Introduction to ISO/IEC 29110 Set of Standards and Technical Reports for Very Small Entities (VSEs)
Generic Profile Group

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Overview of the Course

• Explains the justification and development steps that led to the ISO/IEC 29110 set of Standards, Technical Reports and Deployment Packages for VSEs,
• An introduction to the set of ISO/IEC 29110 documents,
• A description of the Support Mechanisms to facilitate adoption of standard by VSEs:
  – Deployment Packages
  – Pilot Projects
  – Network of Support Centers
  – Education Interest Group
  – Public web site

The “Generic” profile group has been identified as applicable to a vast majority of VSEs that do not develop critical software. The “Generic” profile group does not imply any specific application domain,
Content

- **Introduction**
- Set of requirements to develop standards for VSEs
- Strategy of the ISO Working Group to develop standards and guidelines for VSEs
- Concept of Profiles
- Deployment Packages
- Pilot Projects
- Miscellaneous

The Innovation Process and the Development of the International Standard

Adapted from Rogers 2003

- **Phase 1 - Recognition of Needs and Problems.**
  - Began at a meeting in Australia of an ISO meeting (2004)
- **Phase 2 - Basic and Applied Research**
  - Survey of Process Improvement Initiatives (2005)
  - Survey of VSEs worldwide (2006)
- **Phase 3 - Development**
  - The Development of International Standards for VSEs (2006 - 2009)
- **Phase 4 – Commercialization (2010)**
- **Phase 5 - Diffusion and Adoption**
  - Development of the Means to Accelerate the Adoption and Utilization of International Standards by VSEs (2006 - )
- **Phase 6 - Consequences (2010 - )**
**Background**

- A **VSE** is defined as an entity (i.e. enterprise, organization, department or project) having **up to 25 people**.

- The **majority** of software entities fall within the **VSE category**.

- Industry recognizes the **value of VSEs** in contributing valuable **products and services**.

- VSEs also **develop and/or maintain software** that is **used** in **larger systems**
  - **Recognition of VSEs as suppliers** of high quality software is required.

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**The Importance of VSEs**

**An Example from Japan**

A software defect from one of the producers went into a product and resulted in over $200 M lost by the manufacturer

**Very Small Entities (VSEs):** enterprises, departments, or projects having up to 25 people.

Adapted from K. Shintani, Small Settings Workshop, SEI, 2005
Size of Enterprises

- **European Union**
  - 93% are micro enterprises (less than 10 employees)
- **Micro enterprises account for 70% to 90% of enterprises in OECD* countries (57% in US)**
- **Greater Montréal Area - Software Enterprises.**

<table>
<thead>
<tr>
<th>Number of employees</th>
<th>Number of Software Enterprises</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 25</td>
<td>540</td>
<td>78%</td>
</tr>
<tr>
<td>25 to 100</td>
<td>127</td>
<td>18%</td>
</tr>
<tr>
<td>Over 100</td>
<td>26</td>
<td>4%</td>
</tr>
</tbody>
</table>

50% of enterprises have less than 10 employees
Source: Montreal International, 2006

* OECD: Organisation for Economic Co-operation and Development

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Differences Between Small and Large Companies

**Characteristics**
- Specific business models and goals
- Market niche
- Limited financial resources
- Very good responsiveness and flexibility as competitive advantage
- Informal management
- Resource constraints
- Lack of regular employee training

**Standardization Aspects**
- Lack of awareness of importance of standards
- Difficulties in implementing most standards
- Inability to make effective use of standards available
- Lack of understanding of the language, terminology, etc. of the standards

Adapted from Marty Sanders, LERO, 2007
Some Initiatives to Help SMEs and VSEs

- **Europe**
  - Ireland - Centre for Software Process Technologies (CSPT)
  - Belgium - Centre d’Excellence en Technologies de l’Information et de la Communication (CETIC)
  - Ireland (LERO)
  - Luxembourg - Public Research Center Henri Tudor
  - UK - National Computing Center
  - European Software Institute – IT Mark
- **Australia** - Software Quality Institute (Rapid)
- **Latin Countries**
  - Mexico - Moprossoft
  - COMPETISOFT Project – 13 Latin American countries, Spain, Portugal.
  - Columbia – ParqueSoft
- **Asia**
  - Thailand - Association of Thai Software Industry
  - Hong Kong – Productivity Council
- **North America**
  - ÉTS – Technology Transfer Center for small and very small software enterprises
  - Software Productivity Center (SPC) - Vancouver
  - Software Engineering Institute - Improving Processes in Small Settings (IPSS)

**SMEs**: Small and Medium Enterprises

Examples of Issues and Solutions (Proposed by Thailand)

SMEs are not ready to implement the whole standard*. → Standard should be broken down in to stages or levels in order to fit all sizes of SMEs.

Not all standard activities are suitable for SMEs’ operations → Need to modify activities to suit SMEs’ operation – product and project based type of business.

There is no assessment model. → A set of checklists was developed for use by assessors.

Most software developers are not document-oriented. → Provide packaged templates and examples for rapid documentation.

Source: * ISO 12207 Standard
History of Working Group 24

• SC7 Plenary Meeting - Australia – 2004
  – Canada raised the fact that small enterprises require standards adapted to
    their size and maturity,
  – Establishment of a Special Interest Group.

• Two Workshops - Thailand – 2005
  – Sponsored by the Thai Industrial Standard Institute and the Thai Software
    Industry Promotion Agency,
  – Representatives
    • Australia, Belgium, Brazil, Canada, Czechoslovakia, Finland, South
      Africa, South Korea, USA and Thailand.

• SC7 Plenary Meeting - 2005 – Finland.
  – Proposal to establish a new WG was tabled
  – Twelve countries offered their support to staff WG 24

• WG 24 Meetings
  – Italy (2005), Thailand - Luxembourg (2006), Russia – Canada (2007),
    Germany – Mexico (2008), India - Peru (2009), Japan - USA (2010).

Mandate Working Group 24

• Project Scope
  – Organizations and projects with up to 25 employees.
  – ISO/IEC 12207, the associated guidance document and other relevant
    SC7 Standards (e.g. ISO/IEC 15504, ISO/IEC 90003).
  – Production of Technical Reports (Guides) establishing a common
    framework for describing assessable life cycle profiles used in VSEs,
    including small software systems development departments and
    projects within larger organizations.
  – Guides to be based on International Standardized Profiles (ISP)
    identifying which parts of the existing standards are applicable to
    VSEs, at a specific level and for a specific domain.
  – Guides which can be applied throughout the life cycle for managing
    and performing software development activities; the ultimate goal
    being to improve the competitiveness and capacity of VSEs.

* Mandate of ISO SC7 working groups does not include activities related to
  facilitating the deployment of an ISO standard or technical report.

Source: NWIP 2005
Vision Statement

• This project will:
  – Provide VSEs with a way to be recognized as producing quality software systems without the initial expense of implementing and maintaining an entire suite of systems and software engineering standards or performing comprehensive assessments;
  – Produce guides which are easy to understand, affordable and usable by VSEs;
  – Produce a set of profiles, which builds on or improves a VSE’s existing processes, or provides guidance in establishing those processes;
  – Address the market needs of VSEs by allowing domain-specific profiles and levels;
  – Provide examples to encourage VSEs to adopt and follow processes that lead to quality software, matching the needs, issues and risks of their domain;
  – Provide a baseline for how multiple VSEs can work together or be assessed as a project team on projects that may be more complex than can be performed by any one VSE;
  – Develop scalable profiles and guides so that compliance with ISO/IEC 12207 and/or ISO 9001 and assessment become possible with a minimum of redesign of the VSE’s processes.

Source: NWIP

Approach of Working Group 24

1. Conduct an international survey of VSEs
   • To identify their problems with standards and their needs
2. Focus first on Very Small Enterprises
   • Our work should also apply to very small teams or projects
3. Develop Standards and Technical Reports by assembling ‘Parts’ from existing standards (e.g. from ISO/IEC 12207)
   • Profiles (stages)
     • First for Generic software development VSEs
4. Develop detailed Guidelines
5. Conduct Pilot Projects
6. "Market" WG24 products
   • International Network of Support Centers for VSEs
   • Conferences and courses
   • Publish case-studies of pilot projects conducted
International Survey of VSEs

• **Objectives**
  • Identify VSEs' **utilization of standards**
  • Identify **problems** and potential **solutions** to help VSEs apply standards and become more capable and competitive.

• **Method**
  • **Web-based** Survey
  • Questionnaire in **9 languages** – English, French, German, Korean, Portuguese, Russian, Spanish, Thai and Turkish.
  • **Invitation** to participate in survey widely **broadcasted** via:
    • WG 24 Network of contacts
    • Centers and initiatives focused on SMEs/VSEs
      – e.g., SIPA (Thailand), CETIC (Belgium), Parquesoft (Colombia)
    • **SPINs** (Software Process Improvement Network)
      – Affiliated/Sponsored by the Software Engineering Institute

Responses from 32 Countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of Responses</th>
<th>Country</th>
<th>Number of Responses</th>
<th>Country</th>
<th>Number of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>2</td>
<td>Finland</td>
<td>13</td>
<td>New Zealand</td>
<td>1</td>
</tr>
<tr>
<td>Australia</td>
<td>10</td>
<td>France</td>
<td>4</td>
<td>Peru</td>
<td>4</td>
</tr>
<tr>
<td>Belgium</td>
<td>10</td>
<td>Germany</td>
<td>1</td>
<td>Russia</td>
<td>4</td>
</tr>
<tr>
<td>Brazil</td>
<td>72</td>
<td>India</td>
<td>57</td>
<td>South Africa</td>
<td>10</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>3</td>
<td>Ireland</td>
<td>10</td>
<td>Spain</td>
<td>4</td>
</tr>
<tr>
<td>Canada</td>
<td>10</td>
<td>Italy</td>
<td>2</td>
<td>Taiwan</td>
<td>1</td>
</tr>
<tr>
<td>Chile</td>
<td>1</td>
<td>Japan</td>
<td>3</td>
<td>Thailand</td>
<td>59</td>
</tr>
<tr>
<td>Colombia</td>
<td>109</td>
<td>Korea (South)</td>
<td>4</td>
<td>Turkey</td>
<td>1</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>3</td>
<td>Luxembourg</td>
<td>3</td>
<td>United Kingdom</td>
<td>2</td>
</tr>
<tr>
<td>Dominican Republic</td>
<td>1</td>
<td>Mexico</td>
<td>20</td>
<td>United States</td>
<td>3</td>
</tr>
<tr>
<td>Ecuador</td>
<td>9</td>
<td>Morocco</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**435 responses**
Distribution of Employees in Enterprises Surveyed

- 36% 0-9
- 21% 10-25
- 16% 26-49
- 11% 50-249
- 9% 250 +
- 2% Other

Role of Respondents

- 21% Director
- 31% Manager
- 31% QA
- 11% Coordinator
- 4% Consultant
- 1% Blank
- 1% Other
### Types of Software Development

<table>
<thead>
<tr>
<th>Type</th>
<th>Number of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customized</td>
<td>120</td>
</tr>
<tr>
<td>In-house</td>
<td>40</td>
</tr>
<tr>
<td>COTS</td>
<td>80</td>
</tr>
<tr>
<td>Specialized Product</td>
<td>120</td>
</tr>
<tr>
<td>Embedded</td>
<td>8</td>
</tr>
<tr>
<td>Integrated</td>
<td>4</td>
</tr>
<tr>
<td>Other</td>
<td>20</td>
</tr>
</tbody>
</table>

### Why don't VSEs use Standards?

- **24%** Not required
- **28%** Too time-consuming
- **15%** Standard(s) *
- **10%** Other
- **9%** Lack of support
- **14%** Lack of resources

* Difficult, Bureaucratic, not enough guidance.
Requests from VSEs

- **Certification and Recognition**
  - Only 18% are certified
  - Over 53% of larger companies are certified
  - Over 74% indicated that it was important to be either recognized or certified
    - ISO certification requested by 40%.
    - Market recognition requested by 28%
    - Only 4% are interested in a national certification

- **Needs Regarding Documentation**
  - 62% are asking for more guidance and examples
  - 55% are requiring 'lightweight' standards that are easy to understand and apply and come with templates

The Survey - Weaknesses

- **The Sample**
  - Survey was initiated through WG24 contacts
    - Not a true random sample

- **Geographical Distribution of the Responses**
  - Strong representation: Latin America (50%)
  - Weak representation: Europe (11%), US (0.6%)

- **Application Domain**
  - Strong representation
    - 40% of life/mission-critical systems
    - 34% of regulated developments.
Content

- Introduction
- **Set of requirements to develop standards for VSEs**
- Strategy of the ISO Working Group to develop standards and guidelines for VSEs
- Concept of Profiles
- Deployment Packages
- Pilot Projects
- Miscellaneous

Subset of Requirements to Develop Standards for VSEs

- Developed incrementally since first meeting in 2005
  - R08 - Use of the set of workproduct must be **affordable**.
    - i.e. **consultant** services **should not be** necessary.
  - R15 - The set of workproduct should provide the **whole spectrum of documents**
    - From standards to education material i.e. tutorial information
  - R29 - The set of workproduct should propose to choose a **lifecycle**
    - Provide examples of lifecycles
  - R33 - The set of workproduct should propose **definition of documents**.
    - For example **templates** (e.g. requirements templates - use cases)
  - R37 - The set of workproduct should include **compliance table checklists**
    - E.g. an Assessment Guide
  - R52 - The guide should provide **examples**
    - e.g. plans, workproducts and other deliverables.
  - R57 - The **guide** should be **available free** on the **web**
Content

- Introduction
- Set of requirements to develop standards for VSEs
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Strategy

ISO/IEC 15504
ISO/IEC 12207
ISO 9001 & ISO/IEC 90003
ISO/IEC 29110
ISPs and TRs for VSEs
**Strategy of WG 24**

To develop standards and guidelines for VSEs

- Use the notion of ‘Profile’ to develop a roadmap and standards to meet the needs of VSEs.
  - A profile is an ‘assemblage’ from one or more base standards to accomplish a particular function.
  - Compliance with ISO/IEC 12207 and/or ISO 9001 and assessment should be possible with a minimum of redesign of the VSE’s processes
- A Profile Group (PG)
  - A collection of profiles which are related either by composition of processes (i.e. activities, tasks), or by capability level, or both
- Focus first on VSEs developing generic software (Profile Group)
  - Other Profile Groups, e.g. critical software developers, will be developed later
- Use a Mexican standard as a referential to start the development of profiles
- Use two types of standards:
  - Process standards, such as ISO 12207, that define the activities required to achieve identified objectives or outcomes;
  - Product standards, such as ISO 15289, that define the structure and content of artefacts produced by the processes
- Develop a set of documents to describe and specify the profiles

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**Process Groups of ISO/IEC 12207 Life Cycle Processes Standard**

Source: ISO/IEC PDTR 24748-3
The ISO/IEC 12207 Life Cycle Processes Standard

<table>
<thead>
<tr>
<th>Agreement</th>
<th>Project</th>
<th>Technical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition Process</td>
<td>Project Planning Process</td>
<td>Stakeholder Requirements</td>
</tr>
<tr>
<td>Supply Process</td>
<td>Project Assessment</td>
<td>Definition Process</td>
</tr>
<tr>
<td></td>
<td>and Control Process</td>
<td>System Requirements</td>
</tr>
<tr>
<td></td>
<td>Decision Management</td>
<td>Analysis Process</td>
</tr>
<tr>
<td></td>
<td>Risk Management Process</td>
<td>Implementation Process</td>
</tr>
<tr>
<td></td>
<td>Configuration Management</td>
<td>System Integration Process</td>
</tr>
<tr>
<td></td>
<td>Process</td>
<td>System Qualification Testing</td>
</tr>
<tr>
<td></td>
<td>Information Management</td>
<td>Process</td>
</tr>
<tr>
<td></td>
<td>Process</td>
<td>Software Installation Process</td>
</tr>
<tr>
<td></td>
<td>Measurement Process</td>
<td>Software Acceptance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Support Process</td>
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<tr>
<td></td>
<td></td>
<td>Software Operation Process</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Software Maintenance Process</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Software Disposal Process</td>
</tr>
</tbody>
</table>

Organizational Project-Enabling
- Life Cycle Model Management Process
- Infrastructure Management Process
- Project Portfolio Management Process
- Human Resource Management Process
- Quality Management Process

Top Management
- Business Management

Management
- Process Management
- Project Portfolio Management
- Resource Management

Operations
- Specific Projects Management
- Software Development and Maintenance

Mexican Standard

- ISO 9001:2000 92%
- ISO/IEC 12207 95%
- CMMI Level 2 77%
- PMBOK (PMI) 90%

### CMMI Level 2 Coverage by Moprosoft

<table>
<thead>
<tr>
<th>Category</th>
<th>Fully</th>
<th>Largely</th>
<th>Partially</th>
<th>Not Covered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements Management</td>
<td>70%</td>
<td>20%</td>
<td>10%</td>
<td>0%</td>
</tr>
<tr>
<td>Project Planning</td>
<td>66%</td>
<td>17%</td>
<td>13%</td>
<td>4%</td>
</tr>
<tr>
<td>Project Monitoring and Control</td>
<td>70%</td>
<td>20%</td>
<td>10%</td>
<td>0%</td>
</tr>
<tr>
<td>Measurement and Analysis</td>
<td>61%</td>
<td>17%</td>
<td>22%</td>
<td>0%</td>
</tr>
<tr>
<td>Process and Product Quality Assurance</td>
<td>72%</td>
<td>0%</td>
<td>21%</td>
<td>7%</td>
</tr>
<tr>
<td>Configuration Management</td>
<td>55%</td>
<td>0%</td>
<td>28%</td>
<td>17%</td>
</tr>
<tr>
<td>Supplier Agreement Management</td>
<td>70%</td>
<td>0%</td>
<td>18%</td>
<td>12%</td>
</tr>
</tbody>
</table>

- 84 practices are Fully covered
- 13 practices are Largely covered
- 22 practices are Partially covered
- 7 practices are Not covered

### Moprosoft

- Members of WG24 felt that Moprosoft will still **too ‘big’** for most VSEs,
- WG24 decided to use Moprosoft as the **referential** to develop the new standards.
A Roadmap in 4 Stages (Profiles) for Generic Software Development VSEs

Entry

Basic

Intermediate

Advanced

Content

• Introduction
• Set of requirements to develop standards for VSEs
• Strategy of the ISO Working Group to develop standards and guidelines for VSEs
• **Concept of Profiles**
• Set of ISO/IEC 29110 Standards and Technical Reports for the Generic Profile Group.
• Deployment Packages
• Pilot Projects
• Miscellaneous
Concept of Profiles

• Formal Definition of an International Standardized Profile (ISP)
  – “A set of one or more base standards and/or ISPs, and, where applicable, the identification of chosen classes, conforming subsets, options and parameters of those base standards, or ISPs necessary to accomplish a particular function”

A profile is an ‘assemblage’ from one or more base standards to accomplish a particular function.


Concept of Profiles

• The notion of profile was selected for the following reasons:
  1. Current standards generally target large enterprises, making initial compliance difficult for VSEs;
  2. Preparing profiles with progressive capability levels enable a stepwise approach to full compliance;
  3. Current software Engineering Standards are generally large, and specify many elements that are not necessarily applicable to VSEs;
  4. Preparing profiles that subset the base standards facilitate the match between the standards and the targeted VSEs;
  5. Since an ISO standard does not necessarily cover all the topics needed, profiles can be used to integrate required elements not yet in the ISO standards catalogue.

Adapted from ISO 2009
Concept of Profiles

- To assemble profiles, the working group used two types of standards:
  - **Process standards**
    - such as ISO 12207, that define the activities required to achieve identified objectives or outcomes
  - **Product standards**
    - such as ISO 15289, that define the structure and content of artefacts produced by the processes

Software Configuration Management Process of ISO 12207

- **Purpose**
  - To establish and maintain the integrity of the software items of a process or project, and make them available to concerned parties.

- **Outcomes**
  - As a result of the successful implementation of the Software Configuration Management Process:
    - a software configuration management strategy is developed;
    - items generated by the process or project are identified, defined, and baselined;
    - modifications and releases of the items are controlled;
    - modifications and releases are made available to affected parties;
    - the status of the items and modifications is recorded and reported;
    - the completeness and consistency of the items is ensured; and
    - the storage, handling, and delivery of the items are controlled.
Software Configuration Management Process of ISO 12207

- **Activities and Tasks**
  1. Process implementation (Activity)
     - This activity consists of the following task:
       - A software configuration management plan shall be developed. The plan shall describe:
         » the configuration management activities; procedures and schedule for performing these activities;
         » the organization(s) responsible for performing these activities; and their relationship with other organizations, such as software development or maintenance.
       - The plan shall be documented and implemented.
       - NOTE The plan may be a part of the system configuration management plan.
  2. Configuration identification
  3. Configuration control
  4. Configuration status accounting
  5. Configuration evaluation
  6. Release management and delivery

ISO/IEC 15289 - Guidelines for the content of software life cycle process information products

- A companion standard to ISO 12207.
- Is used to identify and plan the information items to be produced during a project.
- Describes the information content of different types of documents
  - such as Plan, Procedure, Report, Request, Specification.

<table>
<thead>
<tr>
<th>Type</th>
<th>Purpose</th>
<th>Sample of recommended output information types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procedure</td>
<td>Define in detail when and how to perform certain activities or tasks, including tools needed.</td>
<td>Problem resolution procedure</td>
</tr>
</tbody>
</table>
ISO/IEC 15289
Plan – Generic Content Guidelines

• **Purpose:** Define when, how, and by whom specific activities are to be performed.

A Plan includes:

<table>
<thead>
<tr>
<th>Date of issue and status</th>
<th>Budgets and cost estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scope</td>
<td>Resources and their allocation</td>
</tr>
<tr>
<td>Issuing organization</td>
<td>Responsibilities and authority</td>
</tr>
<tr>
<td>References (applicable policies, laws, standards, contracts, and other plans and references)</td>
<td>Interfaces among parties involved</td>
</tr>
<tr>
<td>Approval authority</td>
<td>Risks and risk assessment and mitigation measures</td>
</tr>
<tr>
<td>Approach for technical and management review</td>
<td>Quality assurance and control measures</td>
</tr>
<tr>
<td>Other plans (plans or task descriptions that expand on the details of a plan)</td>
<td>Environment, infrastructure, security, and safety</td>
</tr>
<tr>
<td>Planned activities and tasks</td>
<td>Training</td>
</tr>
<tr>
<td>Identification of tools, methods, and techniques</td>
<td>Glossary</td>
</tr>
<tr>
<td>Schedules</td>
<td>Change procedures and history</td>
</tr>
<tr>
<td></td>
<td>Termination process</td>
</tr>
</tbody>
</table>

Notion of Profile

• **The "Generic" Profile Group**
  – Applicable to a vast majority of VSEs that **do not develop critical software**.
  – Does not imply any specific **application domain**
    • In the future new domain-specific profiles may be developed

**Critical software** is defined as software whose failure could have an impact on safety or could cause large financial or social losses (IEEE 610.12).
Content

- Introduction
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- Miscellaneous

Scope of ISO/IEC 29110

- Not intended to preclude or discourage their use by organizations bigger than VSEs.
  - Certain issues faced by large organisations may not be covered by this set of ISP.
- The life cycle processes can be used by VSEs when acquiring and using, as well as when creating and supplying, a software system.
- They can be applied at any level in a software system’s structure and at any stage in the life cycle.
- The processes described were not intended to preclude or discourage the use of additional processes that VSEs find useful.

The text is extracted from ISO/IEC 29110
Conformance to 29110 ISPs

- The purpose of an 29110 ISP is to specify the use of sets of specifications to provide clearly defined functionally.
  - Implies conformance to the referenced base standards specifications if it is referenced in totality in the profile.
- Is specified within each ISP specification document published as a separate document called Part 4.
- ISPs are pre-tailored packages of related software engineering standards, therefore:
  - ISP cannot be tailored;
  - Partial compliance is not allowed (except in one case)
  - There are no levels of conformance.

The text is extracted from ISO/IEC 29110

Conformance to 29110 ISPs

- Extensions
  - Functionality(ies) beyond what is defined in the specification of the profile.
  - Each implementation shall fully support all required functionality of the profile specification exactly as specified
  - The extensions shall not contradict nor cause the non-conformance of functionality defined in the profile specification.

The text is extracted from ISO/IEC 29110
Profiles of the Generic Profile Group in 29110

- Four profiles within the Generic Profile Group

<table>
<thead>
<tr>
<th>Profile Group</th>
<th>Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generic</td>
<td>Advanced</td>
</tr>
<tr>
<td>Generic</td>
<td>Intermediate</td>
</tr>
<tr>
<td>Generic</td>
<td>Basic</td>
</tr>
<tr>
<td>Generic</td>
<td>Entry</td>
</tr>
</tbody>
</table>

The text is extracted from ISO/IEC 29110

---

Basic Profile

- **Rationale of the Basic Profile**
  - To define a software development and project management guide for a *subset of processes and outcomes* of ISO/IEC 12207 and ISO/IEC 15289 products, *appropriate for characteristics and needs of VSEs*.
  - The reason to include *project management* is that VSEs’ core business is software development and their financial *success* depends on *project profits*.

- **Applicability**
  - Describes software development of a *single application* by a *single project team* with no special risk or situational factors.
  - The project may be to fulfil an *external or internal contract*.

The text is extracted from ISO/IEC 29110
Requirements of the Basic Profile

- In order to benefit from the use of the Basic Profile, the VSE needs to comply with the following entry conditions:
  1. Project contract or agreement with statement of work.
  2. The cost, technical, and schedule feasibility was performed before the project start.
  3. Project working team, including project manager, assigned and trained

The text is extracted from ISO/IEC 29110

Basic Profile Preparation Steps

The text is extracted from ISO/IEC 29110
Basic Profile Preparation Steps

1. The recognition of VSE characteristics related to:
   - finance, resources, customer interface, internal business processes, learning and growth.

2. The identification of VSE’s needs and suggested Competencies that derives from those characteristics.

3. The specification of the Basic VSE Profile elements proper to respond to the VSE needs and suggested Competencies according to the 29110-2 VSE Framework and Taxonomy.

4. The selection and link of the subset of ISO/IEC 12207 processes and outcomes elements and ISO/IEC 15289 products elements related to the Basic VSE Profile elements.

5. The definition of the Basic VSE Profiles Guides: TR 29110-5.1 Management and Engineering Guide for the implementation of Basic VSE Profile.

The text is extracted from ISO/IEC 29110

VSE Characteristics, Needs and Desirable Competencies

• Finance and Resources characteristics
  - Small number of engineers (e.g. the cost of a payroll up to 25 people)
  - Potential for short-term cash flow problems
  - Low-budget projects, which last a few months and involve only a few people developing small products
  - Dependent on successful project completion within schedule and budget
  - Preference for separate projects to perform corrective post delivery maintenance
  - Limited internal resources to perform management support and organizational processes like: risk management, training, quality management, process improvement, and reuse.

• Needs and desirable competencies of the Finance and Resources characteristics
  - Projects carried out within budget and the product delivered on schedule
  - Close communication maintained with the customer to manage risks

The text is extracted from ISO/IEC 29110
Subset of Needs and suggested competencies derived from finance and resources characteristics

- Perform the projects within budget and deliver the product on schedule. To respond to this need and suggested competencies, Basic VSE Profile processes, objectives, and work products are the following:
  - **Project Management Process**
    - PM.O1. The Project Plan for the execution of the project is developed according to the Statement of Work and validated with the Customer. The tasks and resources necessary to complete the work are sized and estimated.
    - PM.O2. Progress of the project is monitored against the Project Plan and recorded in the Progress Status Record. Corrections to remedy problems and deviations from the plan are undertaken when project targets are not achieved. Appropriate treatment is applied to correct or avoid the impact of risk. Closure of the project is performed to obtain Customer acceptance, which is documented in the Acceptance Record.
  - **Software Implementation Process**
    - SI.O1. Tasks of the activities are performed through the accomplishment of the current Project Plan.
    - **Work Products:** Statement of Work, Progress Status Record, Project Plan, Correction Register, and Acceptance Record.

Proposed Stage 1– Entry Profile*

- To help VSEs working on small projects
  - e.g. at most six person-months effort or start-up VSEs

- **Processes**
  - **Project Planning and Monitoring**
    1. Develop an agreement with customer
    2. Develop a plan
      - Determine phases, tasks, milestones, deliverables
      - Assess available resources, estimate effort
    3. Monitor project status and perform reviews (e.g. retrospective)
      - Collect data (e.g. effort spent on tasks)
  - **Software Development**
    - **Requirement Analysis and Design**
      1. Identify the set of requirements to implement,
      2. Plan interactions with customer
      3. Design the software
    - **Software Code and Test**
      1. Code and debug
      2. Perform unit and system testing

* Discussed at a WG24 meeting
Two Additional Stages *

- Management of more than one project
- Additional practices
  - Quality assurance
  - Configuration management
    - Version management is done at Stage 2
  - Testing
    - Improved Integration and Acceptance testing
  - Other Practices
    - Supplier management
    - Measurement
    - Business Management
      - To help the VSE to grow its business

* Discussed at a WG24 meeting

Set of Documents Targeted by Audience

- 29110 Overview (TR 29110-1)
- 29110 Profiles (IS)
  - Framework and Taxonomy (IS 29110-2)
  - Specifications of VSE Profiles (IS 29110-4)
    - Specification - Nnnn VSE Profile (IS 29110-4-x)
- 29110 Guides (TR)
  - Assessment Guide (TR 29110-3)
  - Management and Engineering Guide (TR 29110-5)
    - Management and Engineering Guide – Nnnn VSE Profile (TR 29110-5-x)

Source: ISO/IEC 29110
Set of Documents Targeted by Audience

- **General Documents (applicable to all Profiles)**
  - **Part 1 - Overview** (Technical Report)
    - Introduces the major concepts required to understand and use the suite of documents
  - **Part 2 - Framework and Profile Taxonomy** (Standard)
    - Specifies the elements common to all profiles (structure, conformance, assessment) and introduces the taxonomy (catalogue) of 29110 profiles.
  - **Part 3 - Assessment Guide** (Technical Report)
    - Describes the process to follow to perform an assessment to determine the process capabilities and the organizational process maturity

- **Documents for the first Profile (specific to one Profile)**
  - **Part 4-1-x - Specifications** (Standard)
    - Provides the composition of a profile, provide normative links to the normative subset of standards
  - **Part 5-1-x Management and Engineering Guide** (Technical Report)
    - Provide guidance on its implementation and use of a profile
      - Deployment Packages (DP)

---

**Set of Documents Targeted by Audience**

<table>
<thead>
<tr>
<th>ISO/IEC 29110</th>
<th>Title of Document</th>
<th>Target audience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part 1</td>
<td>Overview</td>
<td>VSEs</td>
</tr>
<tr>
<td>Part 3</td>
<td>Assessment Guide</td>
<td>Assessor and VSEs</td>
</tr>
<tr>
<td>Part 4</td>
<td>Profile Specifications</td>
<td>Standards producers, tool vendors and methodology vendors. Not intended for VSEs.</td>
</tr>
<tr>
<td>Part 5</td>
<td>Management and Engineering Guides</td>
<td>VSEs</td>
</tr>
</tbody>
</table>

- **If a new profile is needed**
  - **Parts 4 and 5 can be developed** without impacting existing documents and they become Part 4-x and Part 5-x respectively through the ISO/IEC process.

The text is extracted from ISO/IEC 29110
ISO/IEC 29110- Part 1

• **Part 1- Overview (Technical Report)**
  – ISO/IEC 29110-1 defines the business terms common to the VSE Profile Set of Documents.
  – It introduces the business aspects, characteristics and requirements of a VSE.
  – Clarifies the rationale for VSE-specific profiles, documents, standards and guides.

ISO/IEC 29110- Part 2

• **Part 2- Framework and Profile Taxonomy (Standard)**
  • Introduces the concepts for Software Engineering International Standardized Profile (ISP) for VSEs,
  • Defines the terms common to the VSE Profile Set of Documents.
  • Establishes the logic behind the definition and application of ISP profiles.
  • Specifies the elements common to all ISP profiles (structure, conformance, assessment)
  • Introduces the taxonomy (catalog) of ISO/IEC 29110 profiles.
ISO/IEC 29110- Part 3

• Assessment Guide (Technical Report)
  • Defines the process assessment guidelines and compliance requirements needed to meet the purpose of the defined VSE Profiles.
  • Contains information that can be useful to developers of assessment methods and assessment tools.
  • Is addressed to people who have direct relation with the assessment process
    • e.g. the assessor and the sponsor of the assessment, who need guidance on ensuring that the requirements for performing an assessment have been met.

The text is extracted from ISO/IEC 29110

ISO/IEC 29110- Part 4

• Part 4-1-x -Specifications (Standard)
  • Provides the specification for Profiles that are based on subsets of appropriate standards elements.
  • VSE Profiles apply and are targeted to authors/providers of guides and authors/providers of tools and other support material.

The text is extracted from ISO/IEC 29110
ISO/IEC 29110- Part 5

• Part 5-1-x Management and Engineering Guide (Technical Report)
  • Provides an implementation management and engineering guide for the Nnnn VSE Profile described in ISO/IEC IS 29110 Part 4-x.

• Annex A (informative)
  • Provides the description of the concept of the Deployment Package and a typical table of content
  • Provides the list of Deployment Packages for the Basic Profile

Part 5 – Table of Contents

Foreword
Introduction
1. Scope
2. Normative references
3. Terms and definitions
4. Basic VSE profile management and engineering guide
   4.1 Introduction
   4.2 Project Management (PM) process
   4.3 Software Implementation (SI) process
   4.4 Roles
   4.5 Product description
   4.6 Software tools requirements
Annex A (informative) – Deployment Package
Bibliography
Part 5 - Foreword

- Introduces ISO, IEC, JTC1
  - ISO (the International Organization for Standardization)
  - IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization.
  - JTC1 (Joint Technical Committee 1)
    - In the field of information technology, ISO and IEC have established ISO/IEC JTC 1.
- International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.
- The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75% of the national bodies casting a vote.
- Describes the 3 types of Technical Reports

Part 5 - Foreword

- ISO/IEC TR 29110 consists of the following parts, under the general title Software Engineering — Lifecycle Profiles for Very Small Entities (VSEs):
  - Part 1: Overview (TR)
  - Part 2: Framework and Taxonomy (IS)
  - Part 3: Assessment Guide (TR)
  - Part 4: Profile Specifications
    - Part 4-1: Basic Profile Specification (IS)
    - Part 4-n: Profile n Specification (IS)
  - Part 5: Management and Engineering Guides
    - Part 5-1: Management and Engineering Guide for Basic Profile (TR)
    - Part 5-n: Management and Engineering Guide for Profile n (TR)
Part 5 - Introduction

• **Motivation** for the development of standards for VSEs
  – Importance of small enterprises in economy
    • ‘Small and Medium Enterprises (SMEs) constitute the dominant form of business organisation in all countries world-wide, accounting for over 95% and up to 99% of the business population depending on country’
  – Survey conducted

• ISO/IEC 29110
  – Targeted by audience
  – Each document is briefly explained

The text is extracted from ISO/IEC 29110

Part 5 - Scope

• Processes described are not intended to preclude or discourage their use by organizations bigger than VSEs.
• The Guide applies for software development project. The project may be to fulfil an external or internal contract.
  – The internal contract need not be explicit between the project team and their customer.
• **Benefits** in the following aspects:
  – An agreed set of project requirements and expected products is delivered to the customer;
  – A disciplined management process, that provides project visibility and corrective actions of project problems and deviations, is performed;
  – A systematic software implementation process, that satisfies customer needs and ensures quality products, is followed.
• Guide is intended to be used with any processes, techniques and methods.

The text is extracted from ISO/IEC 29110
Part 5 - Normative references

- ISO/IEC IS 29110-4-1 Software engineering — Lifecycle profiles for very small enterprises - Part 4-1: Basic Profile Specification (IS).

- NOTE
  - The purpose of the reference to 29110-4-1 is to document that 29110-5-1 is based on the IS 29110-4-1.
  - 29110-5-1 is a stand alone guide.
  - It is not intended for a VSE to use the ISP to implement the 29110-5-1 guide.

Part 5 - Terms and definitions

- process
  - a set of interrelated or interacting activities which transforms inputs into outputs [ISO 9000:2005]

- activity
  - a set of cohesive tasks of a process [ISO 12207:2008]

- task
  - requirement, recommendation, or permissible action, intended to contribute to the achievement of one or more outcomes of a process [ISO/IEC 12207:2008]

- verification
  - confirmation, through the provision of objective evidence, that specified requirements have been fulfilled [ISO 9000:2005]
  - NOTE Verification in a life cycle context is a set of activities that compares a product of the life cycle against the required characteristics for that product. This may include, but is not limited to, specified requirements, design description and the system itself.

- validation
  - confirmation, through the provision of objective evidence, that the requirements for a specific intended use or application have been fulfilled [ISO 9000:2005]
  - NOTE Validation in a life cycle context is the set of activities ensuring and gaining confidence that a system is able to accomplish its intended use, goals and objectives.
Part 5 - Introduction

- To use the Guide the VSE needs the following entry conditions:
  1. Project statement of work (SOW) is documented;
  2. Feasibility of the project was performed before its start;
  3. Project team, including project manager, is assigned and trained;
  4. Goods, services and infrastructure to start the project are available.

- General process descriptions
  - Project Management process
    • Establish and carry out in a systematic way the tasks of the software implementation project, which allows complying with the project’s objectives in the expected quality, time and cost.
  - Software Implementation process
    • Systematic performance of the analysis, design, construction, integration and tests activities for new or modified software products according to the specified requirements.

The text is extracted from ISO/IEC 29110

Part 5 - Introduction

- Process structure description and notation
  - Name
  - Purpose
  - Objectives
  - Input Products
  - Output Products
  - Internal Products
  - Roles involved
  - Diagram
  - Activity
  - Activity Description
    • Tasks description table contain four columns corresponding to:
      − Role - the abbreviation of roles involved in the task execution.
      − Task - description of the task to be performed. Each task is identified by activity ID and consecutive number, for example PM1.1, PM1.2, and so on.
      − Input Products - products needed to execute the task.
      − Output Products - products created or modified by the execution of the task.
  - Incorporation to Project Repository

Each element is illustrated in the next slides

The text is extracted from ISO/IEC 29110
Part 5 - Project Management (PM) Process

• Purpose
  – To establish and carry out in a systematic way the tasks of the software implementation project, which allows complying with the project’s objectives in the expected quality, time and costs.

• Seven Objectives
  – **PM.O1.** The *Project Plan* for the execution of the project is developed according to the *Statement of Work* and validated with the Customer. The *tasks and resources* necessary to complete the work are sized and estimated.

---

6.3.1 Project Planning Process
- a) the scope of the work for the project is defined;
- c) the tasks and resources necessary to complete the work are sized and estimated;
- d) interfaces between elements in the project, and with other project and organizational units, are identified;
- e) plans for the execution of the project are developed, and
- f) plans for the execution of the project are activated.

6.3.7 Measurement Process
- a) the information needs of technical and management processes are identified.

---

[ISO/IEC 12207, 6.3.1, 6.3.7]

Part 5 - Project Management (PM) Process

• Input products
  – Products required to perform the process and its corresponding source, which can be another process or an external entity to the project, such as the Customer.

<table>
<thead>
<tr>
<th>Name</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statement of Work</td>
<td>Customer</td>
</tr>
<tr>
<td>Resources</td>
<td>Organizational Management</td>
</tr>
<tr>
<td>Software Configuration</td>
<td>Software Implementation</td>
</tr>
<tr>
<td>Change Request</td>
<td>Customer</td>
</tr>
<tr>
<td></td>
<td>Software Implementation</td>
</tr>
</tbody>
</table>
Part 5 - Project Management (PM) Process

- **Output products**
  - Products *generated by the process* and its corresponding destination, which can be another process or an external entity to the project, such as Customer or Organizational Management.
  - **Example:**

<table>
<thead>
<tr>
<th>Name</th>
<th>Destination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Software Configuration</td>
<td>Project Management</td>
</tr>
<tr>
<td>- Requirements Specification</td>
<td></td>
</tr>
<tr>
<td>- Software Design</td>
<td></td>
</tr>
<tr>
<td>- Traceability Record</td>
<td></td>
</tr>
<tr>
<td>- Software Components</td>
<td></td>
</tr>
<tr>
<td>- Software</td>
<td></td>
</tr>
<tr>
<td>- Test Cases and Test Procedures</td>
<td></td>
</tr>
<tr>
<td>- Test Report</td>
<td></td>
</tr>
<tr>
<td>- Product Operation Guide</td>
<td></td>
</tr>
<tr>
<td>- Software User Documentation</td>
<td></td>
</tr>
<tr>
<td>- Maintenance Documentation</td>
<td></td>
</tr>
</tbody>
</table>

- **Internal products**
  - Products *generated and consumed* by the process.
Examples of Role Description

- Alphabetical list of the roles, its abbreviations and suggested competencies description

<table>
<thead>
<tr>
<th>Role</th>
<th>Abbreviation</th>
<th>Competency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analyst</td>
<td>AN</td>
<td>• Knowledge and experience eliciting, specifying and analyzing the requirements.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Knowledge in designing user interfaces and ergonomic criteria.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Knowledge of the revision techniques and experience on the software development and maintenance.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Knowledge of the editing techniques and experience on the software development and maintenance.</td>
</tr>
<tr>
<td>Customer</td>
<td>CUS</td>
<td>• Knowledge of the Customer processes and ability to explain the Customer requirements.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• The Customer (representative) must have the authority to approve the requirements and their changes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• The Customer includes user representatives in order to ensure that the operational environment is addressed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Knowledge and experience in the application domain.</td>
</tr>
</tbody>
</table>

Examples of Product Description

- An alphabetical list of the input, output and internal process products, its descriptions, possible states and the source of the product. The source can be another process or an external entity to the project, such as the Customer.

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Acceptance Record</td>
<td>Document establishing the customer acceptance of the deliverables of the project. It may contain:</td>
<td>Project Management</td>
</tr>
<tr>
<td></td>
<td>- Record of the receipt of the delivery</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Identifies the date received</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Identifies the delivered elements</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Records the verification of any Customer acceptance criteria defined</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Signed by receiving Customer</td>
<td></td>
</tr>
<tr>
<td>2. Change Request</td>
<td>It may have the following characteristics:</td>
<td>Software Implementation</td>
</tr>
<tr>
<td></td>
<td>- Identifies purpose of change</td>
<td>Customer</td>
</tr>
<tr>
<td></td>
<td>- Identifies request status (new, accepted, rejected)</td>
<td>Project Management</td>
</tr>
<tr>
<td></td>
<td>- Identifies requester contact information</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Impacted system(s)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Impact to operations of existing system(s) defined</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Impact to associated documentation defined</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Criticality of the request, date needed by</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The applicable statuses are: initiated, evaluated, accepted.</td>
<td></td>
</tr>
</tbody>
</table>
Part 5 - Project Management Process – 7 Objectives

- **PM.O1.** The **Project Plan** for the execution of the project is developed according to the Statement of Work and validated with the Customer. The tasks and resources necessary to complete the work are sized and estimated.

- **PM.O2.** Progress of the project is monitored against the Project Plan and recorded in the Progress Status Record.

- **PM.O3.** The Change Requests are addressed through their reception and analysis. Changes to software requirements are evaluated for cost, schedule and technical impact.

- **PM.O4.** Review meetings with the Work Team and the Customer are held. Agreements are registered and tracked.

- **PM.O5.** Risks are identified as they develop and during the conduct of the project.

- **PM.O6.** A software Version Control Strategy is developed. Items of Software Configuration are identified, defined and baselined. Modifications and releases of the items are controlled and made available to the Customer and Work Team including the storage, handling and delivery of the items.

- **PM.O7.** Software Quality Assurance is performed to provide assurance that work products and processes comply with the Project Plan and Requirements Specification.

---

Part 5 - Project Management Process – 5 Activities

[Diagram of Project Management Process]

- **Statement of Work**
- **Verification Results**
- **Validation Results**
- **Meeting Record**
- **Change Request**
- **Project Plan**
- **Project Repository**
- **Project Plan Execution**
- **Intermediate**
- **Entry**
- **Advanced**
- **Acceptance Record**
- **Project Assessment and Control**
- **Project Closure**
- **Software Configuration**
PM.1 Project Planning Activity *

• Provides:
  1. Reviewed Statement of Work and the tasks needed to provide the contract deliverables and to satisfy customer requirements.
  2. Project life cycle, including task dependencies and duration.
  3. Project quality assurance strategy through verification and validation of work products/deliverables, customer and work team reviews.
  4. Work team and customer roles and responsibilities.
  5. Project resources and training needs.
  7. Identified project risks.
  8. Project version control and baseline strategy.
  9. Project repository to store, handle and deliver controlled product and document versions and baselines.

* To meet objectives PM.O1, PM.O5, PM.O6, PM.O7

The text is extracted from ISO/IEC 29110

PM.1 Project Planning Activity
Example of 2 Tasks

<table>
<thead>
<tr>
<th>Role</th>
<th>Task List</th>
<th>Input Products</th>
<th>Output Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM TL</td>
<td><strong>PM.1.1 Review the Statement of Work</strong></td>
<td>Statement of Work</td>
<td>Statement of Work [reviewed]</td>
</tr>
<tr>
<td>PM CUS</td>
<td><strong>PM.1.2 Define with the Customer the Delivery Instructions</strong> of each one of the deliverables specified in the Statement of Work.</td>
<td>Statement of Work [reviewed]</td>
<td>Delivery Instructions</td>
</tr>
</tbody>
</table>

The text is extracted from ISO/IEC 29110
Software Implementation (SI) Process – 7 Objectives

- **Objectives**
  1. SI.O1. **Tasks** of the activities are performed through the accomplishment of the current **Project Plan**.
  2. SI.O2. **Software requirements** are defined, analyzed for correctness and testability, approved by the Customer, baselined and communicated.
  3. SI.O3. **Software architectural and detailed design** is developed and baselined. It describes the software items and internal and external interfaces of them. Consistency and traceability to software requirements are established.
  4. SI.O4. **Software components** defined by the design are produced. Unit test are defined and performed to verify the consistency with requirements and the design. Traceability to the requirements and design are established.
  5. SI.O5. **Software** is produced performing integration of software components and verified using Test Cases and Test Procedures. Results are recorded at the Test Report. Defects are corrected and consistency and traceability to Software Design are established.
  6. SI.O6. A **Software Configuration**, that meets the Requirements Specification as agreed to with the Customer, which includes user, operation and maintenance documentations is integrated, baselined and stored at the Project Repository. Needs for changes to the Software Configuration are detected and related Change Requests are initiated.
  7. SI.O7. **Verification and Validation** tasks of all required work products are performed using the defined criteria to achieve consistency among output and input products in each activity. Defects are identified, and corrected; records are stored in the Verification/Validation Results.

---

Part 5 - Software Implementation – 6 Activities

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The text is extracted from ISO/IEC 29110
SI.1 Software Implementation initiation (SI.01)
Examples of 2 Tasks

- The Software Implementation Initiation activity ensures that the Project Plan established in Project Planning activity is committed to by the Work Team.

<table>
<thead>
<tr>
<th>Role</th>
<th>Task List</th>
<th>Input Products</th>
<th>Output Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM</td>
<td>SI.1.1 Revision of the current Project Plan with the Work Team members in order to achieve a common understanding and get their engagement with the project.</td>
<td>Project Plan</td>
<td>Project Plan [reviewed]</td>
</tr>
<tr>
<td>TL</td>
<td>SI.1.2 Set or update the implementation environment.</td>
<td>Project Plan [reviewed]</td>
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</table>

The text is extracted from ISO/IEC 29110

Annex A – Informative Deployment Packages

- In order to facilitate the implementation, by VSEs, of a Profile, a set of Deployment Packages are available.
- Definition of deployment package
- Table of content of a deployment package
- List of deployment packages for the Basic Profile

Detailed Description of Deployment Packages is the Next Topic

The text is extracted from ISO/IEC 29110
Content

- Introduction
- Set of requirements to develop standards for VSEs
- Strategy of the ISO Working Group to develop standards and guidelines for VSEs
- Concept of Profiles
- **Deployment Packages**
- Pilot Projects
- Miscellaneous

Deployment Packages (DPs)

- A deployment package is a set of artifacts developed to facilitate the implementation of a set of practices, of the selected framework, in a VSE.
  - A deployment package is not a complete process reference model. Deployment packages are not intended to preclude or discourage the use of additional guidelines that VSEs find useful.
- By deploying and implementing a Deployment Package, a VSE can see its concrete step to achieve or demonstrate coverage to Part 5 *
- Deployment Packages are designed such that a VSE can implement its content, without having to implement the complete framework at the same time.
- Each DP is reviewed and edited by 2 persons
  - Ana Vasquez (Mexico)
  - Claude Y Laporte (Canada)

* And coverage to other standards and Models
Deployment Packages for the Basic Profile

Pilot Projects

- **Definition**
  - A method for exploring the value of a new technological concept via an objective study conducted in a somewhat realistic setting (adapted from Glass 1997).
  - Successful pilot project is also an effective means of building adoption of new practices by members of a VSE *
  - To be credible, the pilot projects should satisfy the following requirements (Fenton 1994):
    - The pilot project experiment has to be designed correctly,
    - The pilot project has to be performed in a real situation,
      - It is not a toy project, i.e. an artificial problem in an artificial situation,
    - The measurements have to be appropriate to the goals of the experiment,
    - The experiment has to be run for long enough.

* To develop a solid business case to promote the adoption of ISO 29110 by VSEs internationally
Pilot Project Deployment Package

- **Purpose**
  - To provide tailorable and usable guidelines and materials in order to select and conduct pilot projects in VSEs.

- **High-Level Tasks**
  - Task 1 - Assess the opportunity to conduct a pilot project
  - Task 2 - Plan the Pilot Project
  - Task 3 - Conduct the Pilot Project
  - Task 4 - Evaluate the Results of the Pilot Project

Content of Deployment Packages*

1. Technical Description
   - Purpose of this document
   - Why this topic is Important?
2. Definitions
   - Generic Terms
   - Specific Terms
3. Relationships with ISO/IEC 29110 Part 5
4. Description of Processes, Activities, Tasks, Steps, Roles and Products
5. Template
6. Example
7. Checklist
8. Tool
10. References
11. Evaluation Form

* As defined in Annex A of Part 5

http://profs.logti.etsmtl.ca/claporte/
Additional Deployment Packages for the Basic Profile

- **Tool-Based Deployment Packages**
  - Description of a process and a step-by-step description of installation and utilisation of a tool.
  - Version Control
    - Version Control with CVS
    - Version Control with SVN
  - Project Management
    - Project Management with GForge
  - Issue Tracking with GForge

Content

- Introduction
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Bibliography

- ISO/IEC 15289 Systems and software engineering - Content of systems and software life cycle process information products (Documentation)