Overview of Software Reliability Enhancement Center

Enhancing Software Reliability for a Safe and Secure Society
Enhancing reliability of information processing systems and its software which support a comfortable life and an affluent society

Software Reliability Enhancement Center (SEC) works to enhance reliability of information processing systems which support the entire society to achieve a comfortable life and an affluent information society through the utilization of IT. Moreover, SEC serves as a hub for sharing knowledge of software professionals and strengthening international cooperation.

Message

IT has become such an indispensable presence for the life of our society that it is now hard to imagine society without IT. Utilization of IT brings further innovation to the field of critical infrastructures such as finance and transportation, and makes them more convenient and comfortable. Meanwhile, once any failure occurred in the IT system, it would have a far-reaching impact and lead to more acute situation. SEC works on developing and disseminating countermeasure techniques and measures for enhancing safety and reliability with a focus on various types of software that control IT. SEC aims to establish an affluent IT society in which users can safely receive its benefits in order to realize more convenient social life and to create new services and industries.
**Measures against information system failures in the field of critical infrastructure**

The critical infrastructures supporting our daily life and socioeconomic activities such as finance, transportation, and information and communication are operated by IT services and products. Recently, however, a great deal of disorder is brought more and more frequently by failure occurring in IT services or software embedded products, causing the critical infrastructures to be temporarily unavailable. In order to maintain our life and socioeconomic activities, safe and secure, it is required to further enhance reliability of products/IT services.

Consequently, it is important to share experiences and information, which are restricted within respective companies, across society, and to make effective use of them to take countermeasures against failures. SEC performs analysis of failure cases of products/IT services, studies measures, and organizes and systematizes the measures in place, while gaining the cooperation from companies which are in responsible for operating critical infrastructures. SEC aims to establish a mechanism to prevent recurrence of similar failures, and to reduce the extent of the impact, by means of widely sharing “lessons” that are learned in the process, across industries and fields.

**Current situation (No sharing of lessons)**

**Mechanism to enhance reliability by sharing lessons from failures**

### Examples of critical infrastructures
- Traffic control such as traffic light/Medical devices/
- Information and communications/Electric and gas/
- Government and administrative services/Finance

### Examples of categories of lessons
- System utilization/System planning and development/System operation and maintenance
- Procurement of system elements/Management/Human resources/Organization/Governance
Visualization of software reliability

SEC promotes visualization of software reliability based on the user’s point of view, in order for users to safely use IT which supports the entire society.

- It is a matter of course that software usually works properly.
  - Few are concerned about software.
- Once an accident or failure occurs, great uncertainty is caused.

Reliability enhancement [Design and verification of reliability enhancement]

SEC analyzes, prepares, and diffuses advanced technologies while focusing on particularly-important design methodologies and verification techniques.

- Reliability enhancement design
- Verification of whether to create the right items properly (as well as confirmation of validity)

Scheme of independent assessment [Reinforcement of ability of quality explanation]

SEC works on diffusing and establishing a scheme for independently assessing whether the qualities of products and systems that product and system suppliers explain to users are appropriate, and to mark the results, with covering targeted for various product fields.

- Proper selection of products
- Safe use of products
- A sense of security offered by independent assessment

Independent assessment

- Enhance customer confidence
- Improving strength of brand
- Reducing business risks such as accidents caused by product

Guideline for implementing software quality explanation scheme

(The basic requirements that a scheme of independent quality assessment should have are specified.)
Efforts toward development of high quality software

SEC has been working on clarifying and resolving problems in software development. Since the software which supports social infrastructures such as railway systems and power grids has become larger in scale and more complex, a method to efficiently develop a high-reliability system is required. The "MIERUKA (Visualization)" series and "White paper on software development data" are the results of efforts focused on the visualization of the development environment and analysis of development data. SEC also has been working on preparing and diffusing the "Embedded Software development exemplar Reference (ESxR)" series which organize knowledge and know-how of developing high-quality embedded software by process.

Major results (References and Guidelines for Software Development)

[The V-model] (Quote from "Common frame 2013")

SEC journal

Issued quarterly for managers and engineers in the software field, writing about effectiveness of software and system, factual articles and cases, and activity results of SEC.

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