



# Certification Report

## EAL 2+ Evaluation of Alcatel-Lucent Service Router Operating System (SR OS) v7.0

Issued by:

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**Canadian Common Criteria Evaluation and Certification Scheme**

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## FOREWORD

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The CCEF that carried out this evaluation is EWA-Canada located in Ottawa, Canada.

By awarding a Common Criteria certificate, the CCS Certification Body asserts that the product complies with the security requirements specified in the associated security target. A security target is a requirements specification document that defines the scope of the evaluation activities. The consumer of certified IT products should review the security target, in addition to this certification report, in order to gain an understanding of any assumptions made during the evaluation, the IT product's intended environment, its security requirements, and the level of confidence (i.e., the evaluation assurance level) that the product satisfies the security requirements.

This certification report is associated with the certificate of product evaluation dated 7 May 2010, and the security target identified in Section 4 of this report.

The certification report, certificate of product evaluation and security target are posted on the CCS Certified Products list (CPL) and the Common Criteria portal (the official website of the Common Criteria Project).

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## Executive Summary

The Alcatel-Lucent Service Router Operating System v7.0 (hereafter referred to as SR OS), from Alcatel-Lucent, is the Target of Evaluation (TOE) for this Evaluation Assurance Level (EAL) 2 augmented evaluation.

SR OS is the operating system designed to provide the functionality for the Alcatel-Lucent 7710 and 7750 Service Routers, and for the 7450 Ethernet Service Switch. The 7710 and 7750 Routers are deployed in a multi-service edge routing environment; the 7450 Switch is deployed in a Metro Ethernet/ Multi-Protocol Label Switching (MPLS) aggregation environment.

EWA-Canada is the CCEF that conducted the evaluation. This evaluation was completed on 22 April 2010 and was carried out in accordance with the rules of the Canadian Common Criteria Evaluation and Certification Scheme (CCS).

The scope of the evaluation is defined by the security target, which identifies assumptions made during the evaluation, the intended environment for SR OS, the security requirements, and the level of confidence (evaluation assurance level) at which the product is intended to satisfy the security requirements. Consumers are advised to verify that their operating environment is consistent with that specified in the security target, and to give due consideration to the comments, observations and recommendations in this certification report.

The results documented in the Evaluation Technical Report (ETR)<sup>1</sup> for this product provide sufficient evidence that it meets the EAL 2 Augmented assurance requirements for the evaluated security functionality. The evaluation was conducted using the *Common Methodology for Information Technology Security Evaluation, Version 3.1 Revision 2*, for conformance to the *Common Criteria for Information Technology Security Evaluation, version 3.1 Revision 2*. The following augmentation is claimed: ALC\_FLR.1 - Basic Flaw Remediation.

Communications Security Establishment Canada, as the CCS Certification Body, declares that SR OS evaluation meets all the conditions of the *Arrangement on the Recognition of Common Criteria Certificates* and that the product will be listed on the CCS Certified Products list (CPL) and the Common Criteria portal (the official website of the Common Criteria Project).

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<sup>1</sup> The ETR is a CCS document that contains information proprietary to the developer and/or the evaluator, and is not releasable for public review.

## 1 Identification of Target of Evaluation

The Target of Evaluation (TOE) for this Evaluation Assurance Level (EAL) 2 augmented evaluation is Alcatel-Lucent Service Router Operating System v7.0 (hereafter referred to as SR OS), from Alcatel-Lucent.

## 2 TOE Description

SR OS is the operating system designed to provide the functionality for the Alcatel-Lucent 7710 and 7750 Service Routers, and for the 7450 Ethernet Service Switch. SR OS resides on a compact flash card that ships with the platforms. With the exception of the performance enhancing hardware queues used in the 7710 SR-c4 and SR-c12, 7750 SR-7, SR-12, ESS-7, and ESS-12.i models, platform hardware is excluded from the TOE boundary.

## 3 Evaluated Security Functionality

The complete list of evaluated security functionality for SR OS is identified in Section 7 of the Security Target (ST).

## 4 Security Target

The ST associated with this Certification Report is identified by the following nomenclature:

Title: Alcatel-Lucent Service Router Operating System (SR OS) v7.0 Security Target

Version: v1.8

Date: 6 April 2010

## 5 Common Criteria Conformance

The evaluation was conducted using the *Common Methodology for Information Technology Security Evaluation, Version 3.1 Revision 2*, for conformance to the *Common Criteria for Information Technology Security Evaluation, Version 3.1 Revision 2*.

SR OS is:

- a. *Common Criteria Part 2 conformant*, with security functional requirements based on functional components in Part 2;
- b. *Common Criteria Part 3 conformant*, with security assurance requirements based on assurance components in Part 3; and
- c. *Common Criteria EAL2 augmented*, containing all security assurance requirements in the EAL 2 package, as well as the following: ALC\_FLR.1 – Basic Flaw Remediation.

## 6 Security Policy

SR OS implements information flow control policies that control the flow of information passing through the TOE. Details of these security policies can be found in Section 6 of the ST.

In addition, SR OS implements policies pertaining to security audit, identification and authentication, security management, and product access.

## 7 Assumptions and Clarification of Scope

Consumers of SR OS should consider assumptions about usage and environmental settings as requirements for the product's installation and its operating environment. This will ensure the proper and secure operation of the TOE.

### 7.1 Secure Usage Assumptions

The following Secure Usage Assumption is listed in the ST:

- Authorized administrators are not careless, willfully negligent, or hostile, and will follow and abide by the guidance provided by SR OS documentation.

### 7.2 Environmental Assumptions

The following Environmental Assumptions are listed in the ST:

- The TOE will be located within controlled access facilities; and
- The operational environment will provide a RADIUS or TACACS+ server for authentication/ authorization, a 5620 Service Aware Manager (SAM) for remote administration, a local console for local management, a Simple Network Management Protocol (SNMP)/Syslog server for logging, and a Network Time Protocol (NTP) server for external time synchronization.

### 7.3 Clarification of Scope

SR OS is intended for use within a non-hostile environment; SR OS relies on the environment for physical and logical protection.

## 8 Architectural Information

SR OS comprises the three main subsystems: Management Plane; Control Plane; and Data Plane. These subsystems are described in detail in Section 1.5 of the ST.

## 9 Evaluated Configuration

The evaluated configuration for SR OS comprises:

Service Router Operating System (SR OS) v7.0 executing on the following platforms:

- Alcatel-Lucent 7710 Service Router models SR-c4 and SR-c12;
- Alcatel-Lucent 7750 Service Router models SR-1, SR-7 and SR-12; and
- Alcatel-Lucent 7450 Ethernet Service Switch models ESS-1, ESS-6, ESS-7 and ESS-12.i.

## 10 Documentation

The Alcatel-Lucent documents provided to the consumer are as follows.

Alcatel-Lucent 7710 Service Router:

- 7710 SR OS Basic System Configuration Guide;
- 7710 SR OS System Management Guide;
- 7710 SR OS Interface Configuration Guide;
- 7710 SR OS Router Configuration Guide;
- 7710 SR OS Routing Protocols Guide;
- 7710 SR OS MPLS Guide;
- 7710 SR OS Services Guide;
- 7710 SR OS OAM and Diagnostic Guide;
- 7710 SR OS Triple Play Guide; and
- 7710 SR Quality of Service Guide.

Alcatel-Lucent 7750 Service Router:

- 7750 SR OS Basic System Configuration Guide;
- 7750 SR OS System Management Guide;
- 7750 SR OS Interface Configuration Guide;
- 7750 SR OS Router Configuration Guide;
- 7750 SR OS Routing Protocols Guide;
- 7750 SR OS MPLS Guide;
- 7750 SR OS Services Guide;
- 7750 SR OS OAM and Diagnostic Guide;
- 7750 SR OS Triple Play Guide;
- 7750 SR Quality of Service Guide; and
- 7750 SR-Series OS Integrated Services Adapter Guide.

Alcatel-Lucent 7450 Ethernet Service Switch:

- 7450 ESS OS Basic System Configuration Guide;
- 7450 ESS OS System Management Guide;
- 7450 ESS OS Interface Configuration Guide;

- 7450 ESS OS Router Configuration Guide;
- 7450 ESS OS Routing Protocols Guide;
- 7450 ESS OS MPLS Guide;
- 7450 ESS OS Services Guide;
- 7450 ESS OS OAM and Diagnostic Guide;
- 7450 ESS OS Triple Play Guide;
- 7450 ESS Quality of Service Guide; and
- 7450 ESS-Series OS Integrated Services Adapter Guide.

## 11 Evaluation Analysis Activities

The evaluation analysis activities involved a structured evaluation of SR OS, including the following areas:

**Development:** The evaluators analyzed the SR OS functional specification and design documentation; they determined that the design completely and accurately describes the TOE security functionality (TSF) interfaces, the TSF subsystems and how the TSF implements the security functional requirements (SFRs). The evaluators analyzed the SR OS security architectural description and determined that the initialization process is secure and that the security functions are protected against tamper and bypass. The evaluators also independently verified that the correspondence mappings between the design documents are correct.

**Guidance Documents:** The evaluators examined the SR OS preparative user guidance and operational user guidance and determined that it sufficiently and unambiguously describes how to securely transform the TOE into its evaluated configuration and how to use and administer the product. The evaluators examined and tested the preparative and operational guidance, and determined that they are complete and sufficiently detailed to result in a secure configuration.

**Life-Cycle Support:** An analysis of the SR OS configuration management system and associated documentation was performed. The evaluators found that the SR OS configuration items were clearly marked. The developer's configuration management system was observed during a site visit, and it was found to be mature and well-developed.

The evaluators examined the delivery documentation and determined that it described all of the procedures required to maintain the integrity of SR OS during distribution to the consumer.

The evaluators reviewed the flaw remediation procedures used by Alcatel-Lucent for SR OS. During a site visit, the evaluators also examined the evidence generated by adherence to the procedures. The evaluators concluded that the procedures are adequate to track and correct security flaws, and distribute the flaw information and corrections to consumers of the product.

**Vulnerability Assessment:** The evaluators conducted an independent vulnerability analysis of SR OS. Additionally, the evaluators conducted a review of public domain vulnerability databases. The evaluators did not identify any potential vulnerabilities applicable to the SR OS in its operational environment.

All these evaluation activities resulted in **PASS** verdicts.

## 12 ITS Product Testing

Testing at EAL 2 consists of the following three steps: assessing developer tests, performing independent functional tests, and performing penetration tests.

### 12.1 Assessment of Developer Tests

The evaluators verified that the developer has met their testing responsibilities by examining their test evidence, and reviewing their test results, as documented in the ETR<sup>2</sup>.

The evaluators analyzed the developer's test coverage and found it to be complete and accurate. The correspondence between the tests identified in the developer's test documentation and the functional specification and TOE design was complete.

### 12.2 Independent Functional Testing

During this evaluation, the evaluator developed independent functional tests by examining design and guidance documentation, examining the developer's test documentation, executing a sample of the developer's test cases, and creating test cases that augmented the developer tests.

All testing was planned and documented to a sufficient level of detail to allow repeatability of the testing procedures and results. Resulting from this test coverage approach was the following list of EWA-Canada test goals:

- a. Initialization: The objective of this test goal is to confirm that the TOE can be installed and configured into the evaluated configuration, as identified in the TOE Description of the Security Target, by following all instructions in the developer's Installation and Administrative guidance;
- b. Repeat of Developer's Tests: The objective of this test goal is to repeat a subset of the developer's tests on the evaluator's TOE installation; and

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<sup>2</sup> The ETR is a CCS document that contains information proprietary to the developer and/or the evaluator, and is not releasable for public review.

- c. TOE Tests: Objectives include verify TOE login authentication, verify RADIUS authentication, verify traffic filter policy, and verify NTP update.

### **12.3 Independent Penetration Testing**

Subsequent to the independent review of public domain vulnerability databases and all evaluation deliverables, and discussion with the developer, limited independent evaluator penetration testing was conducted focussing on Denial of Service.

The independent penetration testing did not uncover any exploitable vulnerabilities in the intended operating environment.

### **12.4 Conduct of Testing**

SR OS was subjected to a comprehensive suite of formally documented, independent functional and penetration tests. The testing took place at the Alcatel-Lucent Kanata, Ontario and Mountain View, California offices. The detailed testing activities, including configurations, procedures, test cases, expected results and observed results are documented in a separate Test Results document.

### **12.5 Testing Results**

The developer's tests and the independent functional tests yielded the expected results, giving assurance that SR OS behaves as specified in its ST, functional specification, TOE design, and security architecture description.

## **13 Results of the Evaluation**

This evaluation has provided the basis for an EAL 2+ level of assurance. The overall verdict for the evaluation is **PASS**. These results are supported by evidence in the ETR.

## **14 Evaluator Comments, Observations and Recommendations**

SR OS is a complex carrier network device that requires training and assistance from the developer to configure, use, and integrate into a customer's network. The evaluator was assisted by the developer when required in the testing phase, and was impressed with the level and robustness of the automated testing provided.

## 15 Acronyms, Abbreviations and Initializations

<u>Acronym/Abbreviation/Initialization</u>	<u>Description</u>
CCEF	Common Criteria Evaluation Facility
CCS	Canadian Common Criteria Evaluation and Certification Scheme
CPL	Certified Products list
DoS	Denial of Service
EAL	Evaluation Assurance Level
ESS	Ethernet Service Switch
ETR	Evaluation Technical Report
IP	Internet Protocol
IT	Information Technology
ITSET	Information Technology Security Evaluation and Testing
MPLS	Multiprotocol Label Switching
NTP	Network Time Protocol
PALCAN	Program for the Accreditation of Laboratories Canada
RADIUS	Remote Authentication Dial-In User Service
SAM	Service Aware Manager
SNMP	Simple Network Management Protocol
SR OS	Service Router Operating System
ST	Security Target
TACACS	Terminal Access Controller Access Control System Plus
TOE	Target of Evaluation
TSF	TOE Security Functionality

## 16 References

This section lists all documentation used as source material for this report:

- a. CCS Publication #4, Technical Oversight, Version 1.1, August 2005.
- b. Common Criteria for Information Technology Security Evaluation, Version 3.1 Revision 2, September 2007.
- c. Common Methodology for Information Technology Security Evaluation, CEM, Version 3.1 Revision 2, September 2007.
- d. Alcatel-Lucent Service Router Operating System (SR OS) v7.0 Security Target, Version 1.8, 6 April 2010.

- e. Evaluation Technical Report for EAL 2+ Common Criteria Evaluation of Alcatel-Lucent Service Router Operating System v7.0, Common Criteria Evaluation Number: 383-4-115, Document No. 1607-000-D002, Version 1.6, 22 April 2010.