EN 16234-1 e-Competence Framework (e-CF)

A common European Framework for ICT Professionals in all sectors
New version 2019 developed under CEN TC428

Jutta Breyer, EN16234-1 „e-CF“ expert team leader
Mary Cleary, Chair CEN TC 428 „ICT Professionalism and digital competences“
e-CF CONTEXTUAL FACTS

• e-CF legal Ownership and IPR: CEN, The European Committee for Standardization and its national member bodies (33 in total)

• Since 2016, e-CF is published by CEN as the official European Standard for IT Professional competence

• This standard is published in four parts:
  
  EN16234-1 – FRAMEWORK
  TR16234-2 – USER GUIDE
  TR16234-3 – METHODOLOGY
  TR16234-4 – CASE STUDIES

  EN= European Norm
  TR = Technical Report

• Maintenance context: CEN Technical Committee (TC) 428 „ICT Professionalism and digital competences“

• e-CF technical update in 2018

  EN16234-1:2019 “e-CF“ NEW VERSION WILL BE PUBLISHED BY CEN IN DECEMBER
European policy context

• The e-CF standard is a major contribution to the European Union’s Skills agenda and the Digital Skills and Jobs Coalition

• Prominent positioning within the European ICT Standardization Rolling Plan

• A key pillar of IT Professionalism for Europe
EN 16234-1 e-CF basic principles

EU shared definition of competence

A demonstrated ability to apply knowledge, skills and attitudes for achieving observable results

Framework in 4 dimensions

Dim 1: 5 e-CF areas
Dim 2: 41 competences
Dim 3: 5 e-CF levels
Dim 4: knowledge and skills examples

+ NEW: 7 Transversal Aspects (TA) relevant to any IT Professional competence performance
## Dimension 1: e-CF area

### Dimension 2: Title + generic description

A. **PLAN**

#### A.2. Service Level Management

Defines, validates and makes applicable service level agreements (SLAs) and underpinning contracts tailored to services offered. Negotiates service performance levels taking into account the needs and capacity of stakeholders and business.

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
<th>Level 5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>–</td>
<td>Ensures the content of the SLA.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>–</td>
<td>Negotiates revision of SLAs, in accordance with the overall objectives.</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ensures the achievement of planned results.</td>
<td></td>
</tr>
</tbody>
</table>

#### Dimension 3: level descriptors

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>–</td>
<td>–</td>
<td>Ensures the content of the SLA.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Negotiates revision of SLAs, in accordance with the overall objectives.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ensures the achievement of planned results.</td>
<td></td>
</tr>
</tbody>
</table>

#### Dimension 4: knowledge and skills examples

<table>
<thead>
<tr>
<th>K1</th>
<th>SLA documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>K2</td>
<td>how to compare and interpret management data</td>
</tr>
<tr>
<td>K3</td>
<td>the elements forming the metrics of service level agreements</td>
</tr>
<tr>
<td>K4</td>
<td>how service delivery infrastructures work</td>
</tr>
<tr>
<td>K5</td>
<td>impact of service level non-compliance on business performance</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>S1</th>
<th>analyse service provision records</th>
</tr>
</thead>
<tbody>
<tr>
<td>S2</td>
<td>evaluate service provision against SLA</td>
</tr>
<tr>
<td>S3</td>
<td>negotiate realistic service level targets</td>
</tr>
<tr>
<td>S4</td>
<td>use relevant quality management techniques</td>
</tr>
<tr>
<td>S5</td>
<td>anticipate and mitigate against potential service disruptions</td>
</tr>
</tbody>
</table>

### Dimension 4: Knowledge examples

- **Knows**/**aware of**
- **familiar with**

### Dimension 4: Skills examples

- **Is able to**

**NEW:** potentially complemented by Transversal Aspects (TA) relevant to performance of this competence: T1 Accessibility, T2 Ethics, T3 ICT legal issues, T4 Privacy, ...
EN16234-1:2019

### e-CF NEW VERSION AT A GLANCE

- **existing Competences updated**
  - in dimensions 2, 3 and 4
  - continued relevance in language
  - revised and/ or enlarged in content where meaningful

- **3 NEW Competences**
  - A.10. User Experience
  - C.5. Systems Management
  - D.7 Data Science and Analytics

- **1 merged Sales Competence**
  - (from previous 3)
  - D.5. Sales Development

- **NEW: 7 Transversal Aspects**

  + **NEW: 7 e-CF TRANSVERSAL ASPECTS**

  *Being aware of and, if applicable, behaving proactively in*

  - T1 Accessibility, T2 Ethics, T3 ICT legal issues, T4 Privacy, T5 Security, T6 Sustainability, T7 Usability
Transversal Aspects

EN 16234-1:2019 Chapters 5.6. and 8.0: Transversal Aspects represent cross-cutting topics that are relevant to ICT Professional performance in all competences defined by this standard.

Each transversal aspect is provided by a title and a generic description that may be applied, dependant upon context by, ‘being aware of’ or ‘behaving proactively’ with regard to the transversal aspect description. Awareness and proactivity influence attitude (3.6) linking with knowledge and skills as applied in the definition of competence in this standard (3.4).

EXAMPLE

T5 Security
• This topic incorporates information security which is the practice of defending information from unauthorized access, use, disclosure, disruption, modification, perusal, inspection, recording or destruction. It also encompasses IT security designed to prevent unauthorized access to computers, networks and data. The overarching goal of IT security is to control access and maintain the integrity and confidentiality of sensitive information without inhibiting access by authorised users.

Being aware of and, if applicable, behaving proactively in
T1 Accessibility, T2 Ethics, T3 ICT legal issues, T4 Privacy, T5 Security, T6 Sustainability, T7 Usability
A European Norm looks like this – COVER PAGE AND TABLE OF CONTENT „e-CF“ EN 16234-1 NEW VERSION

CEN/TC 428
Date: 2018-12
EN 16234-1:2019
Secretariat: UNI

e-Competence Framework (e-CF) – A common European Framework for ICT Professionals in all sectors

Part 1: Framework

ICS: 35.020

Contents

European foreword............................................................................................................................................. 3
Introduction...................................................................................................................................................... 5
1 Scope .......................................................................................................................................................... 7
2 Normative references .................................................................................................................................. 7
3 Terms and definitions .................................................................................................................................. 7
4 Symbols and abbreviated terms .................................................................................................................. 9
5 Main principles .......................................................................................................................................... 10
5.1 General .................................................................................................................................................. 10
5.2 Dimension 1: Five e-Competence areas ............................................................................................... 10
5.3 Dimension 2: e-Competences .............................................................................................................. 10
5.4 Dimension 3: Five work proficiency levels .......................................................................................... 11
5.5 Dimension 4: Knowledge and skills ..................................................................................................... 11
5.6 Transversal Aspects ............................................................................................................................... 11
5.7 Embedded in Dimension 2, 3, 4 and in transversal aspects: Attitudes .................................................. 12
6 Objective .................................................................................................................................................... 12
7 e-Competence Framework overview ........................................................................................................ 13
8 e-Competence Framework full description ............................................................................................ 14
8.1 Transversal Aspects of the e-Competence Framework ....................................................................... 14
8.2 A. PLAN: e-Competences A.1 to A.11 .................................................................................................. 17
8.3 B. BUILD: e-Competences B.1 to B.6 ................................................................................................. 27
8.4 C. RUN: e-Competences C.1 to C.5 ..................................................................................................... 33
8.5 D. ENABLE: e-Competences D.1 to D.11 ......................................................................................... 38
8.6 E. MANAGE: e-Competences E.1 to E.9 ............................................................................................. 49
Annex A (normative) Level parameters of this standard .............................................................................. 50
Annex B (informative) Positioning this standard to other structures and frameworks .................................. 59
B.1 Introduction .......................................................................................................................................... 59
B.2 European Qualifications Framework (EQF) ....................................................................................... 60
B.3 ESCO .................................................................................................................................................... 63
B.4 DigComp .............................................................................................................................................. 68
B.5 P21’s Framework for 21st Century Learning ....................................................................................... 70
B.6 SPIA ..................................................................................................................................................... 73
B.7 European ICT Professional Role Profiles ........................................................................................... 79
B.8 Related ISO standards and standardization initiatives ........................................................................ 86
Bibliography .................................................................................................................................................. 92
### A.10. User Experience

Appreciates and applies the foundational principles of human-computer-interaction to create digital products and services that are intuitive, easy to use, safe and efficient. Understands users' needs and goals, applies understanding of user behaviour to develop alternative options and functions, of the digital product, to create a seamless user experience.

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
<th>Level 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applies digital interfaces options (web, mobile, IoT) and guidelines to achieve usability for all.</td>
<td>Establishes and cultivates relationships with customers and users to understand their tasks, needs and goals. Uses specialist methods to obtain a wide range of significant user engagement.</td>
<td>Provides expert guidance to ensure continuous improvement and establish a successful omni-channel user experience.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Dimension 4**

- **K1** design principles and tools that create a good user experience
- **K2** user-centred interface design
- **K3** emerging technologies such as new interfaces and devices, cloud computing, robotics, IoT, conversational interfaces, cognitive computing, virtual reality, augmented reality, machine learning, artificial intelligence
- **K4** gaming context and techniques
- **K5** principles, standards, methods and frameworks related to ergonomics and accessibility
- **K6** rapid prototyping, agile development
- **K7** return on investment of user experience
- **K8** service design techniques (e.g. net promoter score, usability testing, user story and design thinking
- **K9** Universal Design

**Skills examples**

- S1 design the digital products to support user goals (Interaction Design)
- S2 communicate the use and function of a digital tool through mock-up design and interactive prototypes to ensure that users can effectively interact with it
- S3 engage user research to create personas and user journeys, including users with special needs (e.g. with disabilities)
- S4 organise relevant information in a way that makes sense to users
- S5 measure User Experience and empathise with user requirements
- S6 ensure that information for user is clear, complete and correct and that it is provided in suitable place (application or documentation portal) and format (text, image, video, chatbox, multi-media, etc.)
EN16234-1:2019 „e-CF“
Annex A (Normative)

<table>
<thead>
<tr>
<th>Levels</th>
<th>e-CF Level descriptor</th>
<th>Influence</th>
<th>Complexity</th>
<th>Autonomy</th>
<th>Behaviour</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Overall accountability and responsibility; recognised inside and outside the organisation for innovative solutions and for shaping the future using outstanding leading edge thinking and knowledge.</td>
<td>Determined strategy</td>
<td>Unpredictable - unstructured</td>
<td>Demonstrates substantial leadership and independence in contexts which are novel requiring the solving of issues that involve many interacting factors.</td>
<td>Conceiving, transforming, innovating, finding creative solutions by application of a wide range of technical and/or management principles.</td>
</tr>
<tr>
<td>4</td>
<td>Extensive scope of responsibilities deploying specialised integration capability in complex environments, full responsibility for strategic development of staff working in unfamiliar and unpredictable situations.</td>
<td>Provides executive leadership</td>
<td></td>
<td>Demonstrates leadership and innovation in unfamiliar, complex and unpredictable environments. Addresses issues involving many interacting factors.</td>
<td>Planning, making decisions, supervising, building teams, forming people, reviewing performance, finding creative solutions by application of specific technical or business knowledge / skills.</td>
</tr>
<tr>
<td>3</td>
<td>Respected for innovative methods and use of initiative in specific technical or business areas, providing leadership and taking responsibility for team performances and development in unpredictable environments.</td>
<td>Consults</td>
<td>Structured - unpredictable</td>
<td>Works independently to resolve interactive problems and addresses complex issues. Has a positive effect on team performance.</td>
<td>Designing, managing, surveying, evaluating, improving, finding non standard solutions.</td>
</tr>
<tr>
<td>2</td>
<td>Operates with capability and independence in specified boundaries and may supervise others in this environment; conceptual and abstract model building using creative thinking; uses theoretical knowledge and practical skills to solve complex problems within a predictable and sometimes unpredictable context.</td>
<td>Applies and adapts</td>
<td>Structured - predictable</td>
<td>Works under general guidance in an environment where unpredictable change occurs. Independently resolves interactive issues which arise from project activities.</td>
<td>Scheduling, organising, integrating, finding standard solutions, interacting, communicating, working in team.</td>
</tr>
<tr>
<td>1</td>
<td>Able to apply knowledge and skills to solve straightforward problems; responsible for own actions; operating in a stable environment.</td>
<td>Implements instructions</td>
<td></td>
<td>Demonstrates limited independence where contexts are generally stable with few variable factors.</td>
<td>Applying, adapting, developing, deploying, maintaining, repairing, finding basic-simple solutions.</td>
</tr>
</tbody>
</table>

- e-CF Level parameters e-1 to e-5

Each level marked by increasing levels of
- Influence
- Complexity
- Autonomy
- Behaviour
Positioning/relating e-CF to other relevant frameworks and structures

- B.1 Introduction
- B.2. European Qualifications Framework (EQF)
- B.3. ESCO
- B.4. DigComp
- B.5. P21’s Framework for 21st century learning
- B.6. SFIA
- B.7. European ICT Professional Role Profiles
- B.8. Relationships with other EN and ISO Standards
EN16234-1:2019
new „e-CF“ version availability

• EU level Publication of the standard by CEN announced for December 2019

• 33 national publications by standardisation bodies (AFNOR, DIN, BSI, etc.) a few months later
  – English, German, French obligatory
  – other languages optional by national decisions

• Purchasing via the CEN/ national sales points
CEN TC 428 is responsible for standardisation related to maturing the ICT Profession in all sectors.

- **EN 16234:2016 (e-CF) maintenance and evolution**
- Interaction with different Frameworks
- Curricula guidance
- Professional Role Profiles
- Guidance for the assessment against EN 16234 (e-CF)
- Body of Knowledge (BoK)
- Development of an education and certification model related to e-CF,
- Developing a sustainable code of ethics in the ever changing ICT world.

All conceptual developments shall be consistent and interrelated.

You can join the TC 428 by your National Standardisation Body

Or contribute to the e-CF multi-stakeholder feedback collection phase

Project on-line Survey
User feedback & final workshop
Mary Cleary

Irish Computer Society

and

CEN TC428 Chair
TC428 Mission: Maturing the European IT Profession

Figure 1: The four main building blocks of Professionalism
Maturing the IT Profession for Europe
TC428 projects, interfaces and synergies

CLOSE COLLABORATION BETWEEN ALL TC428 PROJECT ACTIVITIES 2019/20
e-CF embedded complementary structure: 30 EU ICT Professional Role Profiles

- 30 European ICT Professional Role Profiles as generic bricks for adaptation into specific contexts
- e-CF competences a key component of Profiles description
- version 2 published by CEN CWA 16458:2018
- solid embedding in EU environment (EQF, ICT Professionalism, ESCO, etc.)

www.ecompetences.eu/ictprofiles
The top of a European ICT Profiles Family Tree

- 30 European ICT Professional Role Profiles
- as generic bricks for adaptation into specific contexts
- e-CF competences a key component of Profiles description
- version 2 CWA 16458:2018
- solid embedding in EU environment (EQF, ICT Professionalism, ESCO, etc.) and other IT industry standards

www.ecompetences.eu/ictprofiles
30 professional role profiles covering all IT capabilities and contextualizing the e-CF in IT process and work environment
e-CF competences and ICT profiles suiting to traditional and new IT process structures

Quelle: DIGIFRAME 2019 (EC/ Cap Gemini et alt.)
Specific Frameworks and Standards across e-CF dimension 1 (ITIL, TOGAF, etc.)

Quelle: DIGIFRAME 2019
EN 16234-1 e-CF: A shared European language for ICT Professional development

- ICT demand
- ICT supply
- multinationals
- SME’s
- educational institutions
- higher education
- private certification providers
- professional associations
- social partners
- individuals

- Multi-stakeholder user community from all kind of market perspectives

Higher Education Curricula
National frameworks
Job posting & Recruitment
Skills gap analysis
ICT Professional CV
Self promotion

Market scenarios
Certification programs
HR planning
IT strategy make or buy planning
Competence assessment
Individual training plans

Use e-CF content
Create e-CF links
Some user references...
CONFERENCE CONTEXT: Towards three EN 16234-1 e-CF implementation supporting Technical reports

• TR 16234-2: USER GUIDE for the application of EN 16234-1, the European e-Competence Framework (e-CF)
  (REVISION of existing TR)

• TR 16234-3: METHODOLOGY DOCUMENTATION:
  (REVISION of existing TR)

• TR 16234-4 CASE STUDIES illustrating the e-CF standard use in practice
  (NEW DEVELOPMENT – previous CWA 16234-4)

PUBLICATION OF UPDATED e-CF USER SUPPORT BY CEN PLANNED IN 2020
e-CF USER NETWORKING CONFERENCE
Thursday, 14 November 2019, 10 – 17:00h

INAIL Istituto Nazionale Assicurazione Infortuni sul Lavoro
DCOD Direzione Centrale Organizzazione Digitale
Via del Santuario Regina degli Apostoli, 33 – 00145 Roma
Room: AUDITORIUM

CONFERENCE AGENDA

9:30h - 10:00h  Welcome coffee

10:00h  Welcome and introduction – Stefano Tomasini, Director
Central Digital Organisation, INAIL, Italy

10:15h  EN16234-1:2019 „e-CF“ new version and the European IT
Professionalism program – Jutta Breyer CEN EN16234-1 “e-CF”
expert team leader / Mary Cleary CEN TC428 and Irish
Computer Society, EU and Ireland

10:45h  How to prepare the IT department to lead the digital
transformation of the company: Train to transform – Aleix
Palau, netmind / Red Eléctrica de España, Spain

11:30h  Curricula development and Innovation Trijntje van Dijk, Saxion
University of Applied Sciences, The Netherlands

12:00h  How e-CF helps to increase the value of university learning
programs. Example: MIAGE Carine Souveyet, Sorbonne Paris
12:30h

Developing an e-CF based systematic engagement between universities, VET schools and employers in national qualification authority context - Ants Sild, Baltic Computer Systems AS and BCS Koolitus, Estonia

-- 13:00h lunch break --

14:00h

Focus discussions

1. e-CF based Strategy development for company transformation – Maria Grazia Bizzarri and Alessandro Nieto, NEXI payment, Italy

2. e-CF in IT HR development applied to skills development of IT Professionals – Martine de Groot-Grosman, Vivat, The Netherlands

3. Combine e-CF and DigComp application in support of the new IT operating model – François Prudhomme, connectITpeople, France

4. Developing further e-CF interfaces with relevant frameworks: example EURO-Inf label framework – Eduardo Vendrell, Politecnico University Valencia, Spain

-- 16:00h coffee break --

16:30h

Summary of conference outcomes – Jutta Breyer, CEN EN16234 “e-CF user support“ expert team leader

- Key lessons learnt from today
- Questions still open for future exploration
- What should influence good e-CF guidance / future Technical Reports (TRs) in support of EN 16234-1 e-CF?

Invitation to join TC428 & ITPE – Veronica Salsano, UNINFO and TC428 Secretariat / Ulrik Lorck, ITPE, EU-level