Plan						A model of how business might perform financially if strategies, events and plans are carried out	10							
3	Business Case						Captures the reasoning for initiating a project or task		2						

4	Business Plan						Formal statement of a set of business goals, why they are believed attainable, and the plan for reaching them									2	3	8
5	Business Process Definition						A collection of related, structured activities that will accomplish a specific organizational goal									8		
6	Business Relationship						A formal contractual relationship established to provide business services		1	2								
7	Business Requirements						Describes what a business needs so that it may be able to operate successfully	2								9		
8	Course of Instruction						Single unit of a Training Program	13										
9	Data Model						Description of data and relations in terms of dependency, consistency and integrity	5										
10	Development Process						Process imposed on the development of a software product									21		
11	Eco-Responsibilities Referential						Reference for Eco-Responsibilities									10		
12	Enterprise Architecture						Rigorous description of the structure of an enterprise related to ICT	8										
13	First Level Support (WF)						Services providing first level user assistance		17									
14	Hardware Component						Physical artifact of a technology	6								20		
15	HR Development Plan						Systematic process of matching interest,skills and talents of individual with long-term organisation goals		10									
16	ICT Model						Description of user functions and services provided by an information system									20		
17	ICT Process Definition						Defines a collection of related, structured activities or tasks that will accomplish ICT development goals									20		
18	ICT Quality Policy						Principle or rule to guide decisions and achieve rational outcome(s) in ICT quality policy									16		
19	ICT Strategy and Implementation						Defines goals and strategy IT	4								3	11	
20	ICT Training Policy						Principle or rule to guide decisions and achieve rational outcome(s) in ICT training									13		
21	Information Security Policy						Principle or rule to guide decisions and achieve rational outcome(s) in Information Security	11								16	12	

22	Information Security Strategy						Defines goals and strategy for quality in Information Security Process		11				4		
23	Integrated Solution						Solution at the stage where all components and sub-systems are integrated and tested	21	20				15		
24	IS Department & budget						Organisation, Processes, Human Resources,Infrastructure and Budget needed to implement IS Strategy	4					23		
25	Knowledge or Information Base						Model for collection, organization, and retrieval of information and knowledge.	12	9	11			8		
26	Multimedia Component						Software and contents based on audio,video and animations	7							
27	New technology integration proposal						Illustrates goals, benefits and strategy for introducing new ICT technology	9	12	21			8	11	
28	Production Forecast						Projection of achievable production volumes, based on market needs, historical sales data and current Production Capacity						1		
29	Project Plan						A formal, approved document used to guide both project execution and project control	15					9		
30	Project Portfolio						Set of documents for analyzing and collectively managing a group of current or proposed projects	3	4						
31	Quality Assurance						The systematic monitoring and evaluation of the various aspects of a project or service to maximize the probability that minimum standards of quality are being attained by the production process.						16		
32	Quality Performance Indicators						Indicators measuring how quality policy is implemented on IS project and ICT solutions in operation		16				18		
33	Quality Plan						Defines activities to deliver solutions achieveing customer's quality expectations on the basis of the quality standards.						15		
34	Risk Management Plan						Document to foresee risks, to estimate the effectiveness, and to create response plans to mitigate them						12		
35	Risk Management Policy						Principle or rule to guide decisions and achieve rational outcome(s) in Risk Management						16	11	12
36	Sale						Contract involving transfer of the possession and ownership (title) of a good or property, in exchange for money or value.	1							

37	Sales Forecast						Projection of achievable sales revenue, based on historical sales data, analysis of market surveys an d trends, and sales persons' estimates						1		
38	Service Level Agreement						Part of a service contract where the level of service is formally defined		4	18					
39	Software Component						Software package, or module that encapsulates a set of related functions (or data)	6					20		
40	Solution Documentation						Set of Documents which illustrate all aspect related to the Solution		6	15		14	22	23	
41	Solution in Operation						Solution deployed and running in the final environment	18	5	7	19	14	6	7	
42	Solution Specification						Set of Documents which define in detail the Solution to be developed	21	3	5		14	20		
43	Solved Incident						Incident in the stage where a Solution to address the failure has been applyed	22	18	19			5	14	17
44	SW Design Description						Set of Documents which illustrate all the characteristic of Software to be developed						6		
45	SW Needs Assessment						Describes Needs in terms of Software after a detailed organisation assessment	20							
46	Technical Proposal						Document that defines the technical requirements of a project, and explains the plan formulated to address them.		20				1	18	
47	Test Plan						A formal, approved document used to guide Test Phase		23						
48	Test Procedure						A set of tests which addresses homogeneous solution areas		23				5	6	
49	Test Result						Details results after one of several sessions during Test Phase		23						
50	Training Program						Program for the acquisition of knowledge, skills, and competencies		10				6	13	
51	Up-to-date Solution						Updated Solution during the Maintenance Phase		22						
52	Validated Solution						Solution at the end of Test and Validation Phase	15					23		

Table 2: Deliverables from A to Z: Title, e-Competence Area, deliverables description, and accountable/ responsible/ contributing Profiles identified to each deliverable

Deliverables were identified as a tool being valuable contributors to support illumination and differentiation of the 23 ICT Professional Profiles at an appropriate level of granularity. The intention was not to provide a fully comprehensive and consistent Deliverables Framework; this issue is further explained in chapter 3.6.

2.3. The ICT Profiles Template and description rules

A basic achievement of this CWA is the agreement on a template used to show how all 23 ICT Profiles were defined and how they can be further adapted in a specific context by individual users. This template is of generic value and can in principle be applied to any sector. To continue increasing transparency it is recommended to follow this outline format for job profile descriptions in other profile description activities. By using the same basic template it becomes easier to compare and contrast different profiles within the same or different industry sectors.

Influenced by job roles used in ICT organizations across Europe and by considering practicalities to be taken into consideration, the template specification for each profile contains definitions as follows:

- A **title** to give a name to the profile;
- A **summary** statement to indicate the main purpose of the profile;
- A **mission** statement to describe the rationale of the profile;
- A list of **deliverables** (maximum 5 to focus on main ones, with mention of the level of responsibility – accountable, responsible or contributor) to be carried out by the profile;
- A list of typical **tasks** to be performed by the profile;
- A list of necessary **e-competences** (from the e-CF) to carry out the mission;
- A **KPI** (Key Performance Indicator) **area** to inspire how to deduce specific KPIs allowing the measurement of the mission performance and its outputs.

Less is more: About the need to focus

To answer to the need of a common European language for ICT Profiles and flexibility in application, the European ICT Professional Profiles have been developed as “Skeletons” reducing the description of each item to the core of a role. Following the principle “Less is more”, questions considered were: What is the essential content of this Profile? What makes it different from the others? Which are the most relevant e-competences, tasks or deliverables, discriminating a profile one from another? What can serve as generic KPI area (from where specific measurable indicators can be derived by European stakeholders on the next application level, the third or tailored generation)?

For example, even if the CIO Profile is responsible for Service Level Management as a deliverable, the competence A.2. Service Level Management is not associated to this profile. Reducing the Profile to its core shows that other e-competences are more important for the CIO and the assignment of e.g. e-competence A.2. would be too narrow. This question of priority explains also why the e-

competences D.4. Purchasing and A.8. Sustainable Development are not assigned to any of the 23 ICT Profiles. Both e-competences could be included in a number of Profiles but not at this generic European level where the initial sense of Profiles specification is to provide basic characteristics and to make clear differences between them.

"Less is more" is also valid when it comes to the level assignment of e-competences. The intention of this CWA is to reflect competent individuals in conditions of successful work performance. For this reason the competences selected have to focus on a maximum of two levels. Removing the limitation of levels would not lead to the definition of junior and senior specialists in one profile, but lead to less consistent and less usable Profile references.

However, the differences made between Profiles can not be fully understood when only focusing on the selected e-competences and the levels assigned. Some Profiles may need very similar competences for successful work performance however they clearly differ from each other by summary statement, mission and tasks. In this sense, the Profiles have to be understood and used in their entire descriptions.

The following scheme shows a template specifying all items and rules applied to describe each item of a profile.

Profile title	**Gives a commonly used name to a profile.** Identification exercise and multistakeholder agreement as described in chapter 2.1.		
Summary statement	**Indicates the main purpose of the profile.** The purpose is to present to stakeholders and users a brief, concise understanding of the specified ICT Profile. It should be understandable by ICT professionals, ICT managers and Human Resource personnel. The structure should consist of a short sentence (up to approximately 15 words). It should not repeat the entire ICT Profile name. It should provide a statement of the job's main activity.		
Mission	**Describes the rationale of the profile.** The purpose is to specify the designated job role defined in the ICT Profile. It should provide the performance context of the job within an organisational structure. The following verbs may be used within the description or at least for structuring the thinking about how to express the mission: *Guarantees, Ensures, Contributes*.		
Deliverables	**Accountable (A)**	**Responsible (R)**	**Contributor (C)**

	Specifies the Profile by key deliverables. The purpose is to illuminate the ICT Profiles and to explain relevance including the perspective from a non-ICT point of view. Also add the dimension of responsible following the RACI model Select only the most important deliverables, which help to illustrate the ICT Profile, not more than 5 in total (A,R,C together). Mention the level of responsibility – A accountable, R responsible, C contributor – to be carried out by the profile.
Main task/s	**Provides a list of typical tasks to be performed by the profile.** A task is an action taken to achieve a result within a broadly defined context. Tasks may be associated with deadlines, resources, goals, specifications and/or the expected results. These elements depend upon the context of the task and may be omitted, however the action must always be described. A task is defined by a short description using a verb and the objective or goal of the action. List no more than 10. SELECTION CRITERIA: A task contributes to define a Profile.
e-CF competences assigned	**Provides a list of necessary competences (from the e-CF) to carry out the mission.** Must include 1 up to 5 competences. Level assignment is important. Can be (usually) 1 or (maximum) 2 levels. SELECTION CRITERIA: A competence is a consequence of the previously derived Profile definition and helps to separate profiles one from another.
KPI Area	**Based upon KPIs (Key Performance Indicators) KPI area is a more generic indicator, congruent with the overall profile granularity level. It is deployed to add depth to the mission.** Not prescriptive. Non-specific measurements. Use general examples. The principle is to provide KPI areas (which are stable, general and long lasting) providing users with an inspiration to enable development of specific KPI's for specific roles (such KPI measurements can be more short-term oriented). Must be related to the key deliverables in order to measure them. Focus on long-term deliverables (Profile), not short term (Job position). Be described in a single sentence. The KPI area should always be translatable into detailed measurable KPI examples.

Table 3: The European ICT Profile description template and rules

Once all Profiles were fully described, a consistency cross-check was carried out:

- Have all items described been identified in a coherent and consistent way?
- Is there a clear distinction between all profiles and have overlaps been avoided?
- On the assigned level of granularity; are all relevant missions and deliverables of the ICT business process covered?

The technical interim and final results were presented at several occasions to the wider European experts and stakeholders community, seeking further feedback and final improvement.

The outcome of this process, all 23 European ICT Professional Profiles with full descriptions, including profile interrelationships and further illustrative overview schemes, are presented in chapter 3.

2.4. ICT Profile Family identification

Structuring the 23 European ICT Profiles by families significantly facilitates navigation and enriches an initially flat structure with orientation guidance. In this way ICT Profiles can be divided into family groups of related profiles. In identifying groups, different options of similarity were initially considered; for example:

- ICT Profiles could be arranged according to hierarchical roles, like *manager* or *specialist*
- ICT Profiles could be arranged according to similar fields, like *business* or *database*
- ICT Profiles could be arranged according to other similarities such as *functions* or *deliverables*

However, **patterns of competence** are the most helpful arrangement of European ICT Profiles for enterprises, human resources department and professionals involved in competence and skills development. The assigned competences of all European ICT Profiles are gathered from the e-Competence Framework. Consequently every European ICT Profile is characterised by a set of competences at specific levels that form a typical pattern. The following example shows the e-CF competences assigned to two different ICT Manager Profiles:

ICT Security Manager	Project Manager
	A.4 Product/ Service Planning (level 4)
A.7 Technology Trend Monitoring (level 4)	
D.1 Information Security Strategy Development	
	E.2 Project and Portfolio Management (level 4)
E.3 Risk Management (level 3)	E.3 Risk Management (level 3)
	E.4 Relationship Management (level 3)
	E.7 Business Change Management (level 3)
E.8 Information Security Management (level 4)	
E.9 IS Governance (level 4)	

Table 4: e-Competence assignment – Two European ICT Profile examples

Another example of two different ICT Profiles: both located in the field of "systems" (please note the different levels of competence):

Systems Analyst	Systems Architect
A.5 Design Architecture (level 3)	A.5 Design Architecture (level 4)
	A.7 Technology Trend Monitoring (level 4-5)
	A.9 Innovating (level 4)
B.6 Systems Engineering (level 3-4)	B.6 Systems Engineering (level 4-5)
	B.2 Component Integration (level 4)
E.5 Process Improvement (level 3-4)	

Table 5: e-Competence assignment – Two further European ICT Profile examples

Based on the pattern of competence it is possible to locate each European ICT Profile on a map, built from Dimension 1 of the e-Competence Framework which reflects the five main ICT business processes PLAN, BUILD, RUN, ENABLE and MANAGE:

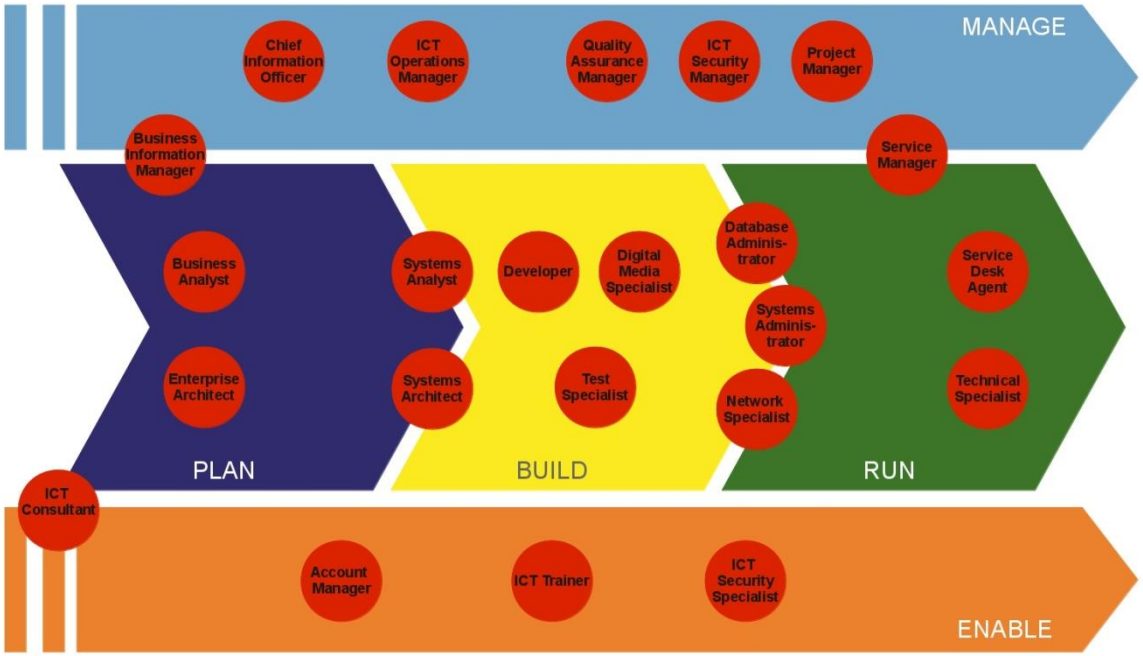


Figure 8: The 23 European ICT Professional Profiles positioned in the 5 main business processes (e-CF Dimension 1)

Most ICT Profiles are located in one e-CF dimension, for example, CIO in MANAGE, Enterprise Architect in PLAN or Technical Specialist in RUN. This means, that all or most important competences of the profile are related to this ICT business process. A minority of ICT Profiles are located on borders, e.g. Business Information Manager in MANAGE and PLAN or the Systems Administrator in BUILD and RUN. This means, that these profiles typically combine competences (and also tasks) from two ICT business processes.

To build families, it was necessary to associate the profiles. Again, different possibilities were available.

- The first and most obvious possibility is to group profiles within the ICT Business Processes and create a MANAGE-family, a PLAN-family and so on. This approach adds little as families fail to add any additional information than the profiles on their own.
- Another possibility was to build families within similar fields of action, integrating some specialisations, and forming groups such as an analyse-family or a service-family. This option may work in some ICT contexts, but it mainly relates to enterprise organisations and fails to be relevant to SMEs.

To ensure maximum added value, it was decided to provide six families combining similar patterns of competence with similar tasks and work relationships. This final result is illustrated in section 3.1.

3. The top of a European ICT Family Tree: 23 ICT Profiles in six families

The prime objective of the presented 23 European ICT Professional Profiles is to increase transparency and to continue the convergence of the European ICT Skills landscape, as initiated in the origins of the European e-Competence Framework (e-CF).

As a response to the vast number of ICT Profiles Frameworks and Profiles descriptions used today in European ICT Business and Qualification practice, it was decided to create a reasonable number of representative ICT Profiles which cover the whole ICT Business process reflected by e-CF Dimension 1 and which can be used for reference or further development by stakeholders Europe-wide.

Structured in six main **ICT Profile families**, the philosophy behind these reference Profiles is to reflect the top of a **European ICT Profiles family tree**.

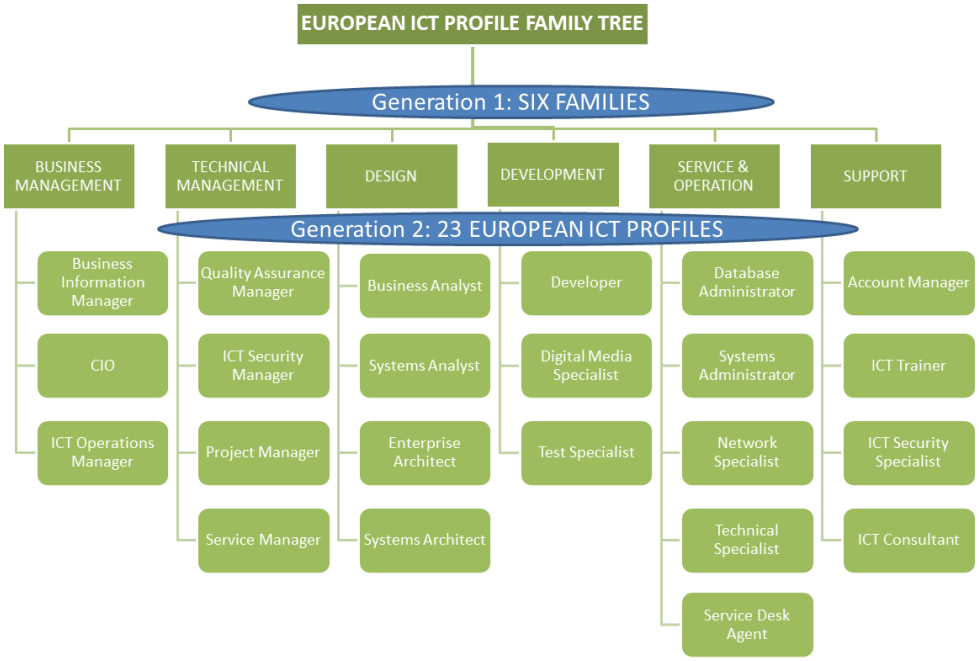


Figure 9: European ICT Profile Family Tree – Generation 1 and 2 for Europe-wide reference

The following chapters present the 23 Profiles and the related Profile families in detail. All ICT Profiles are fully described. Additionally a number of charts are provided which illustrate the profiles structure from different perspectives (e-Competences, Deliverables, Working Relationships, Business/ Technology Orientation).

3.1. Generation 1: Six ICT Profile Families

Six families combining typical patterns of competences with typical tasks and work relationships group the 23 Profiles.

This family classification is shown in the following figure 11.

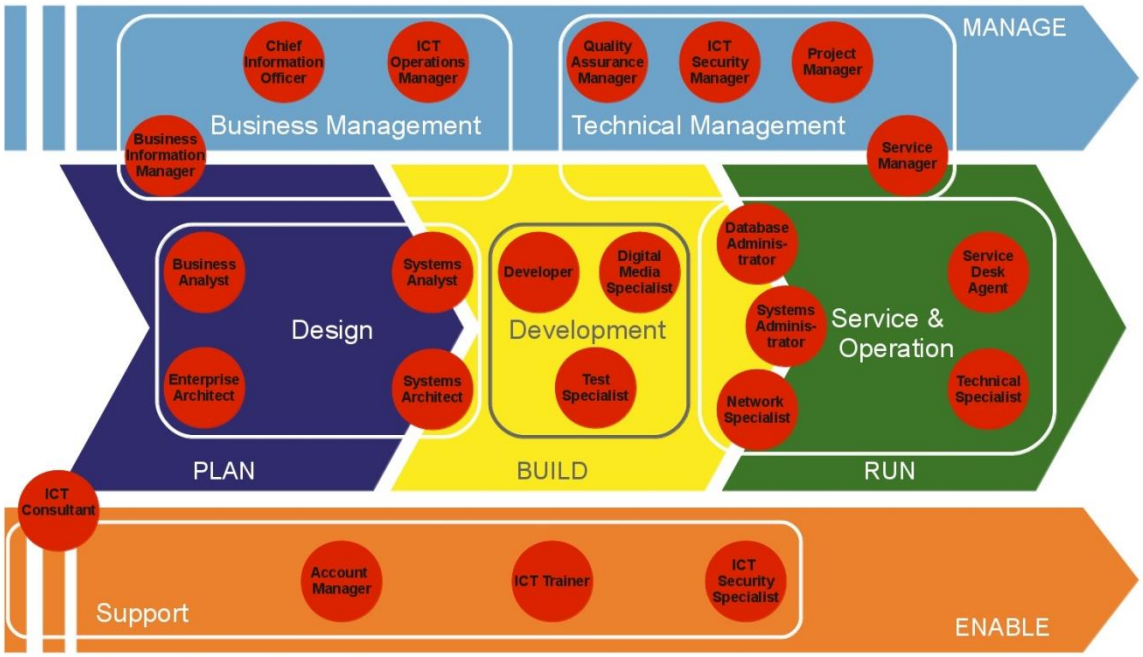


Figure 10: The 23 European ICT Profiles structured by six families

Six families specify Generation 1 of the European ICT Family Tree; leading to the 23 specific ICT Professional Profiles in Generation 2 for Europe-wide reference:

- **Business Management** – with Business Information Manager, Chief Information Officer, ICT Operations Manager
- **Technical Management** – with Quality Assurance Manager, ICT Security Manager, Project Manager, Service Manager
- **Design** – with Business and Systems Analyst, Enterprise and Systems Architect
- **Development** – with Developer, Digital Media Specialist, Test Specialist
- **Service & Operation** – with Database and Systems Administrator, Network and Technical Specialist, Service Desk Agent
- **Support** – with ICT Consultant, Account Manager, ICT Trainer, ICT Security Specialist.

Profiles within families (except the family "Support") share a commonality that sometimes provides a possible basis for them to coexist within similar career paths sharing development opportunities, or participating in similar business and work processes.

3.2. Generation 2: 23 European ICT Profiles – Full descriptions

To add value the European ICT Profiles must be adaptable to the employment environment. They are not useful if, on the contrary, the employer has to change practices to meet profile descriptions.

The European ICT Profile descriptions are therefore reduced to their core characteristics which clearly differentiate them one from another (see chapter 2.3.). Further context-specific elements can be added to the Profiles according to the specific environments in which the Profiles are to be integrated.

An example of this need to take into account context is the use of the acronyms ICT (information communications technology) or IS (information systems). At the top of the European ICT Profiles Family Tree, within Generation 2 Profiles, it is too restrictive and possibly inaccurate to prescribe the use of ICT or IS. The default is to use the more general term ICT, except in exceptional circumstances where only IS, is applicable. However, IS or ICT can be applied within Generation 3 Profiles to more accurately focus the profile. Definitions of IS and ICT are Incorporated within the Glossary, chapter 5.

Profile title	ACCOUNT MANAGER (1)		
Summary statement	Senior focal point for client sales and customer satisfaction.		
Mission	Builds business relationships with clients to facilitate the sale of hardware, software, telecommunications or ICT services. Identifies opportunities and manages sourcing and delivery of products to customers. Has responsibility for achieving sales targets and maintaining profitability.		
Deliverables	**Accountable**	**Responsible**	**Contributor**
	• Sale	• Business Relationship	• Sales Forecast • Technical proposal • Production Forecast
Main task/s	• Maintain overall customer satisfaction with products and/or services • Identify opportunities to propose new products or services to client(s) • Be the primary contact point for client executive management • Deliver value added presentations related to products and services to customer executive management • Lead negotiations to establish profitable contracts with client(s) • Maintain and enhance business relationships		
e-competences *(from e-CF)*	D.5. Sales Proposal Development		Level 4
	D.7. Sales Management		Level 5
	E.1. Forecast Development		Level 3
	E.4. Relationship Management		Level 4
	D.6. Channel Management		Level 4
KPI area	Sales quota achievement		

Profile title	BUSINESS ANALYST (2)		
Summary statement	Analyses Information System for improving business performance.		
Mission	Identifies areas where information system changes are needed to support business plans and monitors the impact in terms of change management. Contributes to the general functional requirements of the business organization in the area of ICT solutions. Analyses business needs and translates them into ICT solutions.		
Deliverables	**Accountable**	**Responsible**	**Contributor**
	• Business requirements	• Business case • Business relationship	• Business plan • ICT Strategy & implementation
Main task/s	• Contribute to the preparation of the business plan of the organization • Identify areas for improvement in business processes providing possible ICT solutions compliant with the ICT strategy • Build requirements, specifications, business processes and the business case related to the proposed solutions • Analyze required information and documents		
e-competences *(from e-CF)*	A.1. IS and Business Strategy alignment		Level 4
	A.3. Business Plan Development		Level 4
	E.5. Process Improvement		Level 4
	D.11. Needs Identification		Level 4
KPI area	Adequacy of the business requirements in response to the business plan		

Profile title	BUSINESS INFORMATION MANAGER (3)		
Summary statement	Proposes plans and manages functional and technical evolutions of the Information System within the relevant business domain.		
Mission	Manages and implements updates to existing applications and maintenance activities guided by the needs, costs and plans agreed with internal users. Ensures quality of service and internal user satisfaction.		
Deliverables	**Accountable**	**Responsible**	**Contributor**
	• Project portfolio	• Solution specification	• Business plan
Main task/s	• Responsible for managing the information technology development within the business domain • Anticipate changes to the Information System and the business impact and vice versa • Formalize, consolidate and drive the development of the configuration of the information system • Evaluate the relevance of the Information systems to the business domain • Build a knowledge base through understanding the organization's information system		
e-competences *(from e-CF)*	A.1. IS and Business Strategy Alignment		Level 4
	A.3. Business Plan Development		Level 4
	E.2. Project and Portfolio Management		Level 4
	E.7. Business Change Management		Level 4
	D.10. Information and Knowledge Management		Level 5
KPI area	Business User requirement satisfaction		

Profile title	CHIEF INFORMATION OFFICER (CIO) (4)		
Summary statement	Develops and maintains Information Systems compliant to business and organisation's needs.		
Mission	Defines and implements governance and ICT strategy. Determines necessary resources for ICT strategy implementation. Anticipates ICT market evolutions and company business needs. Contributes to the development of the organisation's strategic plan. Leads or participates in larger change projects.		
Deliverables	**Accountable**	**Responsible**	**Contributor**
	• ICT Strategy & implementation • ICT Department & budget	• Project Portfolio • Service Level Agreement • Information Security Strategy	• Risk management policy
Main task/s	• Define the company's strategy for IT • Manage all IS department activity • Responsible for the quality and management of customer-supplier relationships • Define and ensure compliance with Service Level Agreements • Negotiate and implement complex contracts • Make recommendations to senior general management • Ensure that change management processes are implemented • Ensure the reliability, confidentiality, security and integrity of Information Systems		
e-competences *(from e-CF)*	A1. IS and Business Strategy Alignment		Level 5
	A3. Business Plan Development		Level 5
	E2. Project and Portfolio Management		Level 5
	E4. Relationship Management		Level 4
	E9. IT Governance		Level 5
KPI area	Overall added value, efficiency and effectiveness of the information system		

Profile title	DATABASE ADMINISTRATOR (5)		
Summary statement	Designs, implements, or monitors and maintains databases.		
Mission	Ensures the design and the implementation (Developer), or ensures the maintenance and repair of an organization's database (Administrator) to support information system solutions that meet business information needs. Verifies the development and design of database strategies, monitoring and improving database performance and capacity, and planning for future expansion requirements. Plans, co-ordinates and implements security measures to safeguard the database.		
Deliverables	**Accountable**	**Responsible**	**Contributor**
	• Data model	• Solution Specification • Solution in operation	• Test procedure • Solved incident
Main task/s	• Define/ build/optimize database models and schemas • Apply standards methods and tools for measuring and reporting on wide set of relevant performance indicators (response time, availability, safety, integrity …) • Produce database procedures and instructions for other analysts or administrators • Monitor and maintain databases • Identify, investigate and correct problems or incidents related to databases • Provide training, support, advice and guidance on database issues to other information system practitioners		
e-competences *(from e-CF)*	A.6. Application design		Level 1
	B.1. Application development		Level 3
	B.2. Component integration		Level 2-3
	C.4. Problem management		Level 3
	D.10. Information and knowledge management		Level 3
KPI area	Database in operation		

Profile title	DEVELOPER (6)		
Summary statement	Builds/codes ICT solutions and specifies ICT products according to customer needs.		
Mission	Ensures building and implementing of ICT applications. Contributes to planning, low level design. Compiles diagnostic programs and designs and writes code for operating systems and software to ensure optimum efficiency and functionality.		
Deliverables	**Accountable**	**Responsible**	**Contributor**
	• Hardware Component • Software Component	• Solution Documentation	• Software Design Description • Test Procedure • Solution in Operation
Main task/s	• Develop component • Engineer component • Shape documentation • Provide component support beyond the first level • Supply 3rd level support		
e-competences *(from e-CF)*	B.1. Application Development		Level 3
	B.2. Component Integration		Level 2
	B.3. Testing		Level 2
	B.5. Documentation Production		Level 3
	C.4. Problem Management		Level 3
KPI area	Fully functional ICT components		

Profile title	DIGITAL MEDIA SPECIALIST (7)		
Summary statement	Creates websites and multimedia applications combining the power of digital technology with effective use of graphics, audio, photographic and video images.		
Mission	Designs, lays out and codes, multimedia applications and websites to maximize information presentation, including marketing messages. Makes recommendations on technical interfaces and ensures sustainability through application of appropriate content management systems.		
Deliverables	**Accountable**	**Responsible**	**Contributor**
	• Multimedia component	• Integrated Solution	• Solution in Operation
Main task/s	• Design web and multimedia content to provide clear and visually attractive solution in line with customer needs • Test and resolve any technical issues • Ensure accessibility for disabled users and for accessibility via a range of browsers • Ensure compliance with privacy, legal requirements and environmental constraints		
e-competences *(from e-CF)*	A.6. Application Design		Level 2
	B.1. Application Development		Level 3
	B.3. Testing		Level 2
	B.4. Solution Deployment		Level 3
	D.12. Digital Marketing		Level 2
KPI area	Fully functional web components		

Profile title	ENTERPRISE ARCHITECT (8)		
Summary statement	Designs and maintains the Enterprise Architecture		
Mission	Balances technological opportunities with business (process) requirements. Maintains a holistic view of the organisation's strategy, processes, information and ICT assets. Links the business mission, strategy and processes to the IT strategy.		
Deliverables	**Accountable**	**Responsible**	**Contributor**
	• Enterprise Architecture		• Business Plan • New Technology integration proposal • Knowledge or Information Base • Business Process Definition
Main task/s	• Devise business improvement opportunities and create proposals • Align IT strategy and planning with the organisation's business goals • Streamline business processes, functions, procedures and workflows and apply a consistent implementation approach • Manage stakeholder engagement in the development of new processes and systems and verifies feasibility • Conduct post-implementation reviews to evaluate benefits accrued from new processes and systems		
e-competences *(from e-CF)*	A.1. IS and Business Strategy Alignment		Level 4-5
	A.3. Business Plan Development		Level 3-4
	A.5. Architecture Design		Level 4
	A.7. Technology Trend Monitoring		Level 5
	E.7. Business Change Management		Level 4-5
KPI area	Quality and consistency of enterprise architecture aligned with business objectives		

Profile title	ICT CONSULTANT (9)		
Summary statement	Supports understanding of how new ICT technologies add value to a business.		
Mission	Ensures technological watch to inform stakeholders of emergent technologies. Anticipates and brings to maturity ICT projects by the introduction of appropriate technology. Communicates the value of new technologies to the business. Contributes to project definitions.		
Deliverables	**Accountable**	**Responsible**	**Contributor**
	• New technology integration proposal	• Knowledge or information base (on his domain)	• Business requirements Project plan
Main task/s	• Provide advice on how to optimize the use of existing tools and systems • Raise awareness of information technology innovations and potential value to a business • Make recommendations for the development and implementation of a business project or technological solution • Participate in the definition of general project specifications • Participate in the assessment and choice of ICT solutions		
e-competences *(from e-CF)*	A.7. Technology Trend Monitoring		Level 5
	E.7. Business Change Management		Level 4-5
	D.11. Needs Identification		Level 4
	A.4. Product or Project Planning		Level 3
	E.3. Risk Management		Level 3
KPI area	Impact of advice in new technologies implementation		

Profile title	ICT OPERATIONS MANAGER (10)		
Summary statement	Manages operations, people and overall resources for the ICT activity.		
Mission	Implements and maintains a designated part of the ICT infrastructure. Ensures that activities are conducted in accordance with organizational rules, processes and standards. Anticipates necessary changes according to company strategy and cost controls. Evaluates and recommends investments based on new technologies. Ensures the effectiveness of the ICT and associated risk management.		
Deliverables	**Accountable**	**Responsible**	**Contributor**
	• Budget plan	• HR Development plan • Training Program	Eco-responsibilities Assurance
Main task/s	• Coordinate and manage staff • Direct, organize, plan and monitor activities • Negotiate the objectives and resources • Manage the departmental budget • Establish and monitor management information • Analyse and propose solutions for the continuous productivity improvement • Manage the implementation and monitoring of IS quality assurance and security • Communicate with internal business departments and project owners		
e-competences *(from e-CF)*	D.9. Personnel Development		Level 4
	E.3. Risk Management		Level 3
	E.6. ICT Quality Management		Level 3
	E.7. Business Change Management		Level 4
	E.8. Information Security Management		Level 3
KPI area	Optimization of overall resources		

Profile title	ICT SECURITY MANAGER (11)		
Summary statement	Manages the Information System security policy.		
Mission	Defines the Information System security policy. Manages security deployment across all Information Systems. Ensures the provision of information availability. Recognized as the ICT security policy expert by internal and external stakeholders.		
Deliverables	**Accountable**	**Responsible**	**Contributor**
	• Information security policy	• Knowledge or Information base • Information security strategy	• Risk Management policy • New technology integration proposal • ICT Strategy & implementation
Main task/s	• Define and implement procedures linked to IS security • Contribute to the development of the organization's security policy • Establish the prevention plan • Inform and raise awareness among general management • Ensure the promotion of the IT security charter among users • Inspect and ensure that principles and rules for IS security are applied		
e-competences *(from e-CF)*	A.7. Technology Trend Monitoring		Level 4
	D.1. Information Security Strategy Development		Level 5
	E.3. Risk Management		Level 3
	E.9. IS Governance		Level 4
	E.8. Information Security Management		Level 4
KPI area	Security Policy effectiveness		

Profile title	ICT SECURITY SPECIALIST (12)		
Summary statement	Ensures the implementation of the organizations security policy.		
Mission	Proposes and implements necessary security updates. Advises, supports, informs and provides training and security awareness. Takes direct action on all or part of a network or system. Is recognized as the ICT technical security expert by peers.		
Deliverables	**Accountable**	**Responsible**	**Contributor**
	• Knowledge or Information base (Security)	• New technology integration proposal (Security)	• Risk Management policy • Risk Management Plan • Information security policy
Main task/s	• Ensure security and appropriate use of ICT resources • Evaluate risks, threats and consequences • Provide security training and education • Provide technical validation of security tools • Contribute to definition of security standards • Audit security vulnerability • Monitor security developments to ensure data and physical security of the ICT resources		
e-competences *(from e-CF)*	C.2 Change Support		Level 3
	C.3 Service Delivery		Level 3
	D.9 Personnel Development		Level 3
	D.10. Information and Knowledge Management		Level 3
	E.8 Information Security Management		Level 3-4
KPI area	Security measures in place		

Profile title	ICT TRAINER		(13)
Summary statement	Educates and trains ICT professionals and practitioners to reach predefined standards of ICT technical/ business competence.		
Mission	Provide the knowledge and skills required to ensure that students are able to effectively perform tasks in the workplace.		
Deliverables	**Accountable**	**Responsible**	**Contributor**
	• Course of Instruction		• ICT training policy • Training Program
Main task/s	• Conduct training needs analyses • Design programs to meet needs • Produce and/or update existing training materials (content and method) • Deliver effective training in classroom, on-line or informally • Monitor, evaluate and report effectiveness of training • Maintain currency of expertise on specialist subject • Evaluate and report student performance		
	D.3. Education and Training Provision		Level 2-3
	D.9. Personnel Development		Level 3
KPI area	Impact of the training		

Profile title	NETWORK SPECIALIST (14)		
Summary statement	Ensures the alignment of the network, including telecommunication and/or computer infrastructure to meet the organization's communication needs.		
Mission	Manages and operates a networked information system, solving problems and faults to ensure defined service levels. Monitors and improves network performances.		
Deliverables	**Accountable**	**Responsible**	**Contributor**
		• Network Solution Documentation • Network Solution in Operation • Network Solution Specification	• Solved Incident
Main task/s	• Ensure that communication performance, recovery, and security needs meet agreed service agreement standards • Contribute to define network design policies, philosophies and criteria. • Investigate, diagnose and solve network problems • Use network management system tools to determine network load and model performance statistics. • Maintain awareness of relevant legislation affecting network security		
e-competences *(from e-CF)*	B.1. Application Design		Level 2-3
	B.2. Component Integration		Level 2-3
	B.4. Solution Deployment		Level 2-3
	C.4. Problem Management		Level 2-3
	E.8. Information Security Management		Level 2
KPI area	Level of Network Services Quality		

Profile title	PROJECT MANAGER (15)		
Summary statement	Manages projects to achieve optimal performance conforming to original specifications.		
Mission	Defines, implements and manages projects from conception to final delivery. Responsible for achieving optimal results, conforming to standards for quality, safety and sustainability and complying with defined scope, performance, costs, and schedule.		
Deliverables	**Accountable**	**Responsible**	**Contributor**
	• Project Plan • Validated solution	• Solution documentation	• Quality Plan • Integrated Solution
Main task/s	• Organize, coordinate and lead the project team • Supervise project progress • Coordinate, record and ensure quality compliance • Circulate and distribute information from the project owner • Implement the new application or service • Plan maintenance and user support • Ensure specification compliance • Comply with budgets and delivery times • Update the project according to changing circumstances		
e-competences *(from e-CF)*	A.4. Product/ Service Planning		Level 4
	E.2. Project and Portfolio Management		Level 4
	E.3. Risk Management		Level 3
	E.4. Relationship Management		Level 3
	E.7. Business Change Management		Level 3
KPI area	Project scope achievement		

Profile title	QUALITY ASSURANCE MANAGER (16)		
Summary statement	Ensures that Information Systems are delivered according to organizational policies (quality, risks, Service Level Agreement).		
Mission	Establishes and operates an ICT quality approach compliant with the organization's culture. Ensures that management controls are correctly implemented to safeguard assets, data integrity and operations. Is focused and committed to the achievement of quality goals and monitors statistics to forecast quality outcomes.		
Deliverables	**Accountable**	**Responsible**	**Contributor**
	• Audit report	• Quality performance indicators	• Quality assurance • ICT quality policy • Risk management policy • Information security policy
Main task/s	• Establish and deploy the ICT quality policy • Organize and provide quality training • Provide ICT managers with quality performance indicators • Perform quality audits • Organize customer satisfaction surveys • Assist project team members to build and perform project quality plans		
e-competences *(from e-CF)*	D.2. ICT Quality Strategy Development		Level 4-5
	E.3. Risk Management		Level 3
	E.5. Process Improvement		Level 3
	E.6. ICT Quality Management		Level 4
KPI area	Achievement of company quality goals		

Profile title	SERVICE DESK AGENT (17)		
Summary statement	Provides first line telephone or e-mail support to internal or external clients with technical issues.		
Mission	To provide user support and troubleshoot ICT problems and issues. The primary objective is to enable users to maximize their productivity through efficient use of ICT equipment or software applications.		
Deliverables	**Accountable**	**Responsible**	**Contributor**
		• First level Support	• Solved Incident
Main task/s	• Identify and diagnose issues and problems • Categorize and record reported queries and provide solutions • Support problem identification • Advise users on appropriate course of action • Monitor issues from start to resolution • Escalate unresolved problems to higher levels of support		
e-competences *(from e-CF)*	C.1. User Support		Level 2
	C.3. Service Delivery		Level 1
	C.4. Problem Management		Level 2
KPI area	Responsiveness and accuracy of solution provision for specific problem		

Profile title	SERVICE MANAGER (18)		
Summary statement	Plans, implements and manages solution provision.		
Mission	Manages the definition of Service Level Agreements (SLAs), Operational Level Agreements (OLAs) contracts and Key Performance Indicators (KPIs). Negotiates contracts with the various business domains or customers and in alignment with the *Business IS Manager*. Man manages the staff who monitor, report and fulfil the SLAs. Takes mitigation action in case of non-fulfilment of agreements. Contributes to the development of the maintenance budget together with business/finance organisations.		
Deliverables	**Accountable**	**Responsible**	**Contributor**
	• Solution in Operation	• Service Level Agreement • Solved incident	• Quality Performance Indicators • Technical Proposal
Main task/s	• Define Service requirements • Negotiate SLA / OLA • Manage solution operation • Provide service delivery		
e-competences *(from e-CF)*	A.2. Service Level Management		Level 4
	C.3. Service Delivery		Level 3
	C.4. Problem Management		Level 4
	D.8. Contract Management		Level 4
	D.9. Personnel Development		Level 3
KPI area	Fulfillment of Service Levels		

Profile title	SYSTEMS ADMINSTRATOR (19)		
Summary statement	Administers ICT System components to meet service requirements.		
Mission	Installs software, configures and upgrades ICT systems. Administers day-to-day operations to satisfy continuity of service, recovery, security and performance needs.		
Deliverables	**Accountable**	**Responsible**	**Contributor**
		• Solution in Operation	• Solved Incident
Main task/s	• Investigate, diagnose and solve system related problems • Install and upgrades software • Schedule installation work, liaising with all concerned to ensure that installation priorities are met and disruption to the organization is minimized. • Diagnose and solve problems and faults occurring in the operation of hardware and software • Comply with organization procedures to ensure integrity of the system		
e-competences *(from e-CF)*	B.2. Component Integration		Level 2
	B.3. Testing		Level 2
	C.1. User Support		Level 2-3
	C.4. Problem Management		Level 2
	E.8. Information Security Management		Level 2
KPI area	Systems in operation		

Profile title	SYSTEMS ANALYST (20)		
Summary statement	Analyses requirements and specifies software and systems.		
Mission	Ensures the technical design and contributes to implementation of new software and/or enhancements.		
Deliverables	**Accountable**	**Responsible**	**Contributor**
	• Software Needs Assessment	• Integrated Solution • Technical Proposal	• ICT Process definition • ICT Model • Solution Specification
Main task/s	• Recommend resolutions and improvements • Provide integrated solutions • Provide consolidate findings on components or processes		
e-competences *(from e-CF)*	A.5. Architecture Design		Level 3
	E.5. Process Improvement		Level 3-4
	B.6. Systems Engineering		Level 3-4
KPI area	Fully functional ICT applications		

Profile title	SYSTEMS ARCHITECT (21)		
Summary statement	Plans and is accountable for the implementation and integration of software and/ or ICT systems.		
Mission	Designs, integrates and implements complex ICT solutions from a technical perspective. Ensures, that technical solutions, procedures and models for development are up-to-date and comply with standards. Watches technology development and integrates into new solutions. Acts as a team leader for developers and technical experts.		
Deliverables	**Accountable**	**Responsible**	**Contributor**
	• Solution Specification • Integrated Solution	• New technology integration proposal	• Development process
Main task/s	• Analyse technology, business and technical requirements • Specify and implement complex ICT solutions • Lead development and integration of components • Lead and/ or conduct system integration		
e-competences *(from e-CF)*	A.5. Architecture Design		Level 4
	A.7. Technology Trend Monitoring		Level 4-5
	B.6. Systems Engineering		Level 4-5
	B.2. Component integration		Level 4
	A.9. Innovating		Level 4
KPI area	Effectiveness and efficiency of solution implementation		

Profile title	TECHNICAL SPECIALIST (22)		
Summary statement	Maintains and repairs hardware and software on client premises.		
Mission	To effectively maintain customer hardware/software. Responsible for delivering timely and effective repairs to ensure optimal system performance and superior customer satisfaction.		
Deliverables	**Accountable**	**Responsible**	**Contributor**
	• Solved Incident	• Up –to-date Solution	• Solution Documentation
Main task/s	• Identify software and hardware problems and repair • Perform regular maintenance on hardware and software components • Install cables and configures hardware and software • Document system addresses and configurations • Run diagnostic programs or use test equipment to locate source of problems • Communicate effectively with end users and customer management • Maintain security and functionality through application of program temporary fixes		
e-competences *(from e-CF)*	C.2. Change Support		Level 3
	C.3. Service Delivery		Level 2
	C.4. Problem Management		Level 3
KPI area	Efficiency and speed of problem resolution		

Profile title	TEST SPECIALIST (23)		
Summary statement	Designs and performs testing plans.		
Mission	Contributes to correctness and completeness of a system ensuring that solutions meet technical and user requirements. Contributes in different areas of systems development, testing system functionality, identifying anomalies and diagnosing possible causes.		
Deliverables	**Accountable**	**Responsible**	**Contributor**
		• Test Plan • Test Procedure • Test Result	• Integrated Solution • Validated Solution • Solution Documentation
Main task/s	▪ Select and develop integration testing techniques to ensure the system meets requirements. ▪ Design and customize integration tests, identify open issues. ▪ Develop test plans and procedures for white and black box testing at unit, module, system and integration levels. ▪ Establish procedures for result analysis and reporting. ▪ Design and implement defect tracking and correction procedures ▪ Write test program to assess software quality ▪ Develop tools to increase test effectiveness.		
e-competences *(from e-CF)*	B.1. Application Development		Level 3-4
	B.2. Component Integration		Level 2-3
	B.3. Testing		Level 2-3
	B.4. Solution Deployment		Level 3
	C.4. Problem Management		Level 2-3
KPI area	Consistency of the test plan according to the quality plan of the project		

3.3. ICT Profiles – Business Technology Complexity Scheme

The technical debate on how to identify and further specify the 23 selected ICT Professional Profiles, at the intended level of granularity, demonstrated a need to view all Profiles from a generic and holistic perspective and to position them according to two main criteria:

- Is the job positioned towards the Business or Technology side of the work process?
- The level of autonomy and/ or complexity represented by each Profile

This positioning cannot be regarded as an exact science owing to the many variables which exist in 'real life' application of the ICT Profiles. To further increase accuracy, the introduction of a third dimension by splitting the autonomy/ complexity axis may be required. However, this would make comprehension more difficult. The key function of the graphic is to provide orientation and communication support to expert and stakeholder discussions about orientation of ICT Profiles.

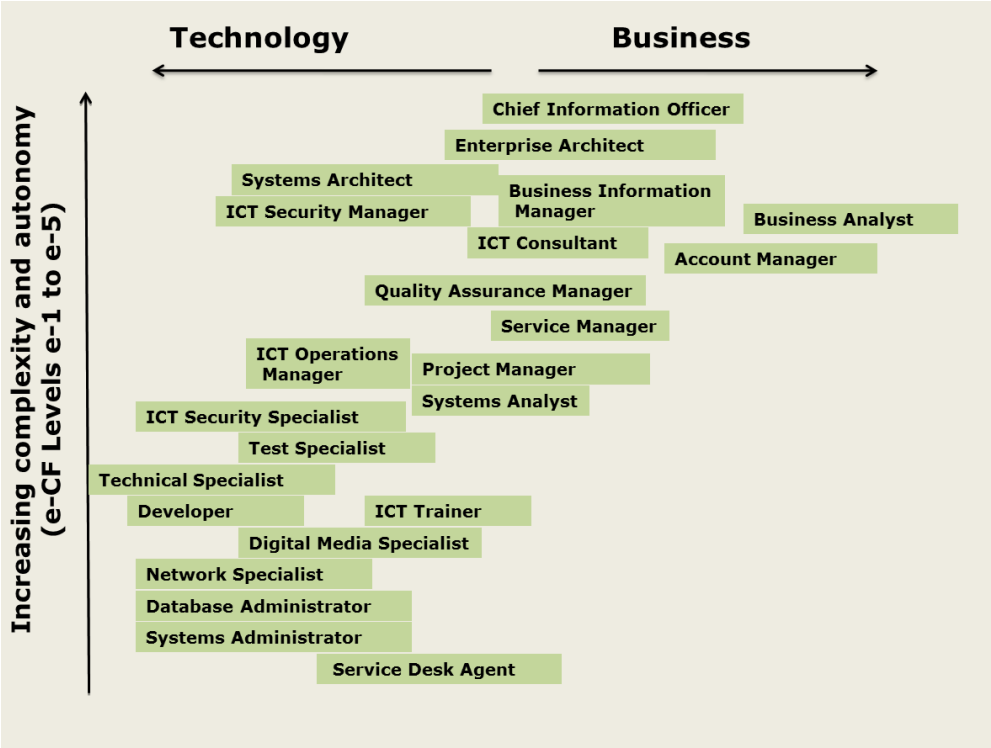


Figure 11: The 23 European ICT Profiles positioned against increasing Autonomy and Complexity (e-CF levels) and Business – Technology orientation

About career paths

Profiles from this CWA may be used to support the creation of organisational job roles. As highlighted in section 4.1. there are many variations in the way in which organisations construct roles, based upon such variables as industry sector, organisation size and business objectives. The application of the European skeleton profiles will consequently result in differences from one organisation to another, especially in terms of granularity.

The formation of company career paths adds more variables that are driven, to name a few, by culture, specialism and profitability. Extraction between the European ICT Professional Profiles and organisational career paths is therefore too tenuous and subjective to be of value.

This CWA does not attempt to create a profile or career path 'straight jacket'. It recognises and supports employers in constructing coherent Profiles serving their needs but at the same time integrated into the European ICT Professional community.

3.4. ICT Profiles – Relationships

ICT Profiles do not function independently; relationships and connections are basic components of an ICT Process. There are many different processes and organizational structures applicable to ICT, for example hierarchical, flat, agile etc. It follows that relationships between roles differ according to the environment in which they operate or the perspective from which they are viewed.

The below schematic diagram depicts loose relationships between some profiles placing them in an overview ICT process. The background arrow shows the direction of an ICT Process from business to operations.

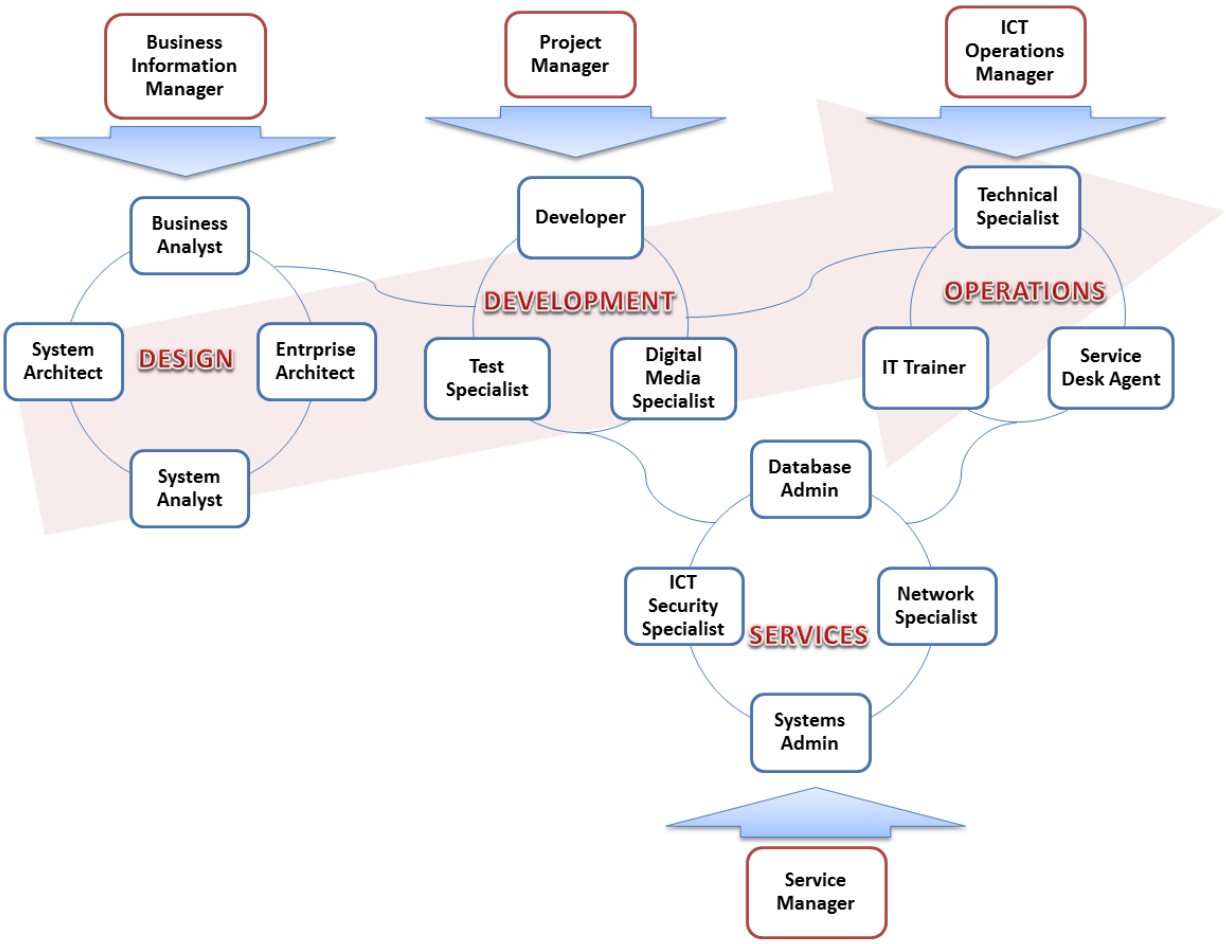


Figure 12: ICT Profiles Relationship Scheme

The following figure 14 represents a cluster of related profiles working on the same process and sharing some common competences.

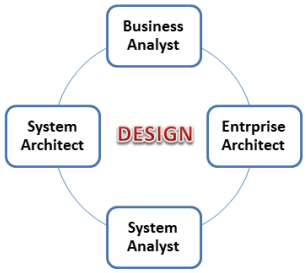


Figure 13: A cluster of related profiles working on the same process and sharing some competences

Different clusters of profiles have a relationship related to process implementation as in the following figure:

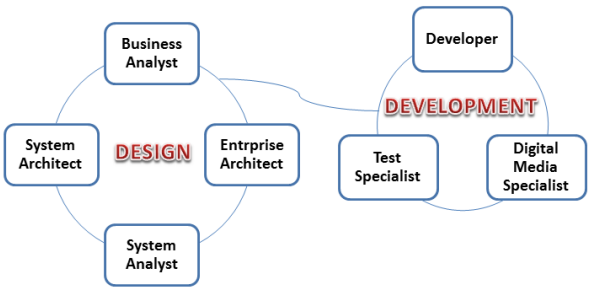


Figure 14: Relationship between different clusters of profiles

Relationships between a management profile and a cluster of technical profiles are represented below.

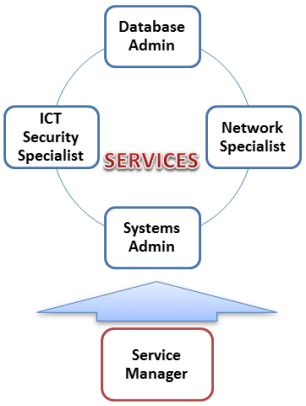


Figure 15: Relationships between a management profile and a cluster of technical profiles

3.5. ICT Profiles – e-Competences Matrix

Each ICT Profile is specified by three up to five e-competences from the European e-Competence Framework. The following Matrix provides a one-sight overview of which e-competences have been assigned as prerequisite to successful performance of which ICT Profile.

ICT Profile titles A-Z	Account Manager	Business Analyst	Business Information Manager	Chief Information Officer	Database Administrator	Developer	Digital Media Specialist	Enterprise Architect	ICT Consultant	ICT Operations Manager	ICT Security Manager	ICT Security Specialist	ICT Trainer	Network Specialist	Project Manager	Quality Assurance Manager	Service Desk Agent	Service Manager	Systems Administrator	Systems Analyst	Systems Architect	Technical Specialist	Test Specialist
e-Competences	e-Competence Framework Level e-1 to e-5																						
A.1 IS and Business Strategy alignment		4	4	5				4 - 5															
A.2 Service Level Management																		4					
A.3 Business Plan Development		4	4	5				3 - 4															
A.4 Product/ Service Planning									3						4								
A.5 Architecture Design								4												3	4		
A.6 Application design					1		2																
A.7 Technology Trend Monitoring								5	5		4										4-5		
A.8 Sustainable Development																							
A.9 Innovating																					4		
B.1 Application development					3	3	3							2 - 3									3 - 4

ICT Profile titles A-Z	Account Manager	Business Analyst	Business Information Manager	Chief Information Officer	Database Administrator	Developer	Digital Media Specialist	Enterprise Architect	ICT Consultant	ICT Operations Manager	ICT Security Manager	ICT Security Specialist	ICT Trainer	Network Specialist	Project Manager	Quality Assurance Manager	Service Desk Agent	Service Manager	Systems Administrator	Systems Analyst	Systems Architect	Technical Specialist	Test Specialist
e-Competences	e-Competence Framework Level e-1 to e-5																						
B.2 Component integration					2-3	2								2-3					2		4		2-3
B.3 Testing						2	2												2				2-3
B.4 Solution Deployment							3							2-3					2				3
B.5 Documentation Production						3																	
B.6 Systems Engineering																				3-4	4-5		
C.1 User support																	2		2-3				
C.2 Change Support												3										3	
C.3 Service delivery												3					1	3				2	
C.4 Problem management					3	3								2-3			2	4	2-3			3	2-3
D.1 Information Security Strategy Development											5												
D.2 ICT quality strategy development																4-5							
D.3 Education and Training Provision													2-3										
D.4 Purchasing																							

ICT Profile titles A-Z	Account Manager	Business Analyst	Business Information Manager	Chief Information Officer	Database Administrator	Developer	Digital Media Specialist	Enterprise Architect	ICT Consultant	ICT Operations Manager	ICT Security Manager	ICT Security Specialist	ICT Trainer	Network Specialist	Project Manager	Quality Assurance Manager	Service Desk Agent	Service Manager	Systems Administrator	Systems Analyst	Systems Architect	Technical Specialist	Test Specialist
e-Competences	e-Competence Framework Level e-1 to e-5																						
D.5 Sales Proposal Development	4																						
D.6 Channel Management	3																						
D.7 Sales Management	5																						
D.8 Contract Management																		4					
D.9 Personnel Development										4		3	2					3					
D.10 Information and Knowledge Management			5		3							3											
D.11. Needs Identification		4																					
D.12. Digital Marketing							2		4														
E.1 Forecast Development	3																						
E.2 Project and portfolio management			4	5											4								
E.3 Risk management									3	3	3				3	3							
E.4 Relationship Management	4			4											3								
E.5 Process improvement		4														3				3 - 4			
E.6 ICT quality management										3						4							
E.7 Business Change Management			4					4 - 5	4 - 5	4					3								

ICT Profile titles A-Z	Account Manager	Business Analyst	Business Information Manager	Chief Information Officer	Database Administrator	Developer	Digital Media Specialist	Enterprise Architect	ICT Consultant	ICT Operations Manager	ICT Security Manager	ICT Security Specialist	ICT Trainer	Network Specialist	Project Manager	Quality Assurance Manager	Service Desk Agent	Service Manager	Systems Administrator	Systems Analyst	Systems Architect	Technical Specialist	Test Specialist
e-Competences	e-Competence Framework Level e-1 to e-5																						
E.8 Information Security Management										3	4	3 - 4		2					2				
E.9 IS Governance				5							4												

Table 6: ICT Profiles – e-Competences Matrix (based upon European e-Competence Framework version 3.0. Updating details made from e-CF v 2.0 to v 3.0 marked in grey)

The table shows that some e-Competences are only applied to one single Profile, others appear more often, two competences are not assigned to any Profile. This follows the "skeleton" principle that "Less is more"; resulting in only the most relevant e-competences being assigned to Profiles. Some e-Competences are relevant to a large number of Profiles but not at the level of this European CWA that focuses upon core competences that clearly differentiate one profile from another. Detailed examples for this are explained in chapter 2.3.

In consequence, the above table 6 does not indicate the frequency or commonality of how individual e-Competences are deployed in daily business practise.

3.6. ICT Profiles – Deliverables Matrix

Each ICT Profile is specified by a maximum of five Deliverables from the Deliverables list illustrated in Chapter 2.2. The following Matrix provides a one-sight overview of which Deliverables have been assigned to each Profile in terms of Accountable (A), Responsible (R) or Contributor (C).

	Profile titles A-Z / Deliverables A-Z	Account Manager	Business Analyst	Business Information Manager	Chief Information Officer (CIO)	Database Administrator	Developer	Digital Media Specialist	Enterprise Architect	ICT Consultant	ICT Operations Manager	ICT Security Manager	ICT Security Specialist	ICT Trainer	Network Specialist	Project Manager	Quality Assurance Manager	Service Desk Agent	Service Manager	Systems Administrator	Systems Analyst	Systems Architect	Technical Specialist	Test Specialist
1	Audit Report																A							
2	Budget Plan		C								A													
3	Business Case		R																					
4	Business Plan			C					C															
5	Business Process Definition								C															
6	Business Relationship	R	R																					
7	Business Requirements		A							R														
8	Course of Instruction													A										
9	Data Model					A																		
10	Development Process																				C			
11	Eco-Responsibilities Referential										C													
12	Enterprise Architecture								A															
13	First Level Support (WF)																	R						
14	Hardware Component						A																	
15	HR Development Plan										R													
16	ICT Model																				C			
17	ICT Process Definition																				C			
18	ICT Quality Policy																C							
19	ICT Strategy and Implementation		C		A							C												
20	ICT Training Policy													C										
21	Information Security Policy											A	C				C							
22	Information Security Strategy				R							R												
23	Integrated Solution															C					R	A		C
24	IS Department & budget				A																			
25	Knowledge or Information Base								C	R		R	A											
26	Multimedia Component							A																

	Profile titles A-Z / Deliverables A-Z	Account Manager	Business Analyst	Business Information Manager	Chief Information Officer (CIO)	Database Administrator	Developer	Digital Media Specialist	Enterprise Architect	ICT Consultant	ICT Operations Manager	ICT Security Manager	ICT Security Specialist	ICT Trainer	Network Specialist	Project Manager	Quality Assurance Manager	Service Desk Agent	Service Manager	Systems Administrator	Systems Analyst	Systems Architect	Technical Specialist	Test Specialist
27	New technology integration proposal								C	A		C	R									R		
28	Production Forecast	C																						
29	Project Plan									C						A								
30	Project Portfolio			A	R																			
31	Quality Assurance																C							
32	Quality Performance Indicators																R							
33	Quality Plan															C			C					
34	Risk Management Plan												C											
35	Risk Management Policy				C							C	C				C							
36	Sale	A																						
37	Sales Forecast	C																						
38	Service Level Agreement				R														R					
39	Software Component						A																	
40	Solution Documentation						R									R							C	C
	Network														R									
41	Solution in Operation							C											A	R				
	Network														R									
	Systems					R	C																	
42	Solution Specification			R		R															C	A		
	Network														R									
43	Solved Incident					C									C			C	R	C			A	
44	SW Design Description						C																	
45	SW Needs Assessment																				A			
46	Technical Proposal	C																	C		R			
47	Test Plan																							R
48	Test Procedures					C	C																	R
49	Test Result																							R
50	Training Program										R			C										
51	Up-to-date Solution																						R	
52	Validated Solution															A								C

Table 7: ICT Profiles – Deliverables Matrix

The table shows that some deliverables feature in a large number of Profiles while for a large number of deliverables, no one is accountable or responsible. Even if the deliverable is identified as being an important attribute of Profiles definition, this doesn't necessarily mean that for the main goal of the 23 ICT Professional Profiles' comprehensive description, all deliverables have to be allocated at the accountable and/ or responsible level.

The deliverables in this CWA have been identified and used as tools; they do not represent a structure which can be coherently mapped against each Profile. The deliverables were identified and used within the 23 European ICT Professional Profiles, to make them more understandable and comprehensive for ICT experts and non-experts alike.

4. Application guide: Create your own ICT Profiles Generation 3

4.1. Some basic observations

It is obvious that for a European set of ICT Professional Profiles to add value they must be easily adaptable to the employment environment. They are not useful if, on the contrary, the employer has to change practices to meet profile descriptions.

The 23 European ICT Profiles have therefore been created in a generic and simple way, in order to enable reference and use by all types of ICT organisations, whatever their size, their structure and their "make or buy" policy. In consequence, the European ICT Profiles provide high level "ICT Profile skeletons"; easy to break down to the next context specific application level, in particular Job Position descriptions.

If you ask one hundred knowledgeable managers to describe a particular job role you will get one hundred different responses.

That means that, however well formulated; no single European ICT Profile will fulfil the needs of every situation. In daily practise, one specific ICT Profile may be divided and performed by several people. Conversely one person's job may combine components of several ICT Profiles proposed at the European level. To meet this challenge it is now appropriate that users can adapt Profiles according to specific needs. In our human genome analogy this is the third Generation development built from the 23 parent profiles in Generation 2.

The European ICT Profiles, clearly related to the European e-Competence Framework and to workplace deliverables, provide a consistent input and basis to create further and more detailed Profiles. Structured in six families, the defined ICT Profiles provide the genesis for new profiles designed to meet user requirements.

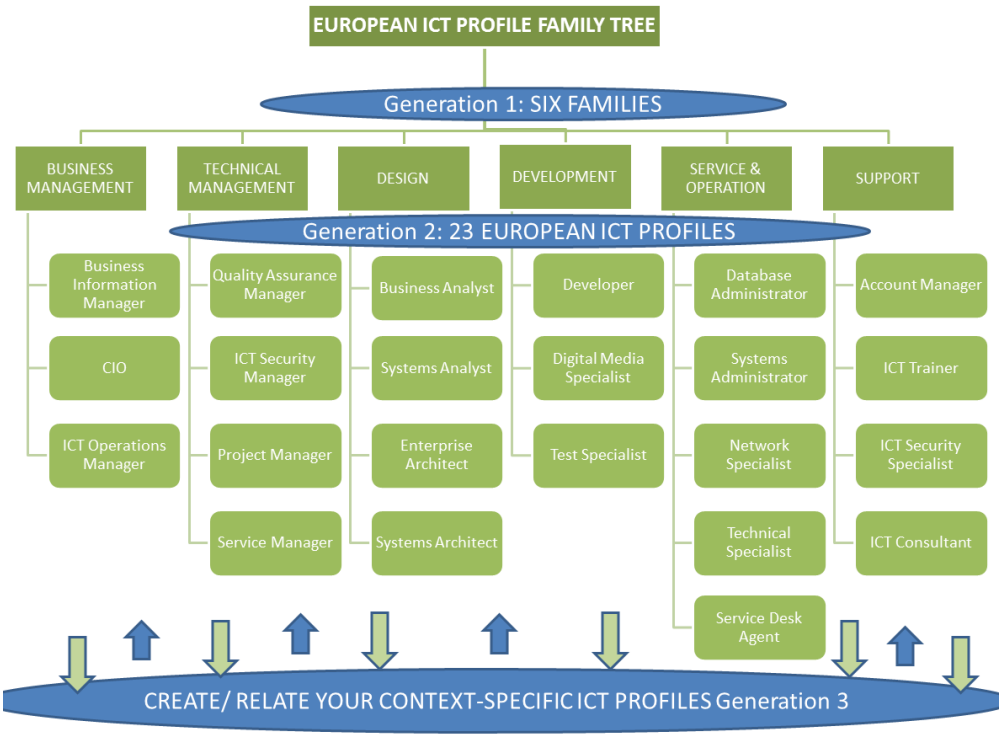


Figure 16: European ICT Family Tree – Create your own Generation 3

The following chapters provide some specific guidance on how to construct and/ or relate Generation 3 profiles.

4.2. Create new – How to adapt the template

For optimum profile assignment and development, carefully check the 23 European ICT Profiles as they are provided in Generation 2. During this exercise, it will be useful to recall some basic aspects of the new profile context:

- Note the size of the organization.
- Take into account company policies, such as make or buy, security, customs/export restrictions, legal issues, HR and ethics.

Complete the template as illustrated below to adapt the existing European ICT Profiles for reference to local specific needs. This leads to a new Generation 3 ICT Profile, a job Profile corresponding to the needs of your specific environment. To allocate your local Profiles to the European ICT family and to adapt the template appropriately several actions are relevant:

1. Select best fit ICT Profile/s (One/ Part of one/ Set of several)
2. Adapt (Title/ Summary Statement/ Mission)

3. Keep or Add (Deliverables/ Tasks/ Competences/ Align Proficiency Levels)
4. Apply the appropriate use of the acronyms, IS and ICT, as described in chapter 3.2.
5. Add missing items according to your organizational needs, (e.g. Experiences (Tools, Methods)/ Attitudes (essential)/ Qualification/ Certification(s)/ Accreditation(s)/ Reporting line)

The following template provides the necessary practical support and instructions for Profile adaptation.

PROFILE TITLE ***Reuse or define***	**Gives a commonly used name to a profile.** Before starting check that there is strong distinction between new proposed profile with the 2nd generation profiles. If not use existing title and modify remainder of profile. If significantly different create a new title that does not conflict or completely overlap with existing.
SUMMARY STATEMENT ***Adapt***	**Indicates the main purpose of the profile.** The purpose is to present a brief, concise understanding of the new specified ICT Profile. It should be understandable by ICT professionals, ICT managers, Human Resource personnel and education and training institutions. The structure should consist of a short sentence (up to approximately 15 words). It should not repeat the entire ICT Profile name. It should provide a statement of the job's main activity. *Note:* Ensure that the statement discriminates between other profiles.
MISSION ***Adapt***	**Describes the rationale of the profile.** The purpose is to specify the designated job role defined in the ICT Profile. It should provide the performance context of the job within an organisational structure. The following verbs *may be* used within the description or at least for structuring the thinking about how to express the mission: Guarantees, Ensures, Contributes
DELIVERABLES ***Keep or add***	**Illuminates the ICT Profiles and explains relevance including the perspective from a non-ICT point of view.**

	Also add the dimension of responsible following the RACI model. Select only the most important deliverables*, which help to illustrate the ICT Profile, e.g. not more than 6 in total (A,R,C together, not all three aspects have to be necessarily covered) *Note:* A cross check may be useful to ensure deliverables do not overlap. Also it may help to identify the existence of an existing profile that could be used rather than creating a new one. * see list of deliverables in table X		
	Accountable (A)	**Responsible (R)**	**Contributor (C)**
	…	…	…
MAIN TASKS ***Keep or add***	**A list of typical tasks to be performed by the profile.** A task is an action taken to achieve a result within a broadly defined context. Tasks may be associated with deadlines, resources, goals, specifications and/or the expected results; however this depends upon the context of the task and they may be omitted, however the action must always be described. A task is defined by a short description using a verb and the objective or goal of the action. List no more than ten. Each task should contribute in defining a Profile.		
e-CF COMPETENCES ***Keep or add***	**A list of necessary competences (from the e-CF) to carry out the mission**. Level assignment is important. Can be (usually) 1 or (maximum) 2 levels Must include 1 up to 5 competences. SELECTION CRITERIA: A competence is a consequence of the above-derived Profile definition and helps to separate profiles one from another.		
SKILLS/ KNOWLEDGE ***Not part of generation 2***	**A list of necessary knowledge and skills.** Some examples for inspiration are provided in European Competence Framework Dimension 4.		
Key Performance Indicators (KPIs) ***Derive from KPI area***	**Must relate to the key deliverables in order to measure them.** In all 23 ICT Profiles KPI areas are provided, reflecting a long-term point of view of good role performance. The KPI areas give an inspiration to enable development of specific KPI's for specific job descriptions. Such KPI measurements can be more short-term oriented. To facilitate KPI definition, in table 9 for each KPI area specific KPI examples are provided as possible optional and non-exhaustive examples. The meaningful KPI's have to be identified in each context by the following rules:		

	• Use KPI's examples which are strictly connected to the profile domain • Use KPI's examples which are strictly connected to the KPI area • Use KPI's examples which inspire a simple mode to measure them (bad examples: ease in navigation, user satisfaction)
QUALIFICATION/ CERTIFICATIONS ***Not part of generation 2***	
ATTITUDES (non ICT) ***Not part of generation 2***	**Up to 5.**
RELATIONSHIPS/ REPORTING LINE ***Not part of geneartion 2***	**Reports to… Interacts with…**

Table 8: The European Profile Template for adaptation at Generation 3

The red items are not part of European ICT Profiles Generation 2. They provide examples for inspiration on how the generic European ICT Profiles can be augmented at Generation 3, with more context specific descriptions and elements, in order to fit to the needs of a specific situation.

Identify Key Performance Indicators (KPI's)

As Key Performance Indicators strongly vary with the working context and the business processes of an ICT organization, it is not possible to provide KPI's, for reference and EU-wide use, in the generation 2 ICT Profile descriptions.

Nevertheless to support the context-appropriate specification of KPI's, one generic KPI area has been identified for each Profile. From these KPI areas, specific KPI's can be derived that are valid and applicable to a specific business context.

The following table provides KPI examples. The examples are given for inspiration and are not intended to be prescriptive or exhaustive.

EU ICT Profile	KPI area	Specific KPI examples for inspiration at Generation 3
Account Manager	Sales quota achievement	Volume, revenues, profit
Business Analyst	Adequacy of the business needs in response to the business plan	Pertinence of requirements in terms of ICT capabilities (technologies, budget, timing …)
Business Information Manager	Business User requirement satisfaction	Requirements fulfilled and deployed in term of: Number, Time, Quality
Chief Information Officer (CIO)	Overall added value, efficiency and effectiveness of the information system	Respect of the ICT budget, ROI on ICT investments
Database Administrator	Database in operation	In coherence with SLA (Service Level Agreement) : availability, confidentiality, performance
Developer	Fully functional ICT components	Percentage of failed Released Components Acceptance Tests, Components delivered on time
Digital Media Specialist	Fully functional web component	Percentage of failed Released Components Acceptance Tests, Components delivered in time
Enterprise Architect	Quality and consistency of enterprise architecture aligned with business objectives	Pertinence of enterprise architecture between “as is is” and “to be”
ICT Consultant	Impact of the advices in new technologies implementation	Number of projects implementing new technologies
ICT Operations Manager	Optimization of overall resources	Customer satisfaction, in coherence with SLA: operation performance indicators
ICT Security Manager	Security Policy effectiveness	Cost/Risk ratio, final impact of security incidents
ICT Security Specialist	Security measures in place	Number of major Security Incidents, Number of implemented Preventive Measures
ICT Trainer	Impact of the training	Satisfaction of trainees, fulfillment of the learning outcomes,
Network Specialist	Level of Network Services Quality	In coherence with SLA: availability, performance, scalability
Project Manager	Project scope achievement	Respect of specifications, costs, delivery time, clients satisfaction, leadership and management quality

EU ICT Profile	KPI area	Specific KPI examples for inspiration at Generation 3
Quality Assurance Manager	Achievement of company quality goals	Customer satisfaction , operation faults, delivery time, budget compliance
Service Desk Agent	Responsiveness and accuracy of the solution provision, specific to the problem	Time and quality of solution provision
Service Manager	Fulfilment of Service Levels	SLA indicators, Usefulness and pertinence of SLA indicators
Systems Administrator	Systems in operation	In coherence with SLA: availability, performance
Systems Analyst	Fully functional ICT applications	Functionalities design in term of: Requirements matching, Number, Time, Quality
Systems Architect	Effectiveness and efficiency of solution implementation	System architecture indicators: TCO (Total Cost of Ownership), scalability, maintainability
Technical Specialist	Efficiency and speed of problem resolution	Problem resolution time, number of unresolved problems
Test Specialist	Consistency of the test plan according to the quality plan of the project	Number of anomalies delivered/ Function Point; Anomaly persistence in development phases before removing

Table 9: The 23 European ICT Profiles with KPI areas and possible KPI examples in your own Profile Generation 3

4.3. Communicate existing – How to relate existing profiles

All 23 European ICT Profiles are created in a generic and straightforward way, in order to enable reference by all types of ICT organisations. In consequence, the European ICT Profiles provide high level "ICT Profile skeletons"; easy to break down into a context specific applications or to assign existing profiles, systems or frameworks. So, it is possible to use the European ICT Profiles as a reference or – like the European e-Competence Framework – as a common language.

Firstly, it is very helpful to find matching dimensions or categories in the descriptions to compare profiles. The most important task to assign profiles to the European ICT Profiles is to find an anchor, one or more categories where the contents are similar in both groups of profiles. The descriptions of the European ICT Profiles contain title, summary statement, mission, deliverables, main tasks, e-CF competences assigned and KPI areas. Contrary to current opinion, the title of a profile is **not** the most

significant information. In most cases, **the summary, the mission statement and the main tasks** are the most effective for an assignment.

For example: the German AITTS Profiles are structured very similar to the European ICT Profiles. An IT specialist profile of the Advanced IT Training System always contains a title, brief description, work area and tasks, profile-typical work processes and characteristic areas of competency. So it is possible to see the European and the German Profiles in contrast to each other:

IT specialist from AITTS	European ICT Profile
Title: IT Security Coordinator	**Title:** ICT Security Specialist
Brief description: IT Security Coordinators design appropriate IT security solutions based on valid technical standards, laws, and regulations, support their implementation, and continually adapt them to current situations.	**Summary statement:** Ensures the implementation of the organizations security policy.
Work area and tasks: IT Security Coordinators consult and support management, partners, and customers with regard to IT security. They design appropriate security solutions based on the valid technical standards, laws, and other regulations, and support their implementation. ...	**Mission:** Proposes and implements necessary security updates. Advises, supports, informs and provides training and security awareness. …
Profile-typical work processes: Maintains IT Security Prepares IT Security policy and solutions Implements IT Security solutions …	**Main tasks:** Ensures security and appropriate use of ICT resources Evaluates risks, threats and consequences Provides security training and education ...

Table 10: National and European ICT Profile relating - Example 1 AITTS/ IT Security Coordinator – EU/ ICT Security Specialist

If your profile(s) include(s) competences and/or assignments to the e-Competence Framework, it could be also helpful to compare competence patterns:

IT specialist from AITTS	European ICT Profile
Title: Administrator	**Title:** Technical Specialist
Related e-CF competences: C.1 User Support (level 2-3) C.2 Change Support (level 2-3) C.3 Service Delivery (level 2) C.4 Problem Management (level 3) E.2 Project and Portfolio Management (level 2) E.8 Information security Management (level 2)	**e-CF competences assigned:** C.2 Change Support (level 3) C.3 Service Delivery (level 2) C.4 Problem Management (level 3)

Table 11: National and European ICT Profile relating - Example 2 AITTS/ Administrator – EU/ Technical Specialist

Other possible starting points to assign profiles to the European ICT Profiles are

- the Deliverables (see Chapter 2.2.): which Profiles reflect which results?
- the ICT Profiles overview scheme (see Chapter 3.3.): which levels of autonomy and complexity are addressed in the field of business and/or technology?
- the ICT Profiles families (see chapter 3.1.): in which processes or families profiles are located?

It depends on the context of profiles which kind and degree of similarity to the European ICT Profiles can be found. In all likelihood local profiles are likely to be more detailed than the European "ICT Profile skeletons". In some cases profiles might contain more than one of the European ICT Profiles, in others it is possible that a European ICT Profile contains two local profiles.

The following example, one of many, which has been drawn from The International Webmasters Association (IWA), demonstrates how linkage between the European ICT Professional skeleton profiles from this CWA and more tailored profiles can be established and exploited.

European ICT Professional Profiles (Generation 2)	IWA Professional Profiles for the Web (Generation 3)
Project Manager	Web Project Manager
Account Manager	Account
Digital Media Specialist	User Experience Designer
Digital Media Specialist	Search Engine Optimizer
Digital Media Specialist and/ or Developer	Front-End Web Developer
Digital Media Specialist	Web Content Manager
Database Administrator	DB Administrator
Systems Administrator	Web Server Administrator

Table 11: Another Example of Profiles relating – IWA Web Skills Profiles : Professional Profiles for the Web

How existing Profiles are allocated within Generation 3, following the logic of the European ICT Family tree, depends on many influences including, relationships to the business, to the size of the company and to the division of work.

Relating local profiles to the European ICT Family Tree will support the use of a common European language for ICT Profile comparisons and increase transparency of local frameworks within an international environment.

5. Glossary

Term	Definition/ description	see also (Glossary)	see also (Chapter)
Accountable	To be Accountable is to be the only "owner" of the work. The owner must sign off or approve when the task, objective or decision is complete. He/she must make sure that responsibilities are assigned for all related activities. There is only one owner accountable for each deliverable. The term "accountability" is also used as generic term, without relationship to the RACI Matrix.	Contribute Deliverable RACI Matrix Responsible	2.2. 2.3. 3.6.
Activities	A very generic term, similar to operations or workings		2.3.
Attitude	Attitude, in the context of the European e-Competence Framework, means the "cognitive and relational capacity" (e.g. analysis capacity, synthesis capacity, flexibility, pragmatism...). If skills and knowledge are the components of competences, attitudes are the glue, which keep them together.	Competence	1.3. 4.2.
Autonomy	In the European e-Competence Framework, Autonomy ranges between "Responding to instructions" and "Making personal choices".	Complexity	3.3.
Contribute	Contributors provide input before work can be completed and signed-off on. They are "in the loop" and active participants. Several people can be contributors to one deliverable.	Accountable Deliverable RACI Matrix Responsible	2.2. 2.3. 2.6.
Competence	In the European e-Competence Framework: Demonstrated ability to apply knowledge, skills and attitudes to achieve observable results.	Attitude Knowledge Skills Job Task	1.3.
Complexity	In the European e-Competence Framework: Context complexity ranges between "Structured – Predictable" situations and "Unpredictable – Unstructured" situations.	Autonomy	3.3.
Deliverable	A predefined result of a task in a working context. Deliverables are observable results, that may be tangible or intangible.	Accountable Contribute Responsible Task	2.2. 2.3. 2.6.
Function	A function in an organisation is the same as a position (see Position)	Position	4.1. 4.2.

Term	Definition/ description	see also (Glossary)	see also (Chapter)
ICT	Information and Communication Technology is an all embracing term covering computing, information storage and telecommunications concepts and applications. The term ICT is commonly used by policy makers	IS	3.2
IS	Information System(s) is normally applied to computing and data systems, bringing together the science of computing with the storage and access of information. In common use it does not include telecommunications.	ICT	3.2
Job	Jobs provide a bridge between enterprises and individuals. Jobs reflect employment conditions in the labour market In addition jobs may indicate requirements, results, tasks, competences and required qualifications. Jobs brings together a number of perspectives and are defined by organizations .Jobs are identified or labeled by a single or few word description, for example, Programmer, Service Manager or Chief Information Officer.	Competence Occupation Position Profession Role Task	4.1. 4.2.
Job Descriptions	Job descriptions provide more detailed and specific information about a job and in this way qualify the single or short word description	Job	4.1. 4.2.
Key Performance Indicator (KPI)	Tasks that have been agreed between an employee and line manager/ HR with an expectation that they will be completed satisfactorily in the time agreed or as an ongoing task.	Job	2.3. 4.2.
Knowledge	In the European e-Competence Framework (and the EQF): Knowledge represents the "set of know-what" (e.g. programming languages, design tools...) and can be described by operational descriptions.	Competence	1.2. 1.3.
Occupation	Refers to a job/employment/career and is often the title given to a work activity	Job	4.1. 4.2.
Organisation	A structural framework, which establishes the basis for determining the responsibility, authority, and relationships of the members of the enterprise. (How the resources are arranged to meet objectives). Organizational design should address function/position, coordination, authority, responsibility and accountability.	Position RACI Matrix	2.2.

Term	Definition/ description	see also (Glossary)	see also (Chapter)
Position	A position is an assigned group of duties and responsibilities, temporary or permanent, requiring the full-time or part-time employment of one person. It may be occupied or vacant. Could be also named as function or "job/job profile".	Job Organisation	4.1. 4.2.
Profession	A specialist role, supported by in depth training and education, culminating in a license to operate. Sometimes used generically but ambiguously as a non-management job role.	Job	4.1. 4.2.
Professional	A person who is engaged in a Profession. Also used in a general context to describe the positive attributes of a capable and ethical employee.	Job	
Profile	Job profiles add to job descriptions by including additional job related components such as mission, main tasks, accountability, requested deliverables, KPI's etc. In this context a job profile provides a comprehensive description written and formal of a job**.**	Job	all
RACI	A RACI (Responsible – Accountable – Contribute/Consulted - Informed) Matrix describes the participation by various roles in completing deliverables for a project or business process. (Source: PMBOK Guide*)*	Accountable Contribute Deliverable Responsible Role	2.2. 2.3. 2.6.
Responsible	The "Doers" of the work are responsible for the work. They must fulfil the task or objective or make the decision. Several people can be jointly responsible for one deliverable. The terms" responsible" and "responsibility" are also used as generic terms, without relationship to the RACI Matrix.	Accountable Deliverable RACI Matrix Contribute	2.2. 2.3. 2.6.
Role	Normally expressed as a role profile: a specialised combination of skills or competences with specific responsibilities to fulfil a specific type of tasks and to produce pre-defined deliverables, mostly used in engineering, especially SW-engineering models.	Deliverables Job Profile Task	all

Term	Definition/ description	see also (Glossary)	see also (Chapter)
Skill	In the European e-Competence Framework: The item skill is defined as "ability to carry out managerial or technical tasks". Managerial and technical skills are the components of competences and specify some core abilities which form a competence.	Competence	1.2. 1.3.
Task	A distinct work activity (normally partially predefined) which has an identifiable beginning and end and observable results.	Deliverable Job Role	2.3. 4.2.

6. References

- CEN, European Committee for Standardization: *e-CF into SMEs (CEN CWA 16367)*, Brussels 2011
- CEN, European Committee for Standardization: *e-Certification in action (CEN CWA xxxxx),* Brussels 2011
- CEN, European Committee for Standardization: *European e-Competence Framework (CEN CWA* 16234-1*). European e-Competence Framework Version 2.0.*, Brussels 2010
- CEN, European Committee for Standardization, *European e-Competence Framework (CEN CWA* 16234-2*). User guidelines for the application of the European e-Competence Framework 2.0*. Brussels 2010
- CEN, European Committee for Standardization, *European e-Competence Framework (CEN CWA* 16234-3*). Building the e-CF – a combination of sound methodology and expert contribution*. Brussels 2010
- CEN, European Committee for Standardization, Interoperability of European e-Career Services *(CEN CWA* 16053). Brussels 2009
- CEN, European Committee for Standardization*: European ICT Skills Meta-Framework – State-of-the-Art review, clarification of the realities ,and recommendations for next steps (CEN Workshop Agreement CWA 15515)*. Brussels 2005

- IG Metall, *Towards a European ICT sector Framework. Addressing ICT competence demand and qualification supply in Europe. Trends, products and multi-stakeholder activities.* Frankfurt am Main 2008
- Interim report "Towards European ICT (e-Job) Profiles", April 2011
- Office for Official Publications of the European Communities: *The European Qualifications Framework for LifeLong Learning*. Luxemburg 2008
- The European e-Competence Framework in the Internet: www.ecompetences.eu

ICT Profile Framework sources used for profile identification exercise (see chapter 2.1.)

- Advanced IT Training System
  http://www.cert-it.com/en/it-specialists/the-14-profiles/
- Airbus, No public access
- Australian Computer Society
  http://www.acs.org.au/ictcareers/index.cfm?action=list&sgrID=200707131235515720
- BringITon
  http://bringitonni.info/job-roles/
- EUCIP
  http://www.cepis.org/index.jsp?p=1116&n=1120
- Information Technology Association in Jordan (Int@j)
  http://www.moict.gov.jo/en_index.aspx
- IWA, International Webmasters Association: IWA Web Skills Profiles. Professional Profiles for the Web
  http://iwanet.org/en/about/web-skills-profiles
- Microsoft Net
  http://www.microsoft.com/learning/career/de/de/ImportedContent/learning/en/us/start-career-student.aspx
- Typical SME, from Germany, No public access
- UK Careers Advice
  http://www.prospects.ac.uk/graduate_job_search_results.htm?t=srs&criteria.keyWord=&&criteria.pageSize=20&sortBy=dp&display=full&addfilter=69

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