

IT Industrial Certifications in Practice

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Abstract—IT industrial certifications have become successful response to the extremely fast and constant changes in the industry of information and communication technologies. The certifications are widely accepted within the industry as industry standards for assessment of particular technical skills and knowledge. Speaking of local conditions in Slovakia, concept of industrial certification needs to put more emphasis and raise awareness. This paper presents general overview on IT certifications. It defines and summarises the types and categories of IT certifications, describes certification process and relation of certification to general training process. Benefits of certification for individuals and organisations are also outlined. Furthermore, the paper presents one of the most globally successful IT certification – Microsoft Office Specialist and finally it shares local practical experiences with IT certifications in Slovakia.

I. INTRODUCTION

Information and communication technologies (ICT) have become very significant part of modern civilisation. We encounter them in every-day routine, both in personal life and work. Thanks to these technologies, new market segments, areas of business and career paths have being established requiring skilled employees – from standard information workers to highly experienced IT professionals. New technologies emerge continuously and replace the previous ones. The ability to use and utilise current ICT determines our future professional career and job opportunities.

The growth and use of ICT and the resulting demand for workers with specialized skills have placed a considerable pressure on traditional educational systems to provide a qualified and sustainable ICT workforce. In response to constant changes and advances in ICT and slow response from traditional education, ICT industry has established industrial certification as preferred way to assess and measure skills and knowledge. **Certification (of skills and competences) results from voluntary evaluation process whereby an individual's knowledge and/or skill in a particular area of interest are validated against a set of predetermined skills requirements** e.g. skills standards by means of an objective assessment [1].

In 1989, Novell created the first IT certification in response to a lack of trained individuals to support their mission critical tasks and the inability to turn to the

traditional educational system for a trained supply of workers [2].

Industrial certification plays an important role in today's ICT industry mostly because of the following reasons:

- Industrial certification represents **standardised method** for assessment of knowledge and skills in specialised area.
- Certification schemes **map directly the current technologies with defined set of skills required to operate these technologies.**
- Certifications are **globally recognised** across the particular industry.

Certification process comprises all activities by which a certification body establishes that a person fulfils specified competence requirements. This process is standardised and acknowledged all across the particular industry.

In other words, holding an IT industrial certificate means that we are qualified enough to operate the certain ICT and this qualification is globally recognised in the ICT industry. Two different individuals (from different parts of the world) holding the same certain industry certificate have the same level of skills and knowledge. Particularly, the momentum of standardisation and globalisation give industrial certification a great deal of importance.

It is necessary to mention the difference between certificate and industry certificate. The first one usually means the documents acknowledging attendance in an instructor-led course or any form of formal training while the industry certificate is perceived as a credential, a result of an objective assessment procedure running by the third party, that an individual met the performance specifications delineated in job profiles recognised by industry stakeholders.

II. CATEGORISATION OF IT CERTIFICATION

There are many possible ways how to categorise the available industrial certifications in IT. To bring up some main categories:

- **Vendor orientation:**
 - Vendor neutral: certification is not aligned to a particular producer (company) but technology as itself (for example CompTIA)

- Vendor centric (vendor specific): certification is aligned and directly managed by a particular technology producer (e.g. Microsoft Office Specialist)
- **Expertise level:** entry, intermediate, advanced (expert)
- **ICT skills level**
 - Certifications for digital literacy: assess the very basic ICT skills (e.g. IC³, ICDL)
 - Certifications for end-users (e.g. Microsoft Office Specialist): the ones who need to have their ICT competences assessed and certified as a tool to do a job which is primarily related to a non-ICT-sector of industry
 - Certifications for IT professionals (e.g. Cisco Certified Voice Professional): this address specialists, who want to demonstrate a specific knowledge or competence in their core activity ICT field
- **Product vs. technology oriented**
 - Product oriented certification: certification focuses on a particular product and/or its version (e.g. Microsoft Windows 7)
 - Technology oriented certification focuses on the particular technology, rather than on a specified product/version
- **Certification complexity**
 - One-exam certification: to acquire the industrial certificate an individual must pass only one single certification exam (e.g. Cisco Certified Network Associate)
 - Chain certification: an individual must successfully pass more than one exam, or have successfully completed lower level exam (e.g. Check Point Certified Security Engineer)
- **Language of certification**
 - Single language: the certification is available only in one language
 - Multi-language (localised): exams are available in many language

Usually, each globally recognised IT certification is provided at least in English language. Many of them are available in the main world language (e.g. Chinese, Spanish, Russian, French etc.)
- **Result evaluation**
 - Automatic non-human evaluation: test is evaluated by a testing system, without any input needed from a proctor
 - Human based evaluation: test must be evaluated by proctor (administrator) manually
- **Delivery method**
 - Computer based exam: exam is delivered via specialised testing software
 - Semi-computer based exam: during an exam a computer is used but part of exam is delivered traditionally (e.g. by pen&paper)
 - Pen&Paper based exam
 - Oral exam

- Web-based testing: a candidate does not have to take an exam in the testing centre, but he can do it via internet and online
- **Area of technology:** digital literacy, desktop applications, networking, operation and server Systems, development tools, process management, virtualisation, security, etc.

Each type of certification has its advantages and disadvantages. The current trend is to provide the certification exams by using computer based testing, preferably as web-based (online testing).

III. ORGANISATION OF IT CERTIFICATION

The standard organisation model of IT certification involves several important stakeholders (see Fig. 1).

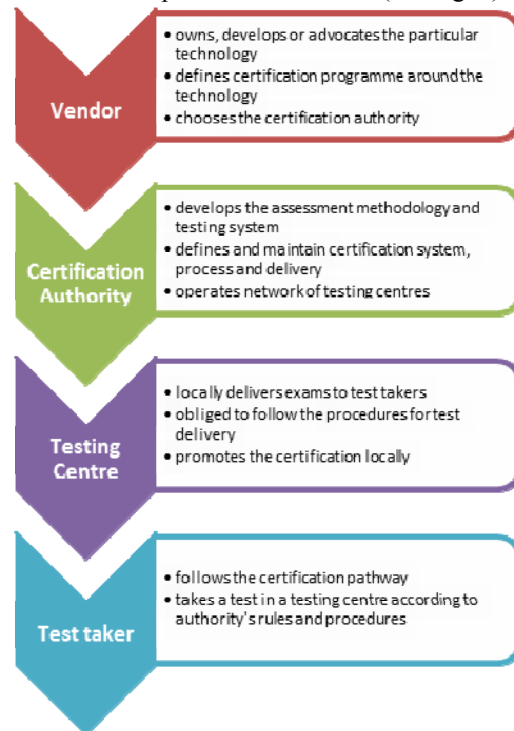


Figure 1. Organisation of IT Certification

1. **Vendor (or sponsor):** usually IT company which owns, develops and supports particular ICT (meaning hardware, software or process). As such technology is standardised and widely accepted by the industry, the company establishes and maintains a certification programme for this technology. All of the globally leading ICT companies have developed their own certification programmes (e.g. Microsoft, Cisco, IBM, Oracle etc.). Also non-commercial organisation might become a vendor for IT certification – for example CompTIA which is a non-profit trade association advancing global interests of IT professionals and companies.
2. **Certification Authority:** is responsible for developing, maintenance and updating the assessment methods for particular vendor's certification programme, certification system, process and delivery. The authority also manages and carries out the certification (in terms of process

and delivery). It must meet at least two basic requirements:

- a. Deliver an assessment based on industry knowledge, independent from training courses or course providers.
- b. Grant a time-limited credential to anyone who meets the assessment standards.

The certification authority co-operates closely with one or many vendors (as its clients) while still being neutral from them. Certification authority usually operates internationally or globally. Currently there are few main global certification authorities: Certiport, Prometric and Pearson VUE. There are also other authorities which may operate more locally and in more specialised segment of IT industry.

3. **Testing centre** is a local company or institution (e.g. school) which is responsible for particular delivery of certification exams in its geographical area of operation. Testing centre must meet the certification authority's technical, organisation, process and personal requirements to ensure that the certification process has its defined quality.
4. **Test taker** (or candidate) is a person who wishes to take an exam (test).

Earning certification means successfully passing one or several certification exams. Rules how an exam is passed are defined by the certification authority.

Delivery process is carried out by a testing centre and is (mostly) computer based. Exam is provided by a testing system (local or online application). Test taker is required to follow exam's instructions, tasks and questions while being passively monitored by test administrator (or proctor). Test taker's actions or/and results are evaluated automatically by testing system or manually by the administrator and is provided with results. Results are in the form of test report with final overall number of points.

Certification programme is usually structured in terms of defined set of skills to achieve, level and dependencies among exams and certification. The programme is usually graphically displayed in form of a certification map to let test takers have better and more convenient overview of the whole programme. An example of certification map can be seen in Fig. 2.

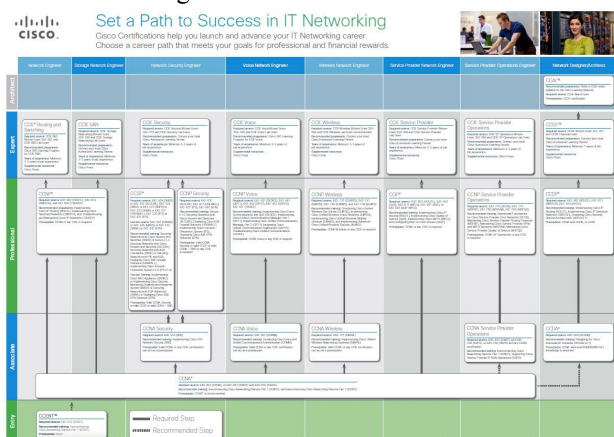


Figure 2. Map of Cisco certifications [3]

Recertification is an important indicator to IT professionals and their employers, ensuring that the

certification holder has kept up with current trends in the technology. Valid certifications may be renewed indefinitely, but without timely renewal, certifications expire or become inactive. To keep certifications current, individuals should recertify by advancing to the next level of certification or passing the designated recertification exam(s). [4]

IV. PLACE OF CERTIFICATION IN TRAINING PROCESS

General training process in ICT industry involves industrial certification as its natural part. In fact, certification is necessary output of the whole process.

The process consists of several stages (see Fig. 3):

1. **Definition of set of skills and standards**
2. **Main training process** (diagnostic test – training – test)
3. **Industrial certification**

The whole process is framed by education (meant as formal education system) and work experience or vocational training.

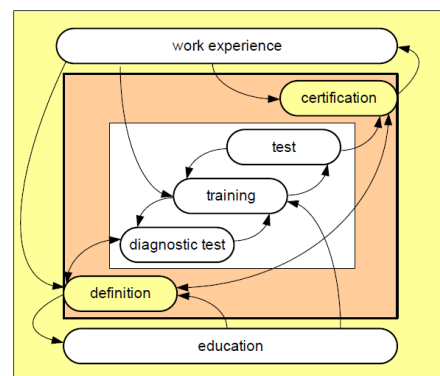


Figure 3. Place of certification in learning process [5]

There are several stakeholders participating in the whole training process: state or government (through its educational system), training providers (as bodies delivering the particular training), certification authorities, and employers as definers of wanted qualifications.

Certification in this model can be seen also as a feedback on the main training process. Successful participant should go to take an exam fully prepared and fully aware of its skills, strengths and weaknesses.

Work experience determines a required set of skills which need to be covered through the training process. There should be a direct link from work experience to definition stage.

The whole training process is obviously revolving, which means that when finishing one stage, more advanced stage is awaiting. This ladder finally leads to the highest possible qualification in the industry.

V. HOW TO GET PREPARED?

In the previous section we outlined a place of certification in general training process. However, how to get prepared for a certification exam? Which are the best how to succeed?

Study obviously depends on the exam's difficulty. The length of the study might take from 1 week to several years. Practice show that the most optimal way for study is to combine several possibilities:

1. **Books** are relatively cheap, often come with great practice questions and are specifically geared towards the exams.
2. **Online certification forums** are a great way to interact with a community of people who are interested in the certification.
3. **Take a training class** (or preparation course). Whether it is online or in a classroom, training offers a hands-on way to learn the material. It is more costly, but it is usually a guaranteed way to pass exams.
4. **Online Practice Tests.** Some are free and others cost money, but all of them will get a test taker in the test-taking mode. Most online practice exams run from 20€ to 70€ and provide a solid way to test the knowledge and readiness.
5. **Visit vendor sites** to find a link that point to education or certification to learn everything about the certification process as well as recommended training and study tools. They often offer exam guides and practice questions free for the taking. [6]
6. **Practical experience** is a critical way how to acquire the knowledge as well as context of the technology. It is necessary to understand that one learns not just to pass the exam but to gain more knowledge, skills and move up in his qualification. Therefore a practical experience is essential in this process.

VI. WHY SHOULD I AIM FOR CERTIFICATION?

The five main reasons and motivation for an individual in Europe to pursue e-skills certification are (in order of decreasing importance):

1. increase credibility
2. assessment of knowledge
3. preparation for a new position
4. increase personal productivity
5. fulfilment of job requirements

The main reasons in other parts of the world are slightly different. For example, ICT workers in North America go for certification in order to be up-to-date with new technologies [7].

Critical momentum for certification comes with focus on students and young people and their chances to be successful at their future career. Personal agencies in the United States of America claim that young people with IT certificate are twice as likely to be placed in the labour market, 50% more likely to be hired on full time and get average 10-15% higher pay than non-certified workers [8].

Survey [9] carried out in Slovakia and Czech Republic in 2009 shows that 81% of respondents think that IT certification is important for further career.

VII. BENEFITS FOR ORGANISATIONS TO HAVE CERTIFIED EMPLOYEES

Certified professionals give an organization a competitive advantage. They can help increase customer satisfaction, reduce operational costs, and push service to a higher level, which translates into an excellent return on investment.

The survey of more than 1 100 IT managers responsible for more than 3000 teams [10] shows that certified teams are 28% more productive. Almost 750 of managers believe that certifications are important to team performance and 66% of managers believe that certifications improve the level of service and support offered to IT customers. A concentration of certifications in a team is clearly linked to improved capability and team performance.

Other study of 14 000 end-users certified on Microsoft Office Specialist conducted [11] shows that employees with a (Microsoft Office Specialist) certification contribute to more knowledgeable and productive working environment:

- 62% of certified employees say that they are more productive than their non-certified co-workers.
- 85% of supervisors say Microsoft Office Specialist certified employees are more productive because of their certification.
- Nearly 70% of certified employees say they make a greater contribution to their employers with certification.
- 60% of certified employees say they take on more complex or difficult assignments after certifying.

Certification also supports the job satisfaction and loyalty. Employees who go through the process of (Microsoft Office Specialist) certification are more likely to gain the skills that enable them to feel more confidence and satisfaction by progressing in their employment. By providing certification opportunities, managers retain the skilled and dedicated employees that are essential to an organization's success.

VIII. OVERVIEW OF THE MOST POPULAR IT CERTIFICATIONS IN THE WORLD

The following list comprises the most popular IT certifications in 2011 (listed in alphabetical order) [12]:

- Certified Information Security Manager (CISM)
- Certified Information Systems Auditor (CISA)
- Checkpoint CCSA NGX certification
- Checkpoint CCSE NGX Certification
- Cisco Certified Internetwork Expert (CCIE)
- Cisco Certified Security Professional (CCSP)
- GIAC Security Audit Essentials
- Microsoft Certified Technology Specialist (MCTS)
- Red Hat Certified Architect (RHCA)
- vmware Certified Professional

All of the above mentioned certifications are for IT professionals – senior and expert specialists in particular areas of ICT. What is possible to see from the list is that there are few categories in which these popular certifications belong: networking, security, operating systems, virtualisation and key Microsoft technologies.

On the other hand, we can name 10 entry-level certifications which are designed to support the start of career in ICT industry [13]:

1. CompTia A+
2. Microsoft Certified Professional
3. Microsoft Certified Desktop Service Technician
4. CompTia Security+

5. Certified Internet Webmaster (CIW) Associate
6. Sun Certified Java Programmer
7. Cisco Certified Networking Associate
8. Microsoft Office Specialist
9. MySQL
10. Graphics & Internet Certifications

IX. MICROSOFT OFFICE SPECIALIST – GLOBALLY RECOGNISED CERTIFICATION FOR IT WORKER

Microsoft Office Specialist (MOS) is the credential required by academic and business institutions, recognized globally as the premier credential chosen by individuals seeking to validate their knowledge, skills and abilities relating to the Microsoft Office systems.

MOS is independent confirmation of an individual's mastery of Microsoft Office programs via realistic, performance-based tests. It is the only credential of its kind provided by Microsoft. The certification programme was created and launched by Certiport in 1997.

The MOS certification is structured in 3 bottom-up levels providing a continuum for skills qualification and validation:



Microsoft Office Specialist (Core Certification) validates skills with the Microsoft Office 2010 suite. Exams are available on Microsoft Office 2010 products:

1. Microsoft Word 2010
2. Microsoft Excel 2010
3. Microsoft PowerPoint 2010
4. Microsoft Access 2010
5. Microsoft Outlook 2010
6. Microsoft Project 2010
7. Microsoft SharePoint 2010



Microsoft Office Expert validates advanced skills in specific Microsoft Office applications.

Gaining the credential requires that a candidate pass either of these exams:

1. Word 2010 Expert
2. Excel 2010 Expert



Microsoft Office Master denotes fluency in several important Microsoft Office applications. To achieve this designation, a candidate must pass four exams: Word 2010 Expert, Excel 2010 Expert and PowerPoint 2010 and either Outlook 2010 or Access 2010.

Test questions are based upon "objectives or tasks" defined by more than 400 Subject Matter Experts in 20 countries, correspond to real world tasks, written by professional item writers and validated by professional psychometricians.

For **academic institutions** the MOS certification:

- Provides relevant, state-of-the-art validation of course offerings
- Embeds digital literacy within programs and curricula
- Offers comprehensive, cost-effective way to give students the opportunity to develop skills

necessary for academic work and required by businesses

- Enhances instructor development programs

The certification also:

- Enables students to progress through coursework and curriculum with greater ease and efficiency
- Empowers students with individual differentiation, setting them apart from others pursuing future academic admissions and employment
- Delivers real-world, recognized credentials—MOS is a distinguished credential for students when applying for jobs, demonstrating workplace readiness

The exam delivery system is very straightforward and is standardised:

1. Candidates take exam in proctored environment of test centre. The exam takes 45 minutes.
2. Candidates receive printed score results. Results are then uploaded to global candidate database.
3. Certiport delivers certificate to passing candidates.
4. Candidates can view their online Digital Transcripts through website www.certiport.com.

Certiport prepares individuals with current and relevant digital skills and credentials for the competitive global workforce. These solutions are delivered worldwide and include Certiport Internet and Computing Core Certification (IC³), Microsoft Office Specialist, Microsoft Technology Associate, Adobe Certified Associate, CompTIA Strata Fundamentals of IT Technology and the iCritical Thinking™ Certification.

Certiport delivers exams in 141 countries and 24 languages. Roughly, 106 000 exams are administered monthly through a network of more than 10 000 Certiport Centers worldwide. Totally, Certiport has delivered more than 7.6 million exams worldwide.

X. PRACTICAL EXPERIENCE WITH IT CERTIFICATIONS IN TRAINING INSTITUTE ELFA

Training Institute elfa is the leading training provider for IT trainings and certification in Slovakia. The company provides client with high-quality training activities, industrial certification, complex project management for educational projects and e-learning and e-content services.

The institute runs, since 2004, the testing centres for all major certification authorities: Certiport, ECDL, Prometric, Pearson VUE. Thanks to this unique combination it is ready to accommodate clients with most of available IT certifications. Annual number of certified candidates is approx. 1000 individuals, mostly IT professionals. The most popular exams are Cisco Certified Networking Associate, Microsoft Certified Professional and vmware Certified Professional.

IT certification has been included in the standard training process for particular sets of trainings: mostly trainings on Microsoft Office (with ECDL and/or MOS certifications) or trainings on Cisco networking technologies (CCNA certification). Certification was part of several training projects focusing on increasing employability of long-term unemployed people. The complex training process included diagnostic (entrance) testing, instructor-lead training, e-learning up to

certification itself. Also the back loop from certification to training is important dimension for increasing the quality of training services – as new certifications are introduced, this momentum launches process of adjusting existing/development new training content to align to the change certification programme.

The comfort of testing delivery is currently being substantially extended by implementing online registration system for certification exams. This system helps candidates to register for an exam at the Training Institute elfa and is standardised for exams tested via different certification authorities.

Training Institute elfa operates as *Certiport Authorised Solution Provider* for Slovakia and Czech Republic as well as *Microsoft Academic Solution Provider* for these two countries. It has broad experience and contact with academic sector – thanks to involvement in *Microsoft IT Academy Program*, *Cisco Networking Academy Program* and also thanks to various academic projects (e.g. national projects *Modernization of Education at the Primary Schools*, or *Modernization of Education at the Secondary Schools*).

CONCLUSION

This paper presents general issues on phenomenon of IT certifications. It introduces the concept, necessity and structure of certification followed by discussing benefits and advantages of certification for individuals as well as for companies and organisations. Further, Microsoft Office Specialist as an exemplary IT certification is introduced giving also short introduction of Certiport and Training Institute elfa.

We believe that this paper outlines and gives good first impression on very important part of IT training industry – which is certification. We think that IT certifications have become essential part in the IT industry.

We also feel that these topics need further and more detailed examinations which might be very promising starting point for further papers or articles.

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