

Dim 1	Dimension 2	Dimension 3 e-CF levels e-1 to e-5, related to EQF level 3-8					Dimension 4	
competence title and generic description		level 1	level 2	level 3	level 4	level 5	knowledge	skills
B	BUILD							
B.1	Design and Development							
	<p>Designs and engineers software and/ or hardware components to meet required specifications, including energy efficiency issues. Follows a systematic methodology to analyse and build the required components and interfaces. Performs unit and system testing to ensure requirements are met.</p>		Systematically develops small components.	Acts creatively to develop and integrate components into a larger product.	Handles complexity by developing standard procedures and architectures in support of cohesive product development.	Has ultimate responsibility for strategic direction of product, technical architecture or technology development	<p>K1 appropriate software programs/ modules, DBMS and programming languages</p> <p>K2 hardware components, tools and hardware architectures</p> <p>K3 functional & technical designing</p> <p>K4 state of the art technologies</p> <p>K5 programming languages</p> <p>K6 Power consumption models of software and/or hardware</p>	<p>S1 explain and communicate the design/development to the customer</p> <p>S2 perform and evaluate test results against product specifications</p> <p>S3 apply appropriate software and/or hardware architectures</p> <p>S4 design and develop hardware architecture, user interfaces, business software components and embedded software components</p> <p>S5 manage and guarantee high levels of cohesion and quality in complex software developments</p> <p>S6 use data models</p>

UPDATE e-CF v 3.0	Application Development Interprets the application design to develop a suitable application in accordance with customer needs. Adapts existing solutions by e.g. porting an application to another operating system. Codes, debugs, tests and documents and communicates product development stages. Selects appropriate technical options for development such as reusing, improving or reconfiguration of existing components. Optimises efficiency, cost and quality. Validates results with user representatives, integrates and commissions the overall solution.	Acts under guidance to develop, test and document applications.	Systematically develops and validates applications.	Acts creatively to develop applications and to select appropriate technical options. Accounts for others development activities. Optimizes application development, maintenance and performance by employing design patterns and by reusing proved solutions.	K1 appropriate software programs/ modules K2 hardware components, tools and hardware architectures K3 functional & technical designing K4 state of the art technologies K5 programming languages K6 Power consumption models of software and/or hardware K7 DBMS K8 operating Systems and software platforms K9 Integrated development environment (IDE) K10 rapid application development (RAD) K11 IPR issues K12 modeling technology and languages K13 interface definition languages (IDL) K14 security	S1 explain and communicate the design/development to the customer S2 perform and evaluate test results against product specifications S3 apply appropriate software and/or hardware architectures S4 develop user interfaces, business software components and embedded software components S5 manage and guarantee high levels of cohesion and quality S6 use data models S7 perform and evaluate test in the customer or target environment S8 cooperate with development team and with application designers	
	changed title focused wording	level 1 added	adapted wording	adapted wording level improvement	K adapted and added K14 added	S7 and S8 added	
B.2	Systems Integration		Acts systematically to identify compatibility of software and hardware specifications. Documents all activities during installation and records deviations and remedial activities.	Accounts for own and others actions in the integration process. Complies with appropriate standards and change control procedures to maintain integrity of the overall system functionality and reliability.	Exploits wide ranging specialist knowledge to create a process for the entire integration cycle, including the establishment of internal standards of practice. Provides leadership to marshal and assign resources for programmes of integration.	K1 old, existing and new hardware components/ software programs/ modules K2 the impact that system integration has on existing system/ organisation K3 interfacing techniques between modules, systems and components K4 integration testing techniques	S1 measure system performance before, during and after system integration S2 document and record activities, problems and related repair activities S3 match customers' needs with existing products S4 verify that integrated systems capabilities and efficiency match specifications S5 secure/ back-up data to ensure integrity during system integration

UPDATE e-CF v 3.0	<p>Component Integration Integrates hardware, software or sub system components into an existing or a new system. Complies with established processes and procedures such as, configuration management and package maintenance., Takes into account the compatibility of existing and new modules to ensure system integrity, system interoperability and information security. Verifies and tests system capacity and performance and documentation of successful integration.</p>	Acts systematically to identify compatibility of software and hardware specifications. Documents all activities during installation and records deviations and remedial activities.	Accounts for own and others actions in the integration process. Complies with appropriate standards and change control procedures to maintain integrity of the overall system functionality and reliability.	Exploits wide ranging specialist knowledge to create a process for the entire integration cycle, including the establishment of internal standards of practice. Provides leadership to marshal and assign resources for programmes of integration.	<p>K1 old, existing and new hardware components/ software programs/ modules K2 the impact that system integration has on existing system/ organisation K3 interfacing techniques between modules, systems and components K4 integration testing techniques K5 development tools (e.g. development environment, management, source code access/revision control) K6 best practice design techniques</p>	<p>S1 measure system performance before, during and after system integration S2 document and record activities, problems and related repair activities S3 match customers' needs with existing products S4 verify that integrated systems capabilities and efficiency match specifications S5 secure/ back-up data to ensure integrity during system integration</p>	
	focused title enhanced wording	no change	no change	no change	K5.K6 added	no change	
B.3	Testing	<p>Constructs and executes systematic test procedures for IT systems or customer usability requirements to establish compliance with design specifications. Ensures that new or revised components or systems perform to expectation. Ensures meeting of internal, external, national and international standards; including health and safety, usability, performance, reliability or compatibility. Produces documents and reports to evidence certification requirements.</p>	<p>Performs simple tests in strict compliance with detailed instructions</p>	<p>Organises test programmes and builds scripts to stress test potential vulnerabilities. Records and reports outcomes providing analysis of results.</p>	<p>Exploits specialist knowledge to supervise complex testing programmes. Ensures tests and results are documented to provide input to subsequent process owners such as designers, users or maintainers. Accountable for compliance with testing procedures including a documented audit trail</p>	<p>K1 techniques, infrastructure and tools to be used in the testing process K2 the lifecycle of a testing process K3 the different sorts of tests (functional, integration, performance, usability, stress etc.) K4 national and international standards defining quality criteria for testing</p>	<p>S1 create and manage a test plan S2 manage and evaluate the test process S3 design tests of ICT systems S4 prepare and conduct tests of ICT systems S5 report and document tests and results</p>

UPDATE e-CF v 3.0	Constructs and executes systematic test procedures for ICT systems or customer usability requirements to establish compliance with design specifications. Ensures that new or revised components or systems perform to expectation. Ensures meeting of internal, external, national and international standards; including health and safety, usability, performance, reliability or compatibility. Produces documents and reports to evidence certification requirements.	Performs simple tests in strict compliance with detailed instructions	Organises test programmes and builds scripts to stress test potential vulnerabilities. Records and reports outcomes providing analysis of results.	Exploits specialist knowledge to supervise complex testing programmes. Ensures tests and results are documented to provide input to subsequent process owners such as designers, users or maintainers. Accountable for compliance with testing procedures including a documented audit trail	Exploits wide ranging specialist knowledge to create a process for the entire testing activity, including the establishment of internal standard of practices. Provides expert guidance and advice to the testing team.	K1 techniques, infrastructure and tools to be used in the testing process K2 the lifecycle of a testing process K3 the different sorts of tests (functional, integration, performance, usability, stress etc.) K4 national and international standards defining quality criteria for testing K5 web, cloud and mobile technologies and environmental requirements	S1 create and manage a test plan S2 manage and evaluate the test process S3 design tests of ICT systems S4 prepare and conduct tests of ICT systems S5 report and document tests and results
	no change (ICT instead of IT)	no change	no change	no change	New level 5 added	added K5	no change

B.4 Solution Deployment

Following predefined general standards of practice carries out planned necessary interventions to implement solution, including installing, upgrading or decommissioning. Configures hardware, software or network to ensure interoperability of system components and debugs any resultant faults or incompatibilities. Engages additional specialist resources if required, such as third party network providers. Formally hands over fully operational solution to user and completes documentation recording all relevant information, including equipment addressees, configuration and performance data.	Performs under guidance and in accordance with detailed instructions, the removal or installation of individual components.	Acts systematically to build or deconstruct system elements. Identifies non performing components and establishes root cause of failure within the overall solution. Provides support to less experienced colleagues.	Accounts for own and others actions within solution provision activities including comprehensive communications with stakeholders. Exploits specialist knowledge to influence solution construction. Gives advice on aligning work processes and procedures with software upgrades.			K1 performance analysis techniques K2 techniques related to problem management (operation, performance, compatibility) K3 software packaging and distribution methods and techniques K4 the impacts of deployment on the current architecture K5 the technologies and standards to be used during the deployment	S1 organise deployment workflow and product roll-out activities S2 organise and plan beta-test activities, testing solution in its final operational environment S3 configure components at any level to guarantee correct overall interoperability S4 identify and engage expertise needed to solve interoperability problems S5 organise and control initial support service provision including user
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UPDATE e-CF v 3.0	Following predefined general standards of practice carries out planned necessary interventions to implement solution, including installing, upgrading or decommissioning. Configures hardware, software or network to ensure interoperability of system components and debugs any resultant faults or incompatibilities. Engages additional specialist resources if required, such as third party network providers. Formally hands over fully operational solution to user and completes documentation recording all relevant information, including equipment addressees, configuration and performance data.	Removes or installs components under guidance and in accordance with detailed instructions.	Acts systematically to build or deconstruct system elements. Identifies failing components and establishes root cause failures. Provides support to less experienced colleagues.	Accounts for own and others actions for solution provision and initiates comprehensive communication with stakeholders. Exploits specialist knowledge to influence solution construction providing advice and guidance.	K1 performance analysis techniques K2 techniques related to problem management (operation, performance, compatibility) K3 software packaging and distribution methods and techniques K4 the impacts of deployment on the current architecture K5 the technologies and standards to be used during the deployment K6 web, cloud and mobile technologies and environmental requirements	S1 organise deployment workflow and product roll-out activities S2 organise and plan beta-test activities, testing solution in its final operational environment S3 configure components at any level to guarantee correct overall interoperability S4 identify and engage expertise needed to solve interoperability problems S5 organise and control initial support service provision including user training during system start-up S6 organise population of data bases and manage data migration S7 collaborates to modify 3rd party code; supports and maintains modified software
	no change	focused wording	focused wording	focused wording	K6 added	S7 added

B.5	Documentation Production	Produces documents describing products, services, components or applications to establish compliance with relevant documentation requirements. Selects appropriate style and media for presentation materials. Creates templates for document-management systems. Ensures that functions and features are documented in an appropriate way. Ensures that existing documents are valid and up to date.	Uses and applies standards to define document structure.	Determines documentation requirements taking into account the purpose and environment to which it applies.	Adapts the level of detail according to the objective of the documentation and the targeted population.	K1 tools for production, editing and distribution of professional documents K2 tools for multimedia presentation creation K3 different technical documents required for designing, developing and deploying products, applications and services	S1 observe and deploy effective use of corporate standards for publications S2 prepare templates for shared publications S3 organise and control content management workflow S4 keep publications aligned to the solution during the entire lifecycle
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UPDATE e-CF v 3.0	Produces documents describing products, services, components or applications to establish compliance with relevant documentation requirements. Selects appropriate style and media for presentation materials. Creates templates for document-management systems. Ensures that functions and features are documented in an appropriate way. Ensures that existing documents are valid and up to date.	Uses and applies standards to define document structure.	Determines documentation requirements taking into account the purpose and environment to which it applies.	Adapts the level of detail according to the objective of the documentation and the targeted population.		K1 tools for production, editing and distribution of professional documents K2 tools for multimedia presentation creation K3 different technical documents required for designing, developing and deploying products, applications and services K4 version control of documentation production	S1 observe and deploy effective use of corporate standards for publications S2 prepare templates for shared publications S3 organise and control content management workflow S4 keep publications aligned to the solution during the entire lifecycle
	no change	no change	no change	no change		K4 added	no change
B.6	Systems Engineering						
UPDATE e-CF v 3.0	Engineers software and/ or hardware components to meet solution requirements such as specifications, costs, quality, time, energy efficiency, information security and data protection. Follows a systematic methodology to analyse and build the required components and interfaces. Builds system structure models and conducts system behavior simulation. Performs unit and system tests to ensure requirements are met.			Ensures interoperability of the system components. Exploits wide ranging specialist knowledge to create a complete system that will satisfy the system constraints and meet the customer's expectations	Handles complexity by developing standard procedures and architectures in support of cohesive product development. Establishes a set of system requirements that will guide the design of the system. Identifies which system requirements should be allocated to which elements of the system.	K1 appropriate software programs/ modules, DBMS and programming languages K2 hardware components, tools and hardware architectures K3 functional & technical designing K4 state of the art technologies K5 programming languages K6 power consumption models of software and/or hardware K7 information Security Basics K8 prototyping	S1 explain and communicate the design/development to the customer S2 perform and evaluate test results against product specifications S3 apply appropriate software and/or hardware architectures S4 design and develop hardware architecture, user interfaces, business software components and embedded software components S5 manage and guarantee high levels of cohesion and quality in complex software developments S6 use data models S7 apply appropriate development and/or process models, to develop effectively and efficiently
	NEW COMPETENCE (previous B1 elements enhanced)			NEW COMPETENCE (previous B1 elements enhanced) level improvement	NEW COMPETENCE (previous B1 elements enhanced) level improvement	NEW COMPETENCE previous B1 knowledge K1-K6 + new K	NEW COMPETENCE previous B1 S1-S6 + new S