



The South African Institute of Computer Science
and
Information Technology

The 1997 National
Research and
Development
Conference

Riverside Sun
Vanderbijlpark
13 & 14 November

Hosted by



Potchefstroomse Universiteit
vir Christelike Hoër Onderwys

The Department of Computer Science and Information Systems
Potchefstroom University for Christian Higher Education
Vaal Triangle Campus

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PROCEEDINGS

Edited by L.M. Venter & R.R. Lombard



The South African Institute of Computer Science
and
Information Technology

Proceedings
of the
The 1997 National
Research and
Development
Conference
Towards 2000

Riverside Sun
Vanderbijlpark
13 & 14 November

Edited by
L.M. Venter
R.R. Lombard

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ISBN 1-86822-300-0

Printed and Binded by Xerox Printers, Potchefstroom

The views expressed in this book are those of the individual authors

Foreword

This book contains a collection of papers presented at a Research and Development conference of the South African Institute of Computer Scientists and Information Technologists (SAICSIT). The conference was held on 13 & 14 November 1997 at the Riverside Sun, Vanderbijlpark. Most of the organization for the conference was done by the Department of Computer Science and Information Technology of the Vaal Triangle Campus, Potchefstroom University for Christian Higher Education.

The programming committee accepted a wide selection of papers for the conference. The papers range from detailed technical research work to reports of work in progress. The papers originate mainly from Academia, but also describe work done in and for Industry. It is hoped that the papers give a true reflection of the current research scene in Computer Science and Information Technology in South Africa. Since one of the aims of the conference is Research development, the papers were not subjected to a refereeing process.

A number of people spent numerous hours helping with the organization of this conference. In this regard, we wish to thank the members of the Organizing committee, and the Programming committee who had very little time to screen the abstracts and compile the program. A special thanks goes to the secretary of the department, Mrs Helei Jooste, whose very able work was interrupted by the birth of her first child.

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Table of Contents

Foreword	i
Organizing Committee	ii
List of Contributors	vii
<i>Software Objects Change : Problems and Solution</i> S.A. Ajila	1
<i>Liming-like Curve Constructions</i> M.L.Baart and R. McLeod	26
<i>A Model for Evaluating Information Security</i> L. Barnard and R. von Solms	27
<i>Integrating Spatial Data Management and Object Store Technology</i> S. Berman, S. Buffler and E. Voges	31
<i>Metamodelling in Automated Software Engineering</i> S. Berman and R. Figueira	32
<i>Using Multimedia Technology for Social Upliftment in Deprived Communities of Southern Africa</i> L. Bester and E. de Preez	33
<i>Extending the Client-Server Model for Web-based Execution of Applications</i> L. Botha , J.M. Bishop and N.B. Serbedzija	36
<i>Access Control Needs in an Electronic Workflow Environment</i> R.A. Botha	45
<i>The Use of the Internet in an Academic Environment to Commercially Supply and Support Software Products</i> B. Braude and A.J. Walker	51
<i>Explanation Facilities in Expert Systems Using Hypertext Technology</i> T. Breetzke and T. Thomas	63
<i>Theoretical Computer Science: What is it all about, and is it of any relevance to us?</i> C. Brink	75
<i>Representing Quadrics on a Computer</i> M.A. Coetzee and M.L. Baart	76

<i>The Generation of Pre-Interpretations for Detecting Unsolvable Planning Problems</i> D.A. de Waal, M. Denecker, M. Bruynooghe and M. Thielscher	77
<i>The Emerging Role of the Chief Information Officer in South Africa</i> B. Dekenah	87
<i>A Java-Implemented Remote Respiratory Disease Diagnosis System on a High Bandwidth Network</i> A. Foster	88
<i>Early Results of a Comparative Evaluation of ISO 9001 and ISO/IEC 15504 Assessment Methods Applied to a Software Project</i> C. Gee and A.J. Walker	89
<i>A Neural Network Model of a Fluidised Bed</i> M. Hajek	99
<i>The Effects of Virtual Banking on the South African Banking Industry</i> M.L. Hart and M. Dunley-Owen	100
<i>Linear Response Surface Analysis and Some Applications</i> J.M. Hattingh	118
<i>Model Checking Software with Symbolic Trajectory Evaluation</i> A. Hazelhurst	120
<i>A Risk Model to Allocate Resources to Different Computerized Systems</i> H.A. Kruger and J.M. Hattingh	137
<i>Returns on the Stock Exchange</i> J.W. Kruger	144
<i>Cardinality Constrained 0-1 Knapsack Problems</i> M.F. Kruger, J.M. Hattingh and T. Steyn	150
<i>An Investigation in Software Process Improvement in the Software Development of a large Electricity Utility</i> M. Lang and A.J. Walker	151
<i>Design and Implementation of a C++ Package for Two-Dimensional Numerical Integration</i> D.P. Laurie, L. Pluym and Ronald Cools	162
<i>Algebraic Factorization of Integers Using BDE's</i> H. Messerschmidt and J. Robertson	169

<i>Global Optimization of Routes after the Process of Recovery</i> M. Mphahlele and J. Roos	176
<i>Using a Lattice to Enhance Adaptation Guided Retrieval in Example Based Machine Translation</i> G.D. Oosthuizen and S.L. Serutla	177
<i>Information Systems Development and Multi Criteria Decision Making / Systems Thinking</i> D. Petkov, O. Petkova	192
<i>The Development of a Tutoring System to Assist Students to Develop Answering Techniques</i> N Pillay	193
<i>Combining Rule-Based Artificial Intelligence with Geographic Information Systems to Plan the Physical Layer of Wireless Networks in Greenfield Areas</i> K. Prag, P. Premjeeth and K. Sandrasegaran	194
<i>A Distributed Approach to the Scheduling Problem</i> V. Ram and P. Warren	202
<i>More readings than I thought : Quantifier Interaction in Analysing the Temporal Structure of Repeated Eventualities</i> S. Rock	203
<i>Ray Guarding Configuration of Adjacent Rectangles</i> I. Sanders, D. Lubinsky and M. Sears	221
<i>Developing Soft Skills in Computer Students</i> C Schröder, T. Thomas	239
<i>Information Security Awareness, a Must for Every Organization</i> M. Thomson and R. von Solms	250
<i>Pla Va: A Lightweight Persistent Java Virtual Machine</i> S Tjasink and S. Berman	253
<i>Beliefs on Resource-Bounded Agent</i> E. Viljoen	267
<i>Object-Orientated Business Modelling and Re-engineering</i> M. Watzenboeck	268

<i>On Indexing in Case Based Reasoning Applied to Pre-Transportation Decision Making for Hazardous Waste Handling</i> K.L. Wortmann, D. Petkov and E. Senior	269
Author Index	270

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A MODEL FOR EVALUATING INFORMATION SECURITY

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EXTENDED ABSTRACT

During the last few decades computing environments have advanced from single user systems to distributed, open environments we all know today. Through these Information Technology advancements, more and more role players moved into the computing arena, resulting in much more and more serious risks threatening the information resources. Information became a very important organizational asset and it needed protection in the same way all other organizational assets needed protection. A few technical controls used to be adequate to protect computing environments of the past, but the highly advanced IT environments of today require more sophisticated protection, and some proof thereof.

It is important to realize that, once an organization is trading with business partners through electronic means, then the direct control over information and information resources of the organization is not in the hands of the organization alone anymore. The insecurity of the business partner may threaten the security of that organization [Von Solms, 1997, p.21]. Secure business partners is a prerequisite for electronic commerce.

A crucial question arises: How can an organization prove adequate information security as a business partner in this age of electronic commerce? The answer to this question lies in information security evaluation and certification.

When organizations want to take part in inter-company trading, there should be some form of trust between trading partners. Electronic commerce can only succeed if all trading partners could provide proof of their security level regarding information security and protection to the other trading partners. Such proof would guarantee the mutual trust needed for successful electronic commerce. Mutual trust can optimally be obtained through a scheme where an IT environment is evaluated and certified according to a generally accepted set of criteria or

standards.

When an organization wants to provide proof of a certain level of information security, an internationally accepted standard, e.g. BS 7799 [CoP, 1993], or set of criteria should be used. It is important that the standard or criteria utilized should be internationally accepted, as all the trading partners should conform to the same standard.

ISO 9000, the Trusted Computer System Evaluation Criteria (TCSEC) and the Information Technology Security Evaluation Criteria (ITSEC) are three evaluation and certification models relevant to the field of information security.

These three evaluation models can be used as the basis for a new, internationally accepted information security evaluation and certification model. Specific information security evaluation criteria that emerged from these models, can be used as building blocks for the new model.

The following criteria were identified from the three evaluation models:

The evaluation process should be split into **two assessment stages**, namely an on-site and an off-site evaluation. ISO 9000 also employs a two-stage evaluation approach [Knight, 1995]. Each IT system is in effect designed and built for a specific need, and would therefore operate in a unique environment. Both ISO 9000 and ITSEC address this issue [Knight, 1995; ITSEC, 1985]. From ISO 9000 it is clear that **organizational and administrative controls** are also an important part of the total IT environment and it should also be evaluated. The **functionality** of the system should point out whether the system has all the controls, as prescribed by the standard against which the evaluation takes place (e.g. BS 7799), installed. **Effectiveness** will test whether the suggested controls are the appropriate ones that will ensure the required security level and the controls should be implemented **correctly**. A thorough audit should determine whether suggested administrative and operational controls are **operational**.

These criteria would allow an organization to be thoroughly evaluated and tested, and it

would provide the organization with the necessary proof to take part in electronic commerce.

Besides the criteria listed above, there are also several evaluation components that should exist within an evaluation and certification model. The organization needs to draft an information security policy (ISP). The policy will envisage an organizational environment that should be implemented. The next step will be to identify all the controls that the organization would consider important to ensure effective protection against possible threats. These controls should be in line with the ISP. This step will identify the *Target of Evaluation (TOE)* of the organization, i.e. what the organization *wants*. The *Security Target (ST)* will contain the controls the organization should have according to BS 7799. The evaluation process will determine whether the TOE meets the ST. This evaluation process will be integrated into an information security evaluation and certification model.

The evolution in the field of information technology made it clear that the area of information security has grown rapidly from almost nonexistent to a critical factor in any organization. The days of single-user machines are gone forever. This situation forced organizations to revisit the issue of information security. The global village in which inter-company trade takes place also compelled organizations to require some form of proof of a specified security level from all electronic commerce partners. Without this proof, mutual trust between the trading partners will not exist, and no electronic commerce can take place with confidence.

This abstract addressed the mechanism that can be used by organizations to obtain the proof of a specified security level, by formulating an evaluation model for some security standard, for example, BS 7799. If all organizations, wishing to trade electronically, adopted this model and adhered to the standards as given in BS 7799, mutual trust between trading partners can be established and electronic commerce would flourish, without fears of possible security infringements.

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