

The University of Reading



**Enterprise Architecture and Education
Education and Enterprise Architecture**

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Architecture and Education

- Education, especially universities at the forefront of interoperability
 - Standard components
 - Standard interfaces
 - Architectures

- Examples
 - World Wide Web
 - Communication, Internet, Internet 2
 - Federated libraries, electronic exchange of information
 - Electronic learning environments

- Projects to date appear to be technology driven



Case Study: Schools Interoperability Framework

- US based initiative
- Seamless integration of instructional, administrative and communications tools
- Supported by the SIF Specification and a Certification program for products conforming to the specification





The Scope of SIF



- Zone Integration Server (ZIS)



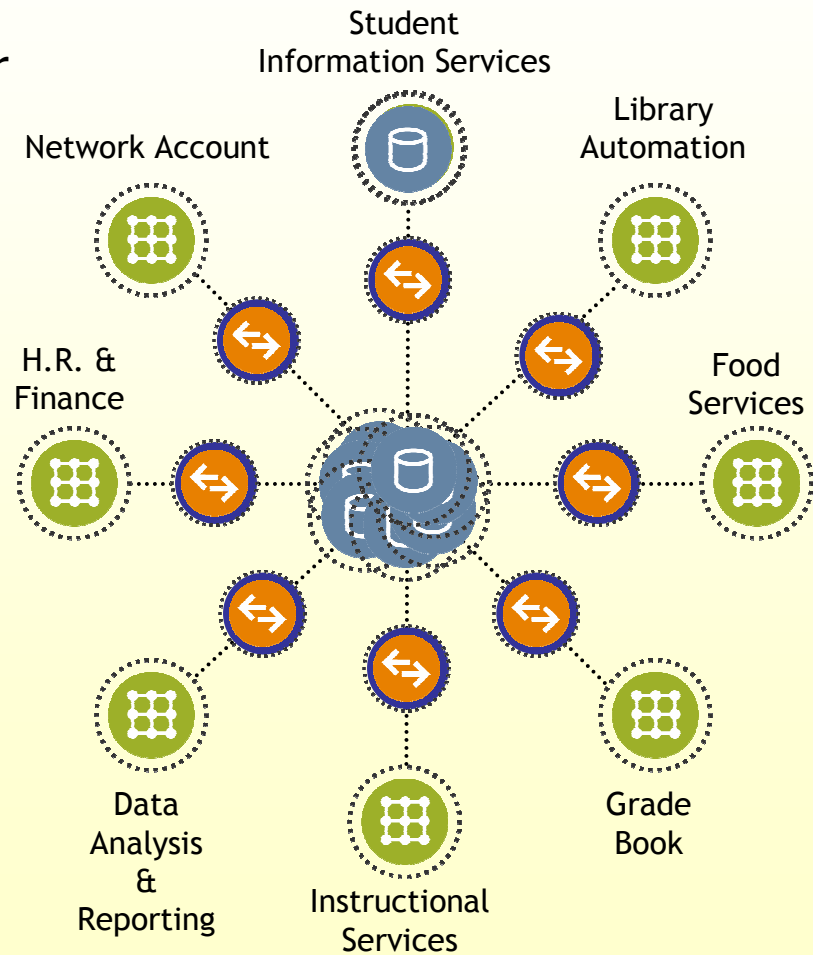
- SIF Agents



- Applications



- SIF Data Objects



The SIF "ZONE"



SIF Results

New Student Registering for Enrollment into:

- *Student Information System
- *ID Card System
- *Cafeteria Management System
- *Directory Service Application
- *Library Automation System

Typical School

- 49 minute task
- 10 times data entered

SIF School

- 4 minute task
- 1 time data entry

**45 minutes/student x 18,000 students =
6 FTE's!**

1/10th the Time – 1/10th the Risk



SIF: State Return on Investment

- ✓ Eliminate 23 Aggregate Reports
- ✓ Reduce 8 hours per school per report
- ✓ Reduce 16 hours per district per report
 - = 70,000 hours school staff
 - = 18,000 hours district staff
 - = \$1,760,000 est. state report savings



Case Study - Blackboard

- The educational equivalent of an ERP product
- Industry architecture based around a Commercial Off-the-Shelf product
- Open Architecture allows integration with wide variety of electronic learning environment functions
 - E.g. "Turnitin" plagiarism detection system



Opportunity

- IT represents a major cost for Education
- Enterprise Architecture represents a major opportunity for education establishments
 - To manage costs
 - To share costs



Education and Enterprise Architecture

- Growing recognition that Enterprise Architecture is important
- Rapidly growing demand for all types of Architect
- Protracted process for development of Architects
- There is a shortage of top class Enterprise Architects
 - Great for architects
 - Not so great for business
- The Education System has a role to play in developing quality Enterprise Architects



Education and Enterprise Architecture - Baseline

- Focus at all levels of Education is still primarily technology based
- The demand is increasingly for a more balanced curriculum for graduates who have Business and Technology skills



Case Study – e-Skills UK

- UK Sector Skills Council
 - “The voice of employers on IT and Telecoms to create the skills environment that businesses need to be productive and competitive”.
- Defined a curriculum for a combined Business and Information Technology undergraduate degree course
 - Mandatory Business Content
 - Mandatory Management Content
 - Mandatory Technology Content
 - Mandatory Industrial Experience
 - Certification mark for conforming courses





Case Study – e-Skills UK

- Results to date have been disappointing
- Little promotion to potential students and career advisors in schools
- No government support in terms of “student numbers”
 - Means no funding



Case Study: Information Technology at Reading



- Course developed in response to the needs of Industry
 - Less computing
 - Less coding
 - Less programming

 - More business
 - More integration

- Three strands
 - E-Business
 - Commercial Off-the-Shelf-Software
 - IT Support



Introduction of Architecture (and TOGAF) into the Syllabus

- 2003: Used Enterprise Architecture as an informal framework within which to introduce issues relating to E-Business
 - The concepts of business requirements
 - Multi-level Enterprise Architecture
 - Migration Planning
 - The role of COTS, Open Source

- 2004: Formal TOGAF course introduced as a final year undergraduate option
 - 20 lectures
 - Coursework
 - An examination
 - Much more rigorous than the base requirement for TOGAF certification
 - 18 TOGAF certified practitioners in 2005 (potential architects)
 - 17 TOGAF certified practitioners in 2006



Introduction of Architecture and TOGAF into the Syllabus

- 2005: Formal TOGAF course introduced as a option within a 1 year taught MSc course
 - Intensive 1 week course
 - 20 hours lectures
 - 12 hours syndicate work based around a case study
 - Practical use of an architecture tool
 - Coursework
 - An examination
 - Much more rigorous than the base requirement for TOGAF certification



The Outcome

- Successful students have
 - An understanding of the concepts of Enterprise Architecture
 - A knowledge of TOGAF
- In general students have no practical experience
- A small number of students show a clear aptitude for Enterprise Architecture



Enterprise Architecture as a Profession

- Objective: Establish Enterprise Architecture as a recognized profession in its own right
 - Recognized body of knowledge
 - Recognized professional qualification based on knowledge, experience and proven competence
 - Recognized career development path



How other professions operate

- Acquire the knowledge
 - Licensed undergraduate university courses built around a standard body of knowledge
 - Often involving periods of practical experience under supervision
 - Specialised postgraduate courses
- Gain the experience
 - Structured on-the-job training to demonstrate expertise and acquire experience (internships)
- Accreditation
 - Examination to achieve acceptance into the profession
- Examples
 - (Building) architects
 - Law
 - Medicine
 - Accountancy
- Escape Routes
 - Recognized routes for those who are not able to “stay the course”
 - Valuable roles as supporting team members

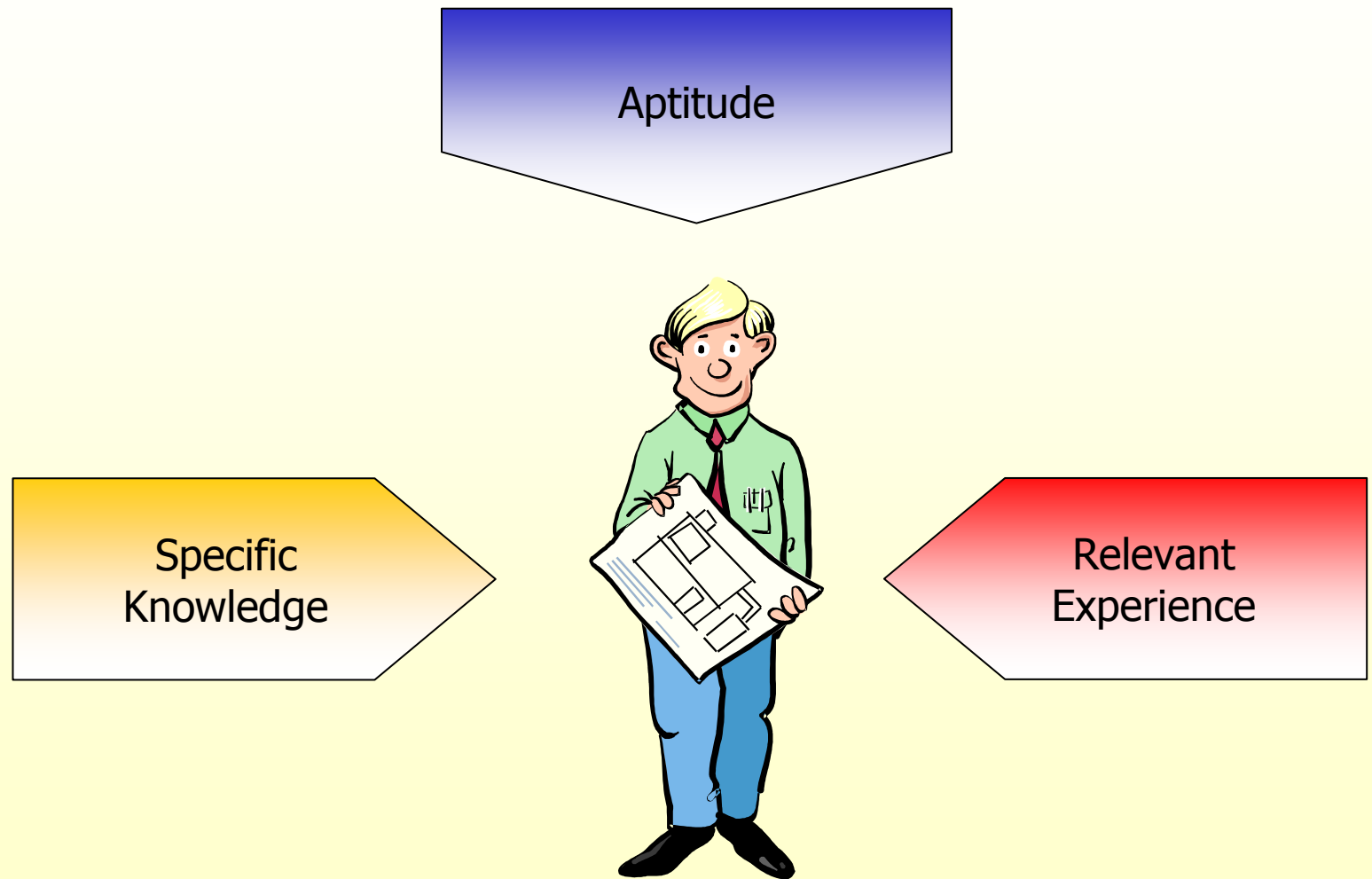


IT Architect Certification

- Launched by The Open Group in mid 2005
- Based on knowledge, experience and competence
- Certification based on peer review
 - Around 1500 architects have achieved certification in first year of operation
 - Supported by major companies
 - Program already has industry acceptance and critical mass

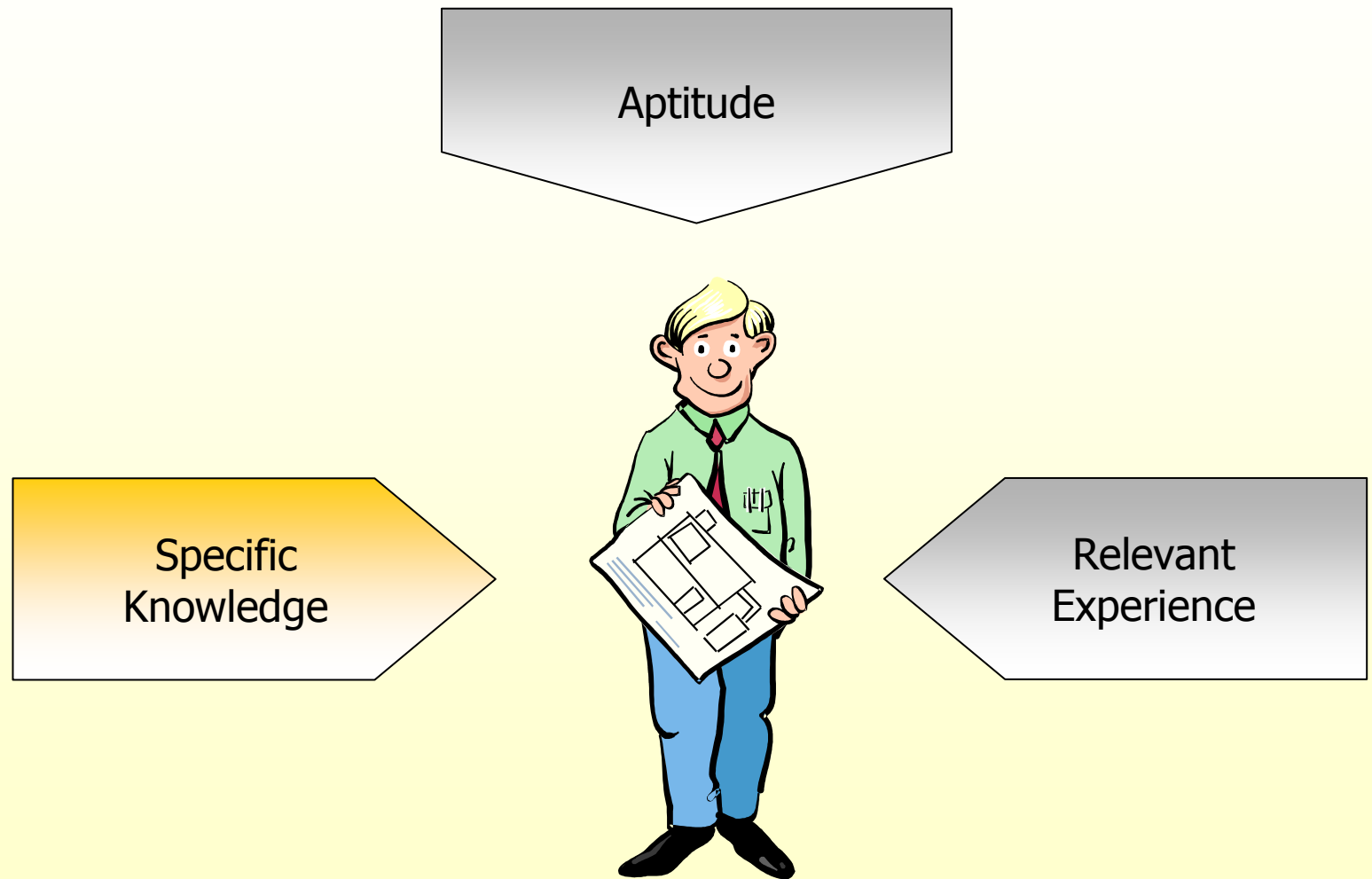


Developing an Architect





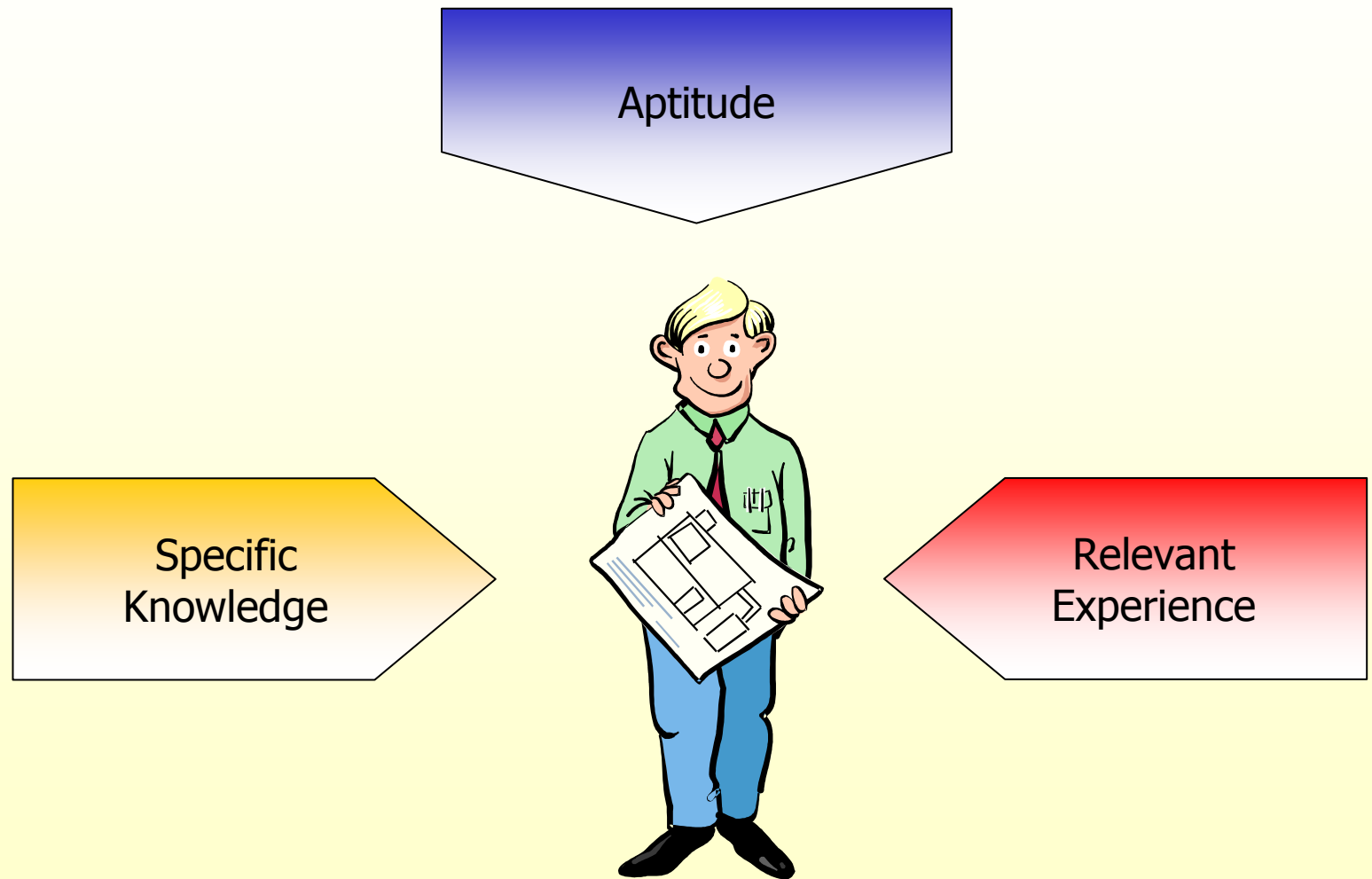
TOGAF Certification



Potential architects & other valuable members of the architecture team.

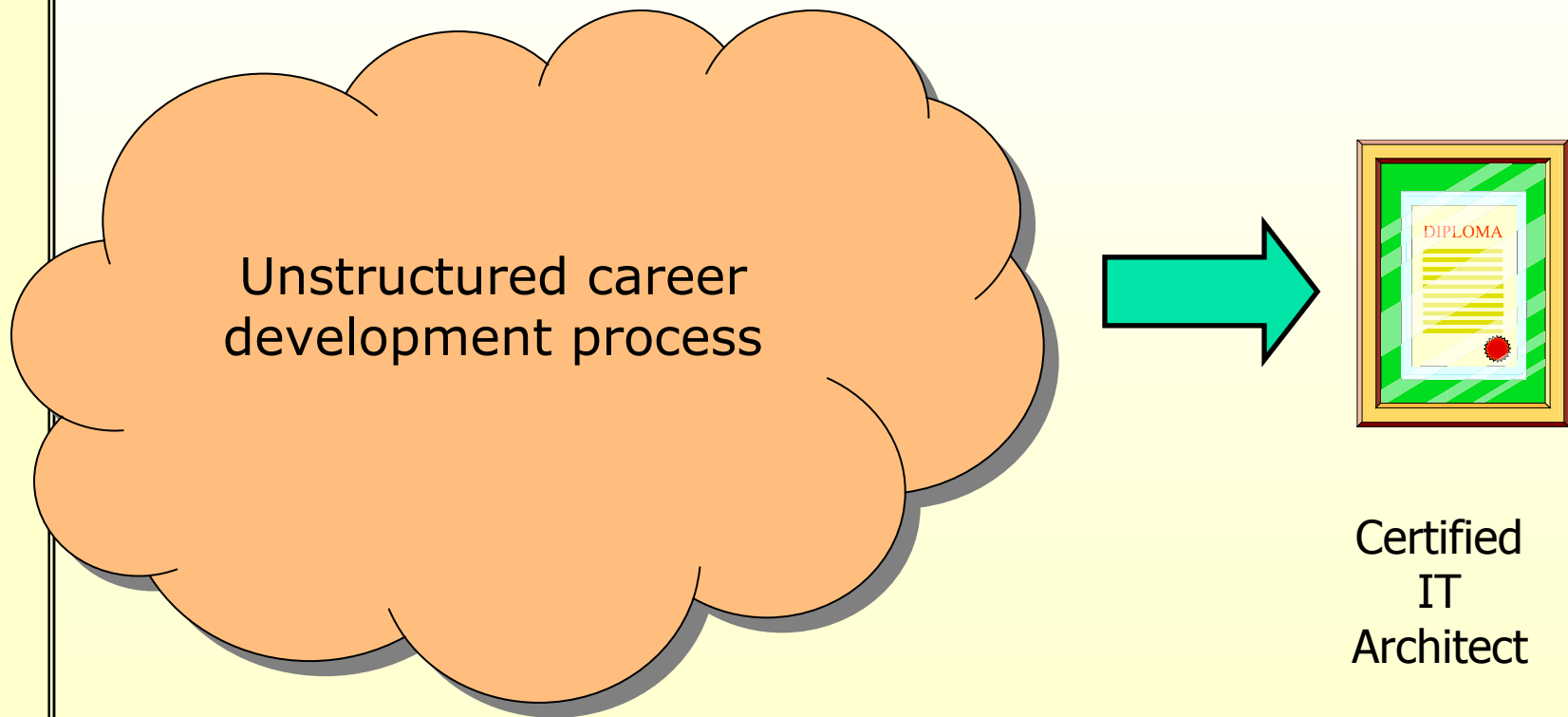


IT Architect Certification



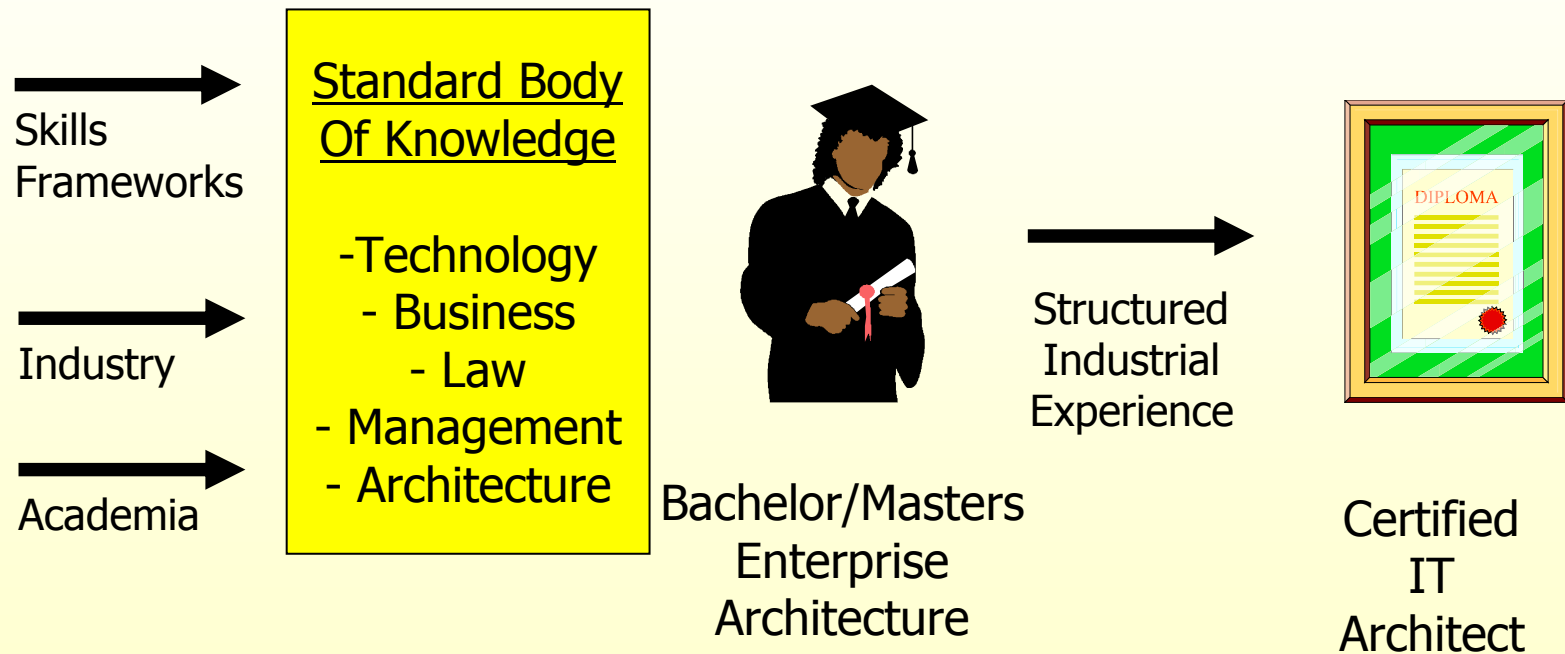


Current Development of an Enterprise Architect





Possible Professional Development of an Enterprise Architect





Role of Academia - Long Term Goal

- Broad range of universities offering accredited Enterprise Architecture courses built around a standard body of knowledge
 - Undergraduate
 - Postgraduate
 - Combination thereof

- Broad range of industrial partners providing structured on-the-job training
 - For graduates
 - Also as integral part of degree courses



Short Term Hurdles

- We don't yet have an agreed body of knowledge
- Creating a new degree course has significant lead time (especially undergraduate degrees)
 - Design course and get approval (1-2 years)
 - Promote to potential students (1-2 years)
 - First course (3-4 years)
- Lead time from concept to first graduate is between 5 and 8 years
- Enterprise Architecture is likely to take longer because of the need to involve multiple "schools" to cover the complete syllabus



We can start NOW

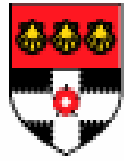
- Adding modules to existing courses is much easier than building new courses, especially optional modules
- It may be possible to evolve existing course modules to meet the needs of the Enterprise Architecture body of knowledge within existing constraints
- Some kind of register of university courses offering some Enterprise Architecture content would be valuable to potential students and industry



Offer to Academic Institutions

- Become an Academic Partner of The Open Group
 - You must have some Enterprise Architecture course content or research
 - No fees involved

- Benefits
 - Promote your current courses
 - Participate in the development of the Body of Knowledge
 - Share experiences, share resources



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