

PRINCIPLES AND ALGORITHMS OF INFORMATION SECURITY MAINTENANCE FOR NUCLEAR MATERIAL PROTECTION IN E-MAIL SYSTEM

Gurvich L.G., Kabulov V.K., Tillaev T.S.
Institute of Nuclear Physics, Tashkent, Uzbekistan

The important component of nuclear material protection is maintenance of authorized usage of information about them and, in particular, about their protection. One of channels of unauthorized usage of information can arise at its transfer via an E-Mail without the conforming the sanction of the proprietor of this information and its writers, and also without its design pursuant to the rules adopted in organization, information, being the proprietor. The mailing programs are not designed for the control of the E-Mail contents, and for this purpose designed software complexes are developed, for example «Picket Jet» [1] and other which detain and do not send any letter, which contains words brought in a data base of the consulting model, used at a filter. As the correspondence between scientific and technological organizations has the pronounced problem related nature, the system such as [1] will detain a large part of the electronic letters. These letters will require a review of the security manager, considerations by the proprietor of the information, and only upon acceptance conforming solution can be sent to them. This will cause an unjustifiable delay in correspondence.

For elimination of these delays the principles of a selective filtration of information and algorithm conforming to them were designed. The method of a selective filtration is designed so that for each electronic letter additional conditions are predetermined, which allow it to pass through the filter. It considerably reduces the number of the letters held back by the filter. The example of possible algorithm of a selective filtration of the information sent via E-Mail is presented for an object being a research organization. For information filtration the algorithm is suggested based on the analysis on a fitting of information to its proprietor and on keywords significantly reducing amount of information required of realize of the semantic control, to hold back and send with the help of the security manager.

The algorithm guesses that the proprietor of the information being a scientific entity on behalf of its head or authorized persons who determined concretely for each report if it should be sent to a target passing the filter. The described further algorithm is one of the possible examples of a selective filtering system of the information sent via E-Mail. The example of the algorithm of information selective filtering system is elaborated for object being scientifically – research-scientific institution. The suggested algorithm is designed so that the person whose name appears on mail box is responsible for the contents of the letter. Though without a digital signature such letter will not be a document, but the information will be transferred to the address of recipient. According to this algorithm the letter intended for dispatch upon “send the letter” command enters the name in an intermediate CACHE of an analyzer and is contained there before check of conditions of its dispatch to the indicated address of the recipient.

For the analysis of a letter the following information arrays are formed and continuously updated:

KA1- Names of mail boxes of the authority persons of institute;

KA2- The pairs of addresses related to divisions of institute, leading joint researches with external organizations, and persons;

KA3- E-mail addresses of employees who are in business trips, the correspondence with which is authorized by management of institute;

KA4- Placed in section “SUBJECT” conditional words and sets of digits UCN, allocated to the scientific articles and other materials, adopted by institute, are prepared for dispatch via E-Mail for the publication in the scientific editions, workshops and conferences. The CACHE of an analyzer is subdivided into files, where one the following information of the parsed electronic letter is contained:

The file NS - names of E-Mail senders;

The file AS - e-mail address of the sender of the letter;

The file AR - e-mail address of the recipient of the letter;

The file CL - contents of the letter;

The file AM - attached material;

The file SL - subject of the letter.

The scheme of the letter analysis is presented in figure 1. The algorithm of the letter transit reflects traditional documenting regulations of the INP AS RUz elaborated for materials submitted for publication, or related to business correspondence.

The proposed system does not limit correspondence of the management of organization. Either by the contents of the letters and materials, sent with them, or the address of the recipients of these letters. The materials interchanged by division of institute with divisions of other organizations with which the official scientific communications are established, can be also sent without limitations.

The same rules are established for correspondence with the employees located in long-lived business trips, and issued a mail box on its name there. For materials directed for the publication and scientific conferences, composed pursuant to the rules, adopted in institute, at their registration to the sender the conditional number is determined, which is introduced to “SUBJECT” section and the employee composing the material is transmitted in the SL file. At processing of the letter on coincidence to these numbers the letter departs without the semantic control.

All letters which do not conform to the listed above privileges, are transmitted to the semantic control, where they are analyzed by the consulting model. The database of this model is based on thesaurus with the truncated endings, which requires the use of concepts and rules of indistinct sets at the analysis of the text.

If a letter at the semantic control, can not be assigned to one of the four privileged groups, it does not depart and is transferred to a special CACHE of the security manager who together with

qualified employees comes to conclusion upon the problem on realization of indispensable padding design of the letter, sufficient for its dispatch to the indicated addresses.

The proposed system should ensure protection against unauthorized sending of information, distribution of which can make a threat to security at usage of nuclear materials.

The work was supported by the grant CST RUz P-20.56 .

REFERENCE

1. “Picket Jet” software - www.jet.msk.ru

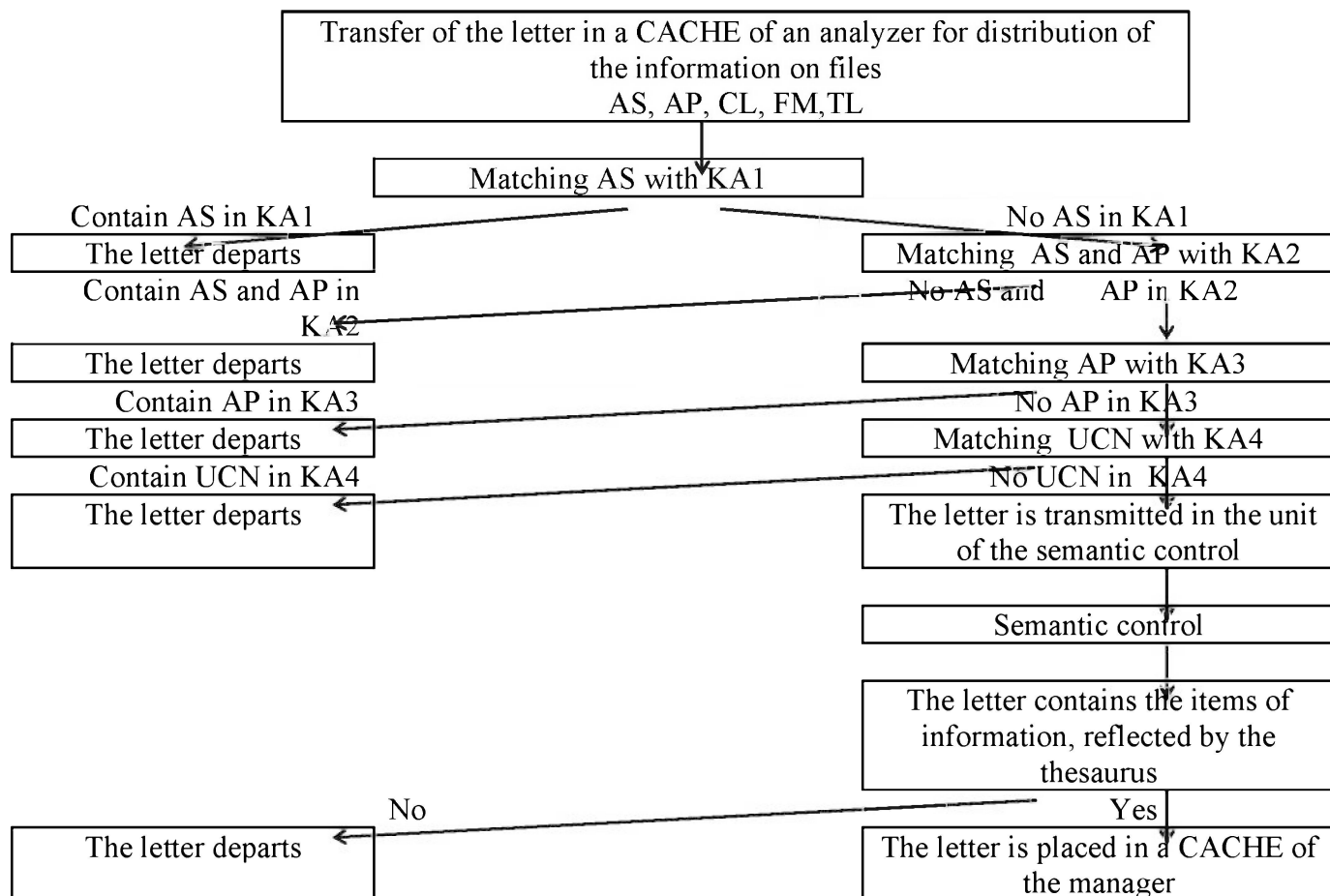


Fig. 1. The Flowchart of the Analysis of the Letter