

Practical Application of SFIA in Software Engineering

Complementing SWEBOK with Industry-Driven Skills and Competencies

Peter Leather, Global Lead, SFIA Foundation

- *Project manager for SFIA versions 7,8 and 9*
- *Develop industry mappings, and education and guidance material for SFIA Users and collaborations with Industry partners*



Topics for today

- Introduction to the SFIA Framework and the SFIA Foundation
- Software engineering and SFIA
- Complementary nature of SWEBOK and SFIA
- How SFIA is used by employers and employees

Resources referenced today will be available via a 'Quick Links' page on the SFIA website dedicated to Software Engineering, SWEBOK and SFIA. Use the link or QR code below.



https://bit.ly/swebok_summit_sfia

About SFIA*

“To enable greater capability and capacity within the workforce.”

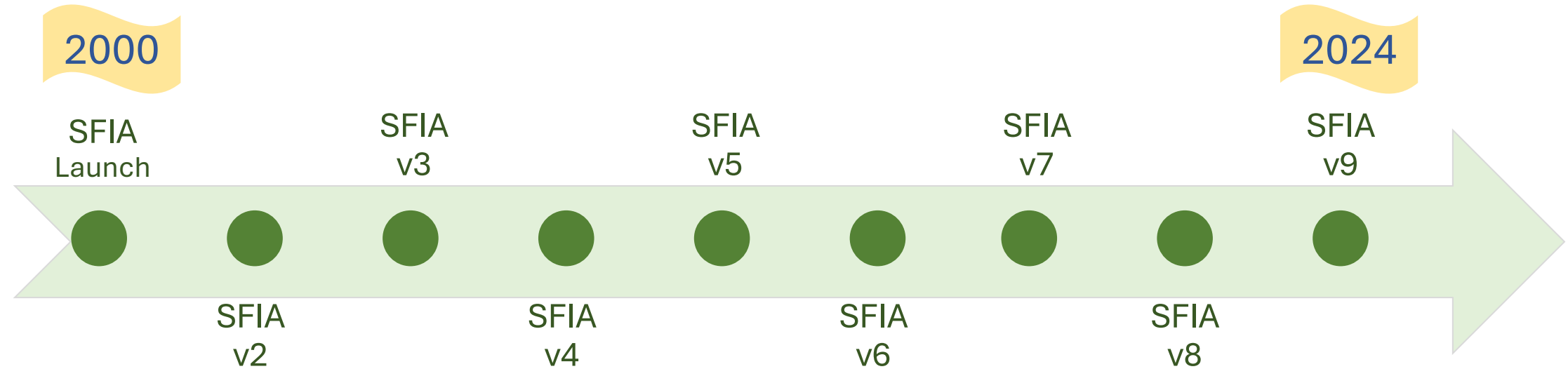
The SFIA Framework

- Describes skills, competencies and behavioral factors and a broad range of technology and digital disciplines including software engineering
- Provides a common language
- A freely accessible, shared resource for employers, individuals, educators, and professional bodies
- Community-driven development and open collaboration
- **Technology- and vendor-neutral**
- Widely used, available in 12 languages

The SFIA Foundation

- Exceptionally **lean, global, non-commercial, not-for-profit** overseeing the SFIA framework
- Operates with **minimal overhead, reinvesting all proceeds** into framework development and community support
- Facilitate a **global ecosystem** – this has grown steadily over time
- **Sources funding** to keep the framework open and freely accessible to employers and individuals
 - (This is not easy!)

SFIA evolution – 25 years



Field-tested approach over 20+ years: Used by practitioners, not a theoretical model

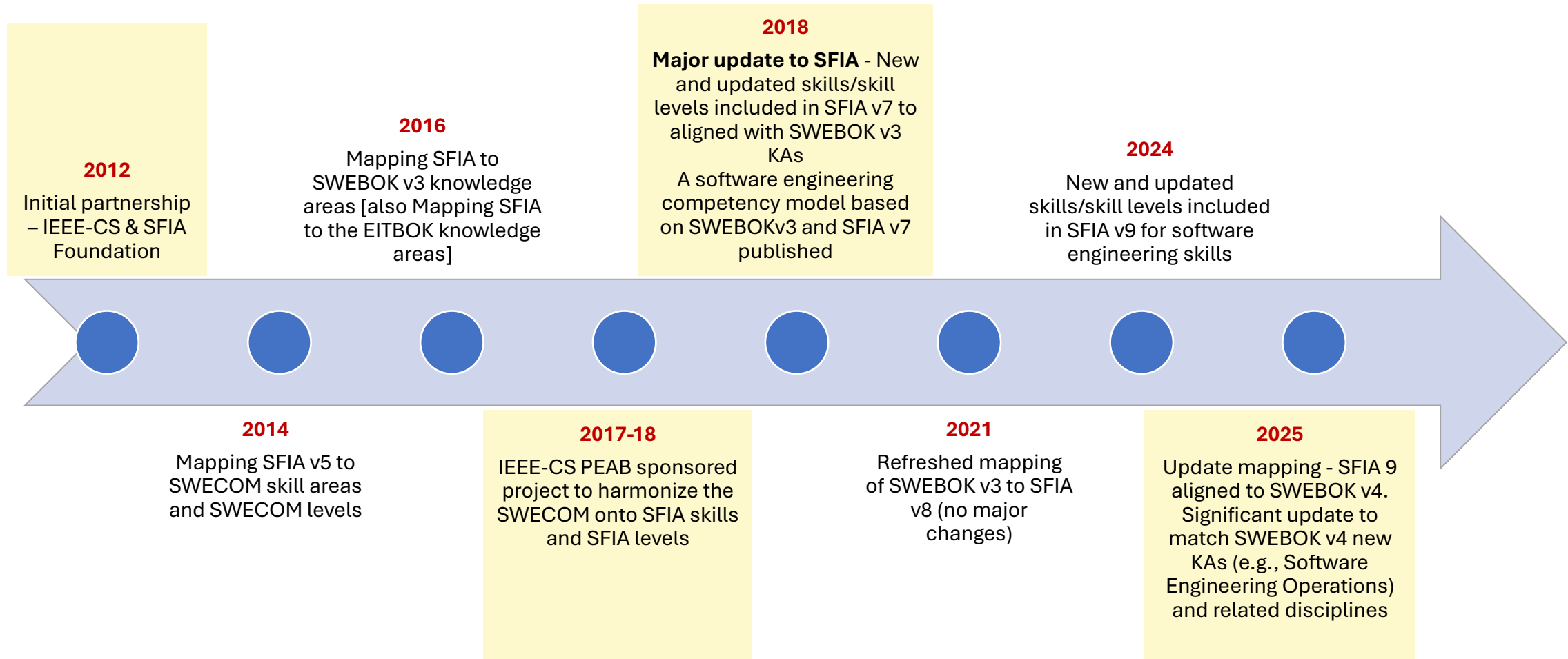
Established update process: Regular revisions with contributors, design authority, beta testing, structured releases and translations

Global adoption: Across government, corporate, and education sectors in 12 languages

Expanding resources over time: Growing guidance materials and industry partnerships

Organic growth: Primarily spread through word-of-mouth success

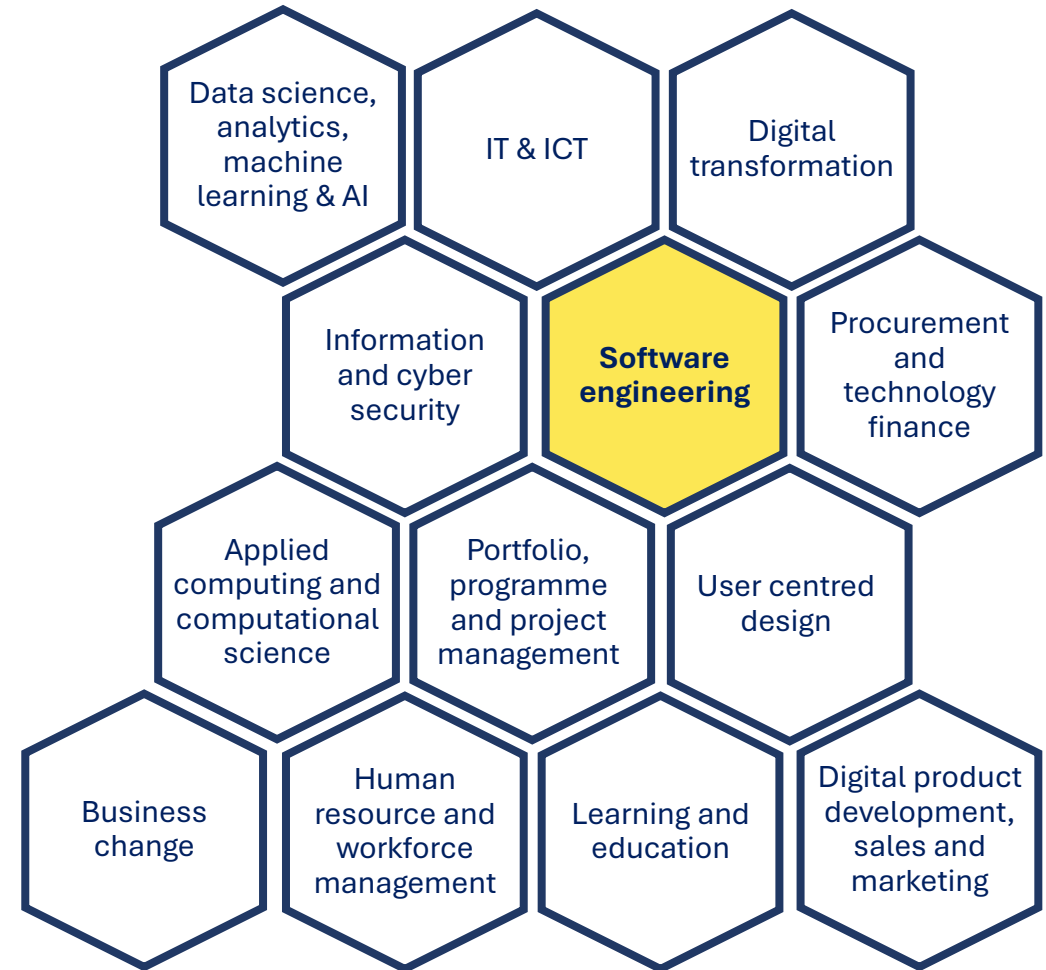
Evolving the SWEBOK / SFIA mapping



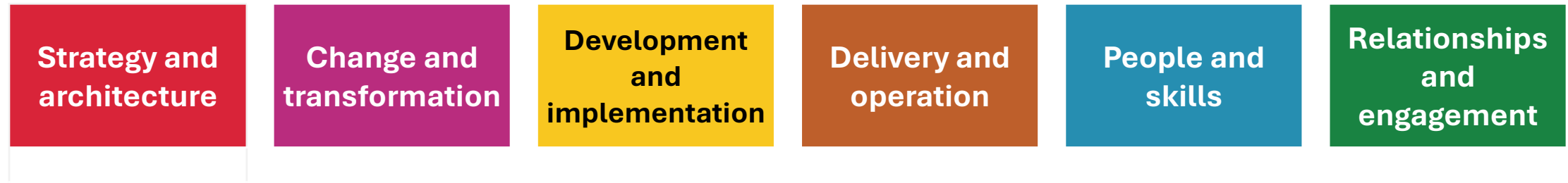
SFIA is a broad framework – built on a common structure

Within the scope of SFIA are the skills needed by many of the world's most in-demand occupations, including professionals working in fields such as...

SFIA applies a common structure to many domains – supporting multidisciplinary teams, varied career paths and integrated workforce planning.



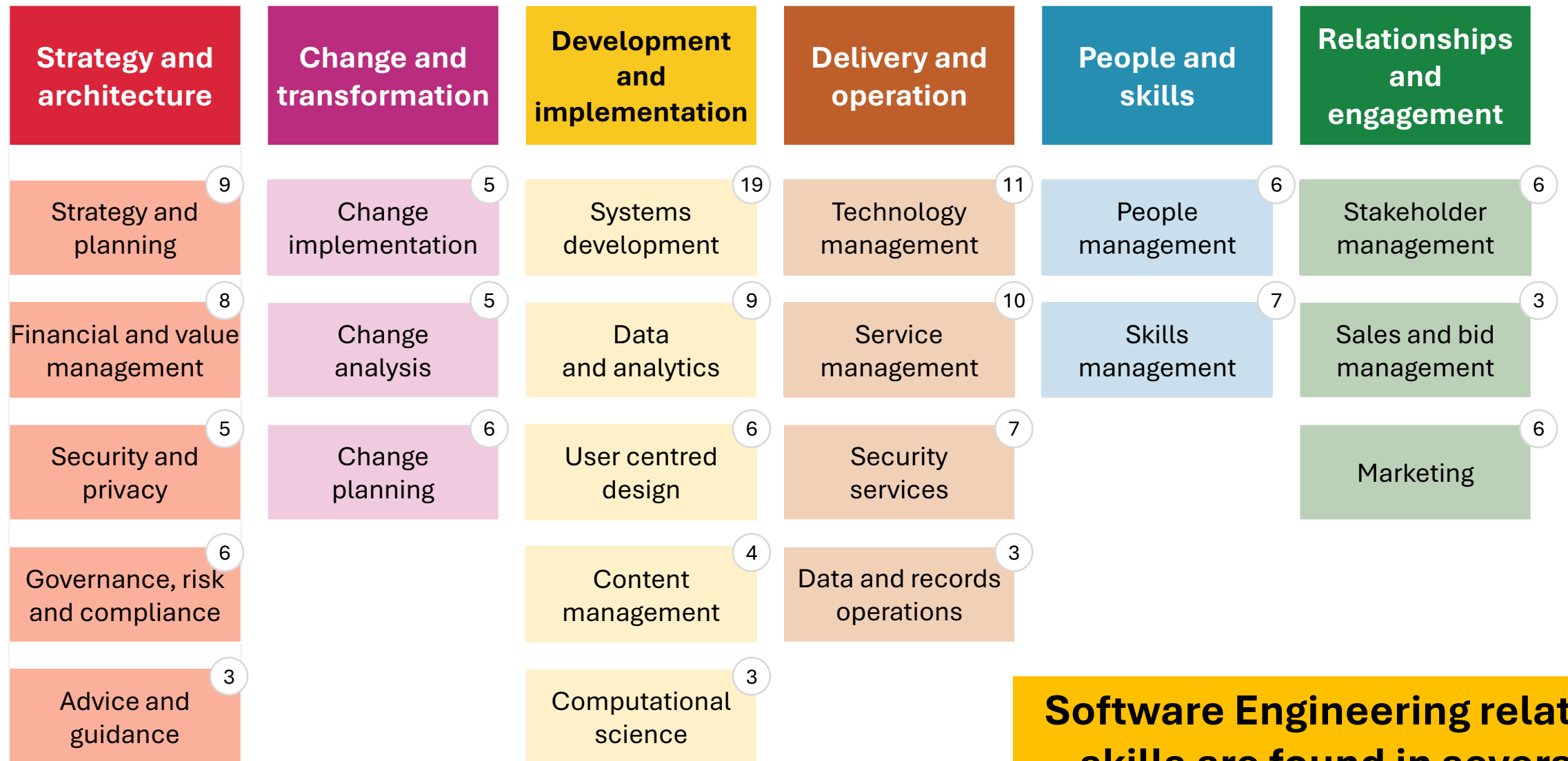
SFIA is a broad skills framework – built on a common structure



These categories can be used to navigate the framework

SFIA v9 has detailed definitions of 147 professional skills spanning a range of technical, digital, business and management disciplines

SFIA is a broad skills framework – built on a common structure



Software Engineering related skills are found in several categories and subcategories

Each of the Professional skills is defined at up to 7 levels of responsibility

Increasing responsibility, accountability and impact

Examples of
range of skills

Professional skills	Levels of responsibility						
	1	2	3	4	5	6	7
Programming / software development		2	3	4	5	6	
Portfolio management					5	6	7
Threat intelligence		2	3	4	5	6	
Infrastructure operations	1	2	3	4	5		
Workforce planning				4	5	6	
Supplier management		2	3	4	5	6	7
etc							

Consistent 7 levels for all skills
SFIA levels describe workplace responsibilities, accountabilities and impact
(e.g., not years of experience or technical expertise)

How SFIA is typically used.... for employers and employees



Employer focus

Work Decomposition: Break down business needs into skills and capabilities.

Role Definition: Identify tasks / activities / responsibilities and skills. Recruitment and team management.

Jobs/Skills Matrix: Map skills to job roles with consistent language and levels (skills matrix).

Resource deployment: Task and project assignments.

Assess employees' performance and skills.

Professional development: Provide career paths, training, mentoring and work experiences.



Employee focus



Self assessment: Assess their own performance based on real **workplace accomplishments**.

Build a **portfolio of experience:** aligned to SFIA's skill& level definitions.

Identify and implement **growth opportunities:** work experiences, career progression options, mentoring, training.

Career progression: Internal promotions or lateral moves into different domains.

Some examples of SFIA in use...

Australian Public Service Digital Transformation Agency – Career pathfinder for career navigation and job-matching

NICE Framework (USA) – levels of professional competency complementary to their cybersecurity work roles framework

University of Strathclyde – Software development apprenticeships embedding SFIA in work-based learning

Royal Air Force (UK) – a structured, professionalized framework to manage and develop skills across their workforce.

Professional Standards – e.g. ACS, BCS, IITPSA, CIPS, ISACA, ISC2, Comptia

Australian Public Service (APS) – Career Pathfinder

APS CAREER PATHFINDER

Search for roles

About Explore roles My career plan Log in

Skills Interests Filters

Add your skills

↑ More relevant pathways

← Lower role classification

Higher role classification →

APS3 Service Desk Assistant

APS4 Associate Service Desk Analyst

APS5 Service Desk Analyst

EL1 Senior Service Desk Analyst

EL2 Senior Service Desk Manager

Typical APS - Digital profession - Software Engineering

APS4 **APS5** Associate Software Engineer

APS6 Software Engineer

EL1 Senior Software Engineer

Typical APS - Digital profession - Systems Analysis

APS5 Associate Systems Analyst

APS6 Systems Analyst

EL1 Senior Systems Analyst

EL2 Lead Systems Analyst

Typical APS - Digital profession - Digital Testing

APS5 **APS4** Junior Automation Tester

APS6 Automation Tester

APS6 Data Migration Tester

Typical APS - Digital profession - Project Management Specialist

EL1 Change Manager

EL1 Program Management Office (PMO) Assurance Officer

EL1 Risk Manager

Typical APS - Digital profession - Enterprise Architecture

EL2 Enterprise Architect

EL2 Principal Enterprise Architect

EL1 Senior Software Engineer

Senior Software Engineers have experience overseeing software development projects, writing optimised code, and provide technical leadership to a team of software engineers. They are responsible for the quality and functionality of the software produced by their team.

SFIA skills

- Testing
- Systems design
- Emerging technology monitoring
- Specialist advice
- Programming/software development
- Software configuration
- Release and deployment
- Software design
- Methods and tools
- Configuration management

Give feedback

Less relevant

https://aps-career-pathfinder.digitalprofession.gov.au/role/digital_profession:Typical_APS_Senior_Software_Engineer

You can find roles that match your skills. Or roles that match your interest.

You can see what skills you need and how to get them. The tool shows you:
descriptions of what the role does, in some case there are profiles of people doing jobs with that role now
details of the required skills
training specific to your skill needs
APS Jobs to show you available jobs.

Visualizing career paths with SFIA

The US Government NICE Workforce Framework for Cybersecurity

The Workforce Framework for Cybersecurity, commonly referred to as the NICE Framework, is a nationally focused resource to help employers develop their cybersecurity workforce. It establishes a common lexicon that describes cybersecurity work and workers regardless of where or for whom the work is performed. The NICE Framework applies across public, private, and academic sectors.

The NICE program of the National Institute for Standards and Technology (NIST) released NICE Framework Components v1.0.0 in March 2024.

Illustrative levelled role families for NICE Design and Development Work roles 1.0.0

Illustrative Levelled Role Families The levelled role families presented here are illustrative examples and are not prescriptive. Of course, no single employer is likely to have all of these roles at all the levels shown. The specific roles, levels, and job families will vary depending on the size, structure, and needs of each organization. Smaller organizations may have fewer distinct roles and levels, while larger organizations may have a more extensive range of specialized roles and levels.

The SFIA levels used in this illustration serve as a guide and provide a common reference point. However, employers will typically have their own job grading methods and career frameworks that align with their unique organizational context and requirements.

It is important to understand that the purpose of role/job leveling is not to establish a rigid hierarchy but rather to enable several key benefits. These benefits include:

1. Clarity in career progression pathways for employees
2. Consistency in job expectations and responsibilities across the organization
3. Alignment of compensation and rewards with the level of contribution and value delivered by each role
4. Identification of skill gaps and development opportunities to support workforce planning and talent management

By providing a structured approach to job leveling, organizations can foster a fair, transparent, and effective framework for managing their workforce and supporting the growth and development of their employees.

NICE Design and Development Work roles 1.0.0	SFIA Level 1 Follow	SFIA Level 2 Assist	SFIA Level 3 Apply	SFIA Level 4 Enable	SFIA Level 5 Ensure, advise	SFIA Level 6 Initiate, influence	SFIA Level 7 Set strategy, inspire, mobilise
Responsibility, accountability and impact.	Follows instructions, completes routine tasks under close supervision, and requires guidance. Learns and applies basic skills and knowledge.	Assists and supports others, works under routine supervision, and uses discretion to solve routine problems. Actively learns through training and on-the-job experiences.	Performs varied tasks, including complex and non-routine, using standard methods. Plans and manages own work, exercises discretion, and meets deadlines. Proactively enhances their skills and impact.	Performs diverse complex activities, supports and supervises others, works autonomously under general direction, and contributes expertise to deliver team objectives.	Accountable for achieving workgroup objectives and managing work from analysis to execution and evaluation. Provides authoritative guidance in their field and works under broad direction.	Influences the organisation significantly, makes high-level decisions, shapes policies, demonstrates thought leadership, fosters collaboration, and accepts accountability for strategic initiatives and outcomes.	Determines overall organisational vision and strategy, operates at the highest level, and assumes accountability for overall success.
Cybersecurity Architecture				Cybersecurity Architect SFIA 4	Lead Cybersecurity Architect SFIA 5	Principal Cybersecurity Architect SFIA 6	
Enterprise Architecture					Lead Enterprise Architect SFIA 5	Principal Enterprise Architect SFIA 6	
Secure Software Development		Junior Software Developer SFIA 2	Software Developer SFIA 3	Senior Software Developer SFIA 4	Lead Software Developer SFIA 5	Principal Software Developer SFIA 6	
Secure Systems Development			Secure Systems Developer SFIA 3	Senior Secure Systems Developer SFIA 4	Lead Secure Systems Developer SFIA 5		
Software Security Assessment			Secure Software Assessor SFIA 3	Senior Secure Software Assessor SFIA 4	Lead Secure Software Assessor SFIA 5		
Systems Requirements Planning			Systems Requirements Planner SFIA 3	Senior Systems Requirements Planner SFIA 4	Lead Systems Requirements Planner SFIA 5		
Systems Testing and Evaluation	Entry Level Test Systems Tester SFIA 1	Junior System Testing & Evaluation Specialist SFIA 2	System Testing & Evaluation Specialist SFIA 3	Senior System Testing & Eval Specialist SFIA 4			
Technology Research and Development			Research & Development Specialist SFIA 3	Senior R & D Specialist SFIA 4	Lead R & D Specialist SFIA 5	R & D Director SFIA 6	

Visualising software engineer career paths with SFIA

Software engineer role family

Illustrative levelled roles in a role family

<p>Employers are best placed to design & name jobs/roles, define career pathways, create job descriptions and select skills and skill levels. SFIA provides a framework to help you do this.</p> <p>SFIA's attributes of AUTONOMY, INFLUENCE and COMPLEXITY are the key to determining level of impact, responsibility and accountability. Click the SFIA level to find the details.</p>	SFIA Level 1 Follow	SFIA Level 2 Assist	SFIA Level 3 Apply	SFIA Level 4 Enable	SFIA Level 5 Ensure, advise	SFIA Level 6 Initiate, influence	SFIA Level 7 Set strategy, inspire, mobilise
	Follows instructions, completes routine tasks under close supervision, and requires guidance. Learns and applies basic skills and knowledge.	Assists and supports others, works under routine supervision, and uses discretion to solve routine problems. Actively learns through training and on-the-job experiences.	Performs varied tasks, including complex and non-routine, using standard methods. Plans and manages own work, exercises discretion, and meets deadlines. Proactively enhances skills and impact in the workplace.	Performs diverse complex activities, supports and supervises others, works autonomously under general direction, and contributes expertise to deliver team objectives.	Accountable for achieving workgroup objectives and managing work from analysis to execution and evaluation. Provides authoritative guidance in their field and works under broad direction.	Influences the organisation significantly, makes high-level decisions, shapes policies, demonstrates thought leadership, fosters collaboration, and accepts accountability for strategic initiatives and outcomes.	Determines overall organisational vision and strategy, operates at the highest level, and assumes accountability for overall success.
Software engineer role family	Software engineer SFIA Level 1	Software engineer SFIA Level 2	Software engineer SFIA Level 3	Software engineer SFIA Level 4	Software engineer SFIA Level 5	Software engineer SFIA Level 6	Software engineer SFIA Level 7
<p>Role purpose: To design, develop, and maintain high-quality software solutions. You collaborate with cross-functional teams to understand requirements, architect solutions, and write efficient code. Your role involves testing, debugging, and continuously improving software to meet user needs and business objectives.</p> <p>Example job titles Software engineer, Junior Software engineer, Lead Software engineers, Principal Software engineer</p>	not applicable	At this level, Software Engineers assist with the development and maintenance of software applications. They write, debug and test code under regular supervision, addressing routine problems, and actively participating in learning opportunities to understand the complexities of software engineering practices.	At this level, Software Engineers independently handle a broad range of development tasks, including coding, refactoring, testing, and debugging of applications. They employ standard development methodologies and tools, exercise sound judgment within defined practices and procedures, and effectively manage their time to meet project deliverables and deadlines.	At this level, Software Engineers play a pivotal role in leading development efforts, driving the technical direction of projects, and enabling team members to achieve project milestones. They work with substantial autonomy, leveraging their deep technical expertise to mentor junior engineers, and collaborate across teams to deliver robust software solutions	At this level, Software Engineers act as senior technical leaders, taking responsibility for the successful execution of complex software development. They ensure the adherence to technical standards, provide authoritative advice on advanced development methodologies, and manage the integration of technological innovations to enhance product performance and reliability	At this level, Software Engineers have a strategic impact on the organization's technology landscape. They initiate and lead major technical projects, influence policy and strategic decisions, advocate for best practices in software development, and play a crucial role in shaping the future direction of the organization's technology initiatives.	not applicable

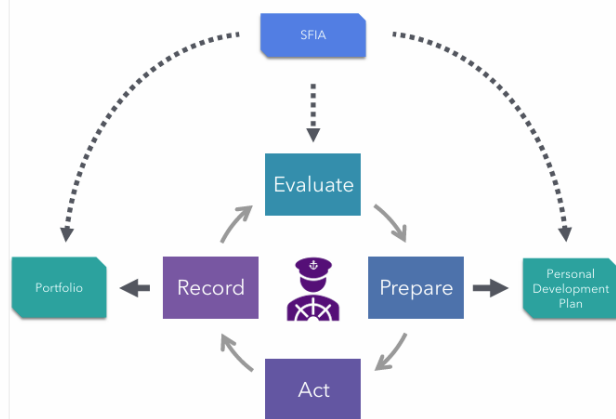
Candidate SFIA professional skills: Your organisation's priorities and context will drive the SFIA skills and competency levels required. Click the SFIA skill name for details

SFIA professional skills		Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7
Programming/software development	PROG		2	3	4	5	6	
Software design	SDCN		2	3	4	5	6	
Testing	TEST	1	2	3	4	5	6	
Systems and software life cycle engineering	SLEN				4	5	6	7
Requirements definition and management	REQM		2	3	4	5	6	

Candidate behavioural factors/workplace/power skills: Your organisation's priorities and context will drive the skills and levels required. Click the workplace skill name for details

SFIA workplace skills		Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7
Security, privacy and ethics	SCPE	1	2	3	4	5	6	7
Communication	COMM	1	2	3	4	5	6	7
Collaboration	COLL	1	2	3	4	5	6	7
Problem-solving	PROB	1	2	3	4	5	6	7
Decision-making	DECM	1	2	3	4	5	6	7
Planning	PLAN	1	2	3	4	5	6	7
Leadership	LEAD	1	2	3	4	5	6	7
Improvement mindset	IMPM	1	2	3	4	5	6	7
Creativity	CVTY	1	2	3	4	5	6	7
Learning and professional development	LAPD	1	2	3	4	5	6	7
Adaptability	ADPT	1	2	3	4	5	6	7
Digital mindset	DISI	1	2	3	4	5	6	7

A learner-centred process



- Evaluate – understand where competency lies and where focus is needed
- Prepare – record areas for development and translate these into specific objectives (Personal Development Plan, PDP)
- Act – Take action to make progress on these objectives
- Reflect – Document learning in the form of evidence that is collected in the portfolio, mapped against SFIA

Work-based Learning

University of Strathclyde

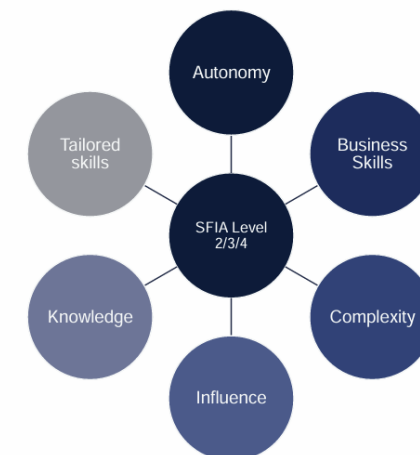
Developed and runs an innovative approach to work-based learning (WBL) in their **graduate and degree apprenticeship programmes**, using SFIA to provide structure and progression paths for apprentices.

Their model:

- Combines academic study with workplace experience
- Uses SFIA to structure skills development and competency assessment
- Employs innovative assessment methods including the STARC framework
- Provides early career exposure to industry-standard frameworks
- Develops both technical and professional skills

Using SFIA as a WBL framework

- Primarily utilise the SFIA professional skill Programming/Software development...but we can drop in others if needed
- This is combined with the 5 generic *attributes* (Autonomy, Influence, Complexity, Business Skills and Knowledge) to provide a comprehensive framework for our learners.
- Vital that apprentices consider not only their technical competency, but the much wider skill set needed to be a successful employee.
- The generic attributes provide the mechanism for exactly this and are invaluable in assisting apprentices in building a rounded skill set.
- The nature of SFIA allows us to support apprentices with a variety of backgrounds and job roles



The RAF Cyberspace Journey with SFIA

FLT LT AMY PHILLIPS-MAHON & FLT SGT DEBRA ROBERTS

TRANSFORMING AT SCALE:

REIMAGINING RAF CAREERS THROUGH SFIA

- 121 distinct conditions.
- 3000 People and Job roles located across 4 Continents.
- Multiple Governmental and External Stakeholders.
- 9 Months to deliver!



Recruit



Select



Train



Sustain



Retain



Resettle

Benefits of the Approach

- **Professionalisation:** SFIA backbone creates pathways to professional registration, simplifies CPD, and fosters a motivated, professional workforce.
- **Talent Management:** Objective skill measurement for clear talent distribution to facilitate skill-based career management in the RAF.
- **Transferable Skills:** Formal skill progression recording enhances employability and serves as a recruitment tool for Cyberspace careers.
- **Sector Alignment:** Use of SFIA ensures alignment across Defence, Government, and wider sector.
- **Lateral Entry:** Facilitates clear skill articulation for lateral moves within RAF and civilian sectors, provides bespoke training pathways, and enhances recruitment and employment of Reserve forces.

26 Generic Roles

1. Application Support
2. Change & Transformation
3. Cloud Services
4. Cryptography
5. Cyber Protection
6. Cyber Incident Response
7. Cyberspace Training & Support
8. Data & Analytics
9. Governance, Risk & Assurance
10. Infra Provision & Assurance
11. Information Service Management
12. Information Service Operations
13. Network Delivery & Operations
14. Network Security
15. Radar & Radio Management
16. Satellite & Radio
17. Software Development
18. Solutions Architect
19. Strategy & Planning
20. User Interface & User Experience

The RAF Cyber Space Profession uses SFIA to create a structured, professionalized framework to manage and develop skills across their workforce.

The RAF is the UK's air force. It works with partners around the world to respond to threats, prevent conflict, watch the skies, and combat cyber threats.

Some SFIA Partners

IEEE-CS, IET, IITPSA - Institute of IT Professionals South Africa, CIPS - Canadian Information Processing Society, BCS - The Chartered Institute for IT, Australian Computer Society, ISACA, ISC2, SANS, Institute of IT Professionals New Zealand, IT Promotion Agency Japan, CIISec, CREST, itSMF International

Professional Standards

Key Features of the IP3P standard



- The IP3P is the IP3 accreditation standard that is used to assess an organization's professional standard. It applies to the professional certification program and not to individuals.
- The Skills Framework for the Information Age (SFIA) (or equivalent) is the reference document for establishing the minimum professional standard of competence.
- The professional autonomy and responsibility level has been set at SFIA Level 5 (or equivalent or above).

How the SFIA framework works



Consistent 7 levels for all skills

SFIA levels describe workplace responsibilities, accountabilities and impact

(not e.g., years of experience or technical expertise)

7 levels of responsibility

Generic attributes

Autonomy

Influence

Complexity

Business skills / Behavioural factors

Knowledge

SFIA Professional skills

Described using the same 7 levels

Integration of skills and generic attributes

Progression of responsibility, accountability, and impact



Increasing responsibility, accountability and impact

	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7
	Follow	Assist	Apply	Enable	Ensure, advise	Initiate, influence	Set strategy, inspire, mobilise
Essence of the level	Performs routine tasks under close supervision, follows instructions, and requires guidance to complete their work. Learns and applies basic skills and knowledge.	Provides assistance to others, works under routine supervision, and uses their discretion to address routine problems. Actively learns through training and on-the-job experiences.	Performs varied tasks, sometimes complex and non-routine, using standard methods and procedures. Works under general direction, exercises discretion, and manages own work within deadlines. Proactively enhances skills and impact in the workplace.	Performs diverse complex activities, supports and guides others, delegates tasks when appropriate, works autonomously under general direction, and contributes expertise to deliver team objectives.	Provides authoritative guidance in their field and works under broad direction. Accountable for delivering significant work outcomes, from analysis through execution to evaluation.	Has significant organisational influence, makes high-level decisions, shapes policies, demonstrates leadership, promotes organisational collaboration, and accepts accountability in key areas.	Operates at the highest organisational level, determines overall organisational vision and strategy, and assumes accountability for overall success.

Business skills/behavioral factors*

**Also called soft skills,
workplace skills,
durable skills amongst
other names*



... all described at 7 levels

“success in technology-related roles requires not just technical proficiency, but also the ability to navigate complex business environments”

Each SFIA skill has a full description

... SFIA is published in a range of formats

- Web pages
- 2 pdf documents (content and “How to” guide)
- One page summary chart
- Excel download
- JSON – via SFIA API (great for GenAI use)
- RDF / ttl (knowledge graphs/embeddings)

```
{
  "code": "SWDN",
  "name": "Software design",
  "description": "Architecting and designing software to meet specified requirements, ensuring adherence to es",
  "guidance": "<p>Activities may include, but are not limited to:</p>\r\n<ul>\r\n<li>designing and architecti",
  "levels": {
    "level_1": "",
    "level_2": "Creates and documents detailed designs for simple software applications or components. \r\nApp",
    "level_3": "Undertakes complete design of moderately complex software applications or components.\r\nAppL",
    "level_4": "Designs and architects complex software applications, components and modules.\r\nUses appropr",
    "level_5": "Specifies, designs and architects large or complex software applications, components and modu",
    "level_6": "Leads the selection and development of software design and architectural methods, tools and te",
    "level_7": ""
  }
}
```

Software design SWDN

Skill name and code

SFIA version 9
Framework status: Current standard

Version

Architecting and designing software to meet specified requirements, ensuring adherence to established standards and principles.

Revision notes

Short skill description

Guidance notes

Guidance notes for application of the skill

Related SFIA skills

Related skills and links to other resources

Short links to this skill

Levels of responsibility for this skill

Software design: Level 2

Software design: Level 3

Software design: Level 4

Skill at a responsibility level

Increasing responsibility, accountability, impact

Flexibility by design - employers name jobs and match skills to their jobs

SFIA describes skills not job titles

	Junior software engineer	Software engineer	Senior software engineer	Lead software engineer	Principal engineer
	SFIA levels for each skill				
Programming/software development (PROG)	2	3	4	5	6
Software design (SWDN)		2	3	4	
Functional testing (TEST)	1	2	3	4	
Systems integration and build (SINT)	2	3	4	5	6
Systems development management (DLMG)				5	6
Specialist advice (TECH)			4	5	

Illustrative job titles and skills and skill levels

Job roles combine multiple SFIA skills

SFIA levels describe increasing responsibility, accountability and impact

Programming/software development: Level 3

Programming/software development: Level 4

Programming/software development: Level 5

Levels of responsibility – the same for all SFIA skills

Level 3 - Apply: Essence of the level: Performs varied tasks, sometimes complex and non-routine, using standard methods and procedures. Works under general direction, exercises discretion, and manages own work within deadlines. Proactively enhances skills and impact in the workplace.

Level 4 - Enable: Essence of the level: Performs diverse complex activities, supports and guides others, delegates tasks when appropriate, works autonomously under general direction, and contributes expertise to deliver team objectives.

Level 5 - Ensure, advise: Essence of the level: Provides authoritative guidance in their field and works under broad direction. Accountable for delivering significant work outcomes, from analysis through execution to evaluation.

SFIA skill definition – unique for each skill – but all aligned to the generic levels

Designs, codes, verifies, tests, documents, amends and refactors moderately complex programs/scripts.

Applies agreed standards, tools and security measures to achieve a well-engineered result.

Monitors and reports on progress. Identifies issues related to software development activities. Proposes practical solutions to resolve issues.

Collaborates in reviews of work with others as appropriate.

Designs, codes, verifies, tests, documents, amends and refactors complex programs/scripts and integration software services.

Contributes to the selection of the software development methods, tools, techniques, and security practices.

Applies agreed standards, tools, and security measures to achieve well-engineered outcomes.

Participates in reviews of own work and leads reviews of colleagues' work.

Takes technical responsibility across all stages and iterations of software development.

Plans and drives software construction activities. Adopts and adapts appropriate software development methods, tools and techniques.

Measures and monitors applications of project/team standards for software construction, including software security.

Contributes to the development of organisational policies, standards and guidelines for software development.

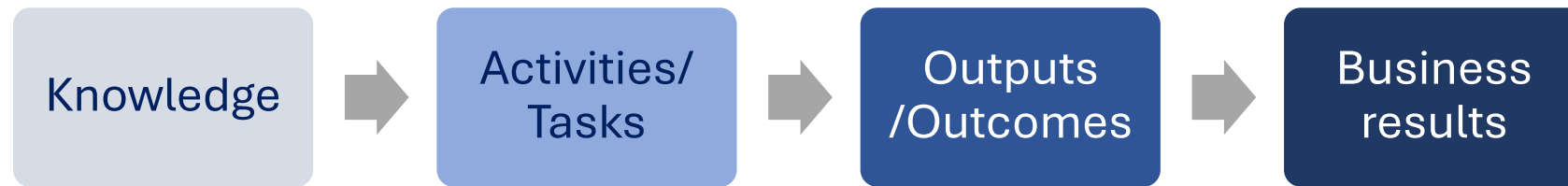
An extract of
Software
Engineering
related skills in
SFIA v9

SFIA Skill name	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7
Requirements definition and management REQM		2	3	4	5	6	
Systems design DESN		2	3	4	5	6	
Software design SWDN		2	3	4	5	6	
Programming/software development PROG		2	3	4	5	6	
Systems integration and build SINT		2	3	4	5	6	
Real-time/embedded systems development RESD		2	3	4	5	6	
Methods and tools METL							
Configuration management CFMG							
Functional testing TEST	1						
Non-functional testing NFTS	1						
Release management RELM							
Deployment DEPL							
Quality assurance QUAS							
Measurement MEAS							
Safety engineering SFEN							
Systems development management DLMG							7
Systems and software lifecycle engineering SLEN							7
Project management PRMG							7
Product management PROD							
Safety assessment SFAS							
Business situation analysis BUSA							
Feasibility assessment FEAS							
User experience design HCEV							
Solution architecture ARCH							
Data modelling and design DTAN							
Change control CHMG							
Incident management USUP	1	2	3	4	5	6	
Problem management PBMG		2	3	4	5		
Portfolio management POMG					5	6	7
Investment appraisal INVA				4	5	6	
Stakeholder relationship management RLMT				4	5	6	7
Resourcing RESC		2	3	4	5	6	
Supplier management SUPP		2	3	4	5	6	7
Contract management ITCM		2	3	4	5	6	7
Financial management FMIT				4	5	6	

Like SWEBOK's
Knowledge Areas,
SFIA covers a
comprehensive
range of software
engineering tasks,
activities, and
responsibilities

SWEBOK & SFIA in the professional working environment

Shift of focus from "what you know" to "what you can do"



SWEBOK

SFIA

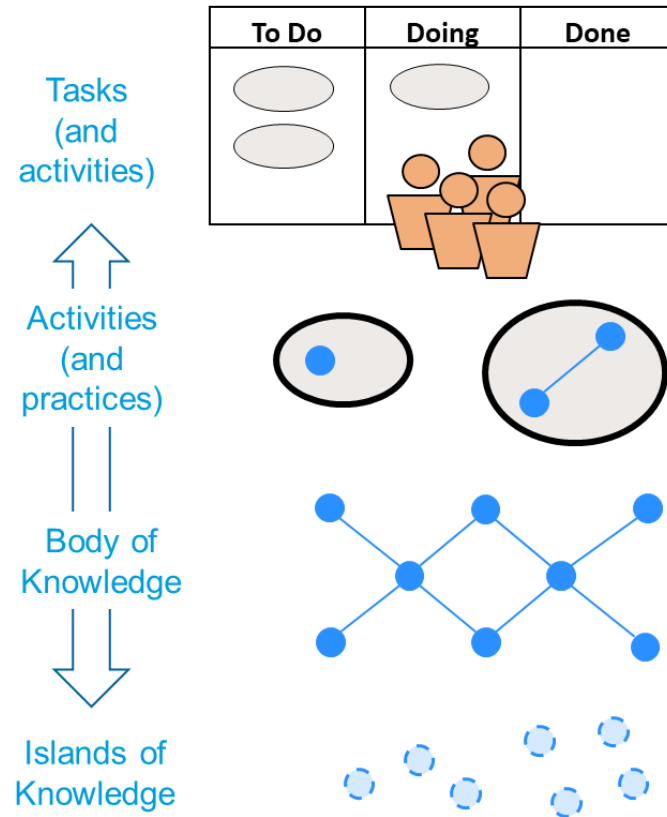
Knowing facts, principles, and theory

Applying knowledge and skills consistently,
professionally, independently in a work environment.

SFIA is used by a wide range of employers: public and private sector, different industries, different sizes

The SFIA skills related to the core software engineering KAs are the most visited on the SFIA website

SWEBOK / SFIA mapping



Credit: Hironori Washizaki

SWEBOKv4 content

1. Some purely Knowledge-based descriptions:

- Focus on understanding principles, methods, or theories.
- Relevant for learning foundational concepts.
- Example: "Requirements validation ensures alignment with stakeholder needs."

2. Some explicitly described Tasks and Activities:

- Provide direct, actionable steps or processes.
- Bridge the gap between theoretical knowledge and practical application.
- Example: "This includes selecting or developing the facilities, hardware, software, firmware, and procedures to conduct the testing activity."

3. Some inferred Tasks and Activities:

- Describe outcomes or objectives indirectly linked to actions.
- Leave flexibility for implementation.
- Example: **section 2.2.7. Non-functional Testing** implies several non-functional testing tasks.

SFIA skill descriptions describe workplace tasks, activities and responsibilities.

This forms the basis of the mapping to SWEBOK KA's and related disciplines. It is not a mapping of knowledge only.

The mapping is not 1:1 SFIA skill to KA.

The mapping is a **loose coupling** for informative purposes.

Content from SWEBOK is not copied into SFIA.

SWEBOK v4 to SFIA v9

A broad mapping to illustrate related disciplines

Illustrative mapping of SWEBOK v4 Knowledge Areas and related disciplines to SFIA v9 skills

Core Software Development Lifecycle						
SWEBOK v4 Knowledge Area	Software Requirements	Software Architecture	Software Design	Software Construction	Software Testing	Software Maintenance
	<ul style="list-style-type: none">• Requirements definition and management• Real-time/embedded systems development• Methods and tools• Functional testing• Non-functional testing• Configuration management• Safety engineering <p>Related disciplines</p> <ul style="list-style-type: none">• Stakeholder relationship management• Business situation analysis• Feasibility assessment• User research• User experience analysis• Solution architecture• User acceptance testing	<ul style="list-style-type: none">• Requirements definition and management• Software design• Methods and tools <p>Related disciplines</p> <ul style="list-style-type: none">• Stakeholder relationship management• Knowledge management• Systems design	<ul style="list-style-type: none">• Software design• Real-time/embedded systems development <p>Related disciplines</p> <ul style="list-style-type: none">• Systems design• Safety engineering• User experience design• Solution architecture• Hardware design	<ul style="list-style-type: none">• Programming/software development• Real-time/embedded systems development• Systems integration and build• Functional testing• Non-functional testing	<ul style="list-style-type: none">• Programming/software development• Systems integration and build• Functional testing• Non-functional testing• Safety assessment• Real-time/embedded systems development <p>Related disciplines</p> <ul style="list-style-type: none">• User acceptance testing• Penetration testing	<ul style="list-style-type: none">• Application support• Programming/software development• Deployment• Release management
Cross-cutting Concerns						
SWEBOK v4 Knowledge Area	Software Configuration Management		Software Quality	Software Security	Software Engineering Professional Practice	
	<ul style="list-style-type: none">• Configuration management• Deployment• Release management• Systems integration and build		<ul style="list-style-type: none">• Quality management• Quality assurance• Safety assessment	<ul style="list-style-type: none">• Software design• Systems design• Information security• Information assurance• Non-functional testing• Penetration testing• Vulnerability assessment	<ul style="list-style-type: none">• SFIA's generic attributes, behaviors and levels of responsibility• Professional development• Artificial intelligence (AI) and data ethics	
Software Engineering Operations						
SWEBOK v4 Knowledge Area	Software Engineering Operations - Planning		Software Engineering Operations - Delivery		Software Engineering Operations - Control	
	<ul style="list-style-type: none">• Supplier management• Capacity management• Continuity management• Availability management• Service level management	<ul style="list-style-type: none">• Configuration management• Deployment• Systems integration and build• Budgeting and forecasting• Resourcing• Stakeholder relationship management	<ul style="list-style-type: none">• Service acceptance• Release management• Deployment• Problem management	<ul style="list-style-type: none">• Functional testing• Non-functional testing• Infrastructure operations• Stakeholder relationship management	<ul style="list-style-type: none">• Service level management• Change control• Problem management• Incident management• Customer service support• Knowledge management	<ul style="list-style-type: none">• Financial management• Cost management• Contract management• Infrastructure operations• Stakeholder relationship management
Management & Process						
SWEBOK v4 Knowledge Area	Software Engineering Management	Software Engineering Process	Software Engineering Models and Methods	Software Engineering Economics		
	<ul style="list-style-type: none">• Systems development management• Project management• Technology service management• Budgeting and forecasting• Cost management• Stakeholder relationship management• Performance management• Delivery management• Resourcing	<ul style="list-style-type: none">• Systems development management• Systems and software lifecycle engineering• Methods and tools• Measurement <p>Related disciplines</p> <ul style="list-style-type: none">• Organisational capability development• Quality management	<ul style="list-style-type: none">• Requirements definition and management• Software design• Systems design• Methods and tools <p>Related disciplines</p> <ul style="list-style-type: none">• User experience design• Data modelling and design• Business modelling• Scientific modelling	<ul style="list-style-type: none">• Systems development management• Investment appraisal• Benefits management• Financial analysis• Budgeting and forecasting• Cost management <p>Related disciplines</p> <ul style="list-style-type: none">• Portfolio management• Product management• Program management		

Benefits & uses of using SWEBOK and SFIA together

- Create unified model
- Gateway to introduce SWEBOK to employers who are using SFIA
- Integrate technical knowledge with behavioural factors/soft skills
- Enables consistent professional development across experience levels
- Prioritise / sequence 'just in time' learning – e.g., based on role and level of responsibility

Benefits & uses of using SWEBOK and SFIA together

- Create unified model – knowledge, skills, competency – for software engineering
- Gateway to introduce SWEBOK to employers who are using SFIA
- Integrate technical know how with behavioural factors/soft skills
- Enables consistent professional development across experience levels
- Prioritise / sequence 'just in time' learning – e.g., based on role and level of responsibility

A reference for curriculum development:

- Connecting engineering principles to workplace skills and responsibilities
- Designing learning experiences for students
- Employability and work-based learning
- Targeted continuing education for mid-career professionals (e.g. managers, architects)

A reference for curriculum development:

- Connecting engineering principles to workplace skills and responsibilities
- Designing learning experiences for students
- Employability and work-based learning
- Targeted continuing education for mid-career professionals (e.g. managers, architects)

For alternative entry-points

- Contextualize tool-specific knowledge gained through e.g. bootcamps / self-learning
- Guide learning beyond initial technical / tool specialization
- Assess and validate skills acquired outside formal education

specialization

- Assess and validate skills acquired outside formal education

g

onsibility

s

c knowledge
amps / self-

tial technical / tool

Any questions and ideas?

- Use the link or the QR code for resources related to SFIA and SWEBOK:SFIA mapping resources are available to explore in more detail
- Email: updates@sfia-online.org

https://bit.ly/swebok_summit_sfia

