Secure Print Server (SPS)

The personnel of a company uses a group of printers to print their documents. The company management requires a secure printing system that protects document confidentiality.

Documents to be printed can be directed to one of two printers located at different rooms. The printers are managed by a common Print Server.

The documents in the company are classified into two groups of confidentiality, namely *Public* and *Secret*. Clients, who are the users of the system, can supply print requests after getting connected to the Print Server.

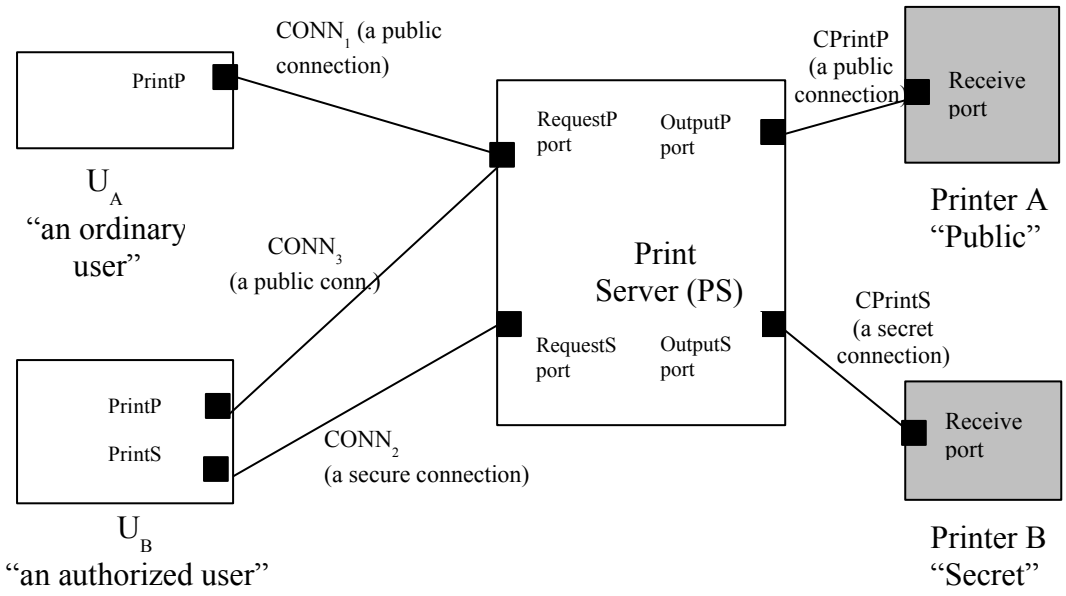

Figure 1: A box-and-line diagram for Secure Print Server

Printer A, the Public Printer, prints Public documents, whereas Printer B, the Secret one, fulfills only Secret document print requests. The aim in this configuration is to provide a way of printing user documents while, at the same time, preserving the confidentiality by regarding the privacy of the documents.

Each user must establish a connection to the server before sending documents for printing. He/she is assigned a clearance that represents the authorization level by which he/she is allowed to supply print requests. Two types of clearance, namely 'EVERYONE' and 'AUTHORIZED', are associated with users.

The Print Server, having received the request from a user connected through one of its ports, directs the document to a suitable printer regarding the secrecy of the document. The server can use public printer if it receives a request from its public port (*RequestP*). It is expected to send the document to the secret printer if the user uses the server's secret port (*RequestS*) for his print request. The connections between the server and the printers are established using separate connectors.

In the example SPS configuration, as shown in Figure 1, there are two users, namely U_A and U_B. U_A is an ordinary user and involved in the connection $CONN_1$ which connects the user to the public port of the server. U_B, on the other hand, is a privileged user and involved in two connections called $CONN_2$ and $CONN_3$, to the secure port and public port, respectively. The print server is connected to printers by connectors called *CPrintP* and *CPrintS*.

If the authorized user, i.e. U_B, needs a secret document to be printed out, this document must not be printed by the public printer. He is required to use its *PrintP* port to send a public document. In such a case, print server directs the document to the public printer for the output. U_B must use its *PrintS* port for secret documents. The ordinary user, on the other hand, has a single connection to the print server through its *PrintP* port. Therefore, the print server always prints his documents using the public printer.

The access control lattice model and the Wright/c description of the system is presented in Figure 2.

In our example, there are three connections instantiated between users and the Print Server (PS). User U_A establishes a single connection to a public port of the server ($CONN_1$) whereas U_B creates one to the public port ($CONN_3$), and also one connection to the secret port of the server ($CONN_2$). Therefore, U_A can only send public documents to be printed through $CONN_1$ and they are printed by Printer A. User U_B, who is an authorized person, uses either PrintP or PrintS ports, and so $CONN_2$ or $CONN_3$ connector, respectively, depending on the secrecy of the

documents, to make a print request to the server. However, $CONN_2$ must be used in cases where a document labeled as secret is intended for printing. In such cases, the server receives a request from its secure port, where $CONN_2$ is established onto, and directs the document to 'Secure' Printer B to fulfill the print request of U_B. The description of the computation part of Component PrintServer clearly describes what to do after observing a request from one of its ports. The external (or nondeterministic) selection is needed since the server selects one of two printers according to the port through which the document is received. The Print Server is connected to public printer by the connector CPRINTP and to secure printer by the connector CPRINTS. These connectors are of the same type used between users and the print server.

Lattice CSL // content of lattice file "/project/printing/ACLattice.txt"

Security Labels

PUBLIC,

SECRET

Ordering

PUBLIC, SECRET

Clearance List

EVERYONE : PUBLIC

AUTHORIZED : SECRET

End Lattice

// Wright/c description of Secure Print Server

Style ClientServerPrinting //style description

Import Lattice CSL "/project/printing/ACLattice.txt"

Component Client(τ : SecurityLabel) =

Port PrintP = $\overline{\text{request!}}\ x^{\tau} \rightarrow$ PrintP

Port PrintS = $\overline{\text{request!}}\ x^{\text{SECRET}} \rightarrow$ PrintS

Computation = $\overline{\text{PrintP. request!}}\ x^{\tau} \rightarrow$ Computation

Π $\overline{\text{PrintS. request!}}\ x^{\text{SECRET}} \rightarrow$ Computation

Component Printer =

Port Receive = request? x $\rightarrow$ Receive

Computation = Receive. Request? x $\rightarrow \overline{\text{DoPrint}} \rightarrow$ Computation

Component PrintServer =

Port RequestP = request?x $\rightarrow$ RequestP

Port RequestS = request?x $\rightarrow$ RequestS

Port OutputP **=** $\overline{\text{Print!x}} \rightarrow$ OutputP

Port OutputS **=** $\overline{\text{Print!x}} \rightarrow$ OutputS

Computation = RequestP.Request?x $\rightarrow \overline{\text{OutputP.Print!x}} \rightarrow$ Computation

$\Box$ RequestS.Request?x$\rightarrow \overline{\text{OutputS.Print!x}} \rightarrow$ Computation

Connector PrintConnector =

Role ClientP = request!x $\rightarrow$ ClientP

Role ServerP = $\overline{\text{request?x}} \rightarrow$ ServerP

Glue = ClientP.request!x $\rightarrow \overline{\text{ServerP.request?x}} \rightarrow$ **Glue**

End Style

Figure 2: Access Control Lattice Model and Wright/c description of Secure Print Server

```
Configuration PrintServer
  Style ClientServerPrinting
    Instances
        U_A              : Client(CSL.min())
        U_B              : Client(CSL.min())
         PS              : PrintServer
         SECUREPRINTER : Printer
         PUBLICPRINTER : Printer
         CONN_1: PrintConnector
         CONN_2: PrintConnector
         CONN_3: PrintConnector
         CPRINTS         : PrintConnector
         CPRINTP         : PrintConnector
    Clearance
         U_A                          : EVERYONE
         U_B                          : AUTHORIZED
         U_B.PrintP                   : EVERYONE
         PS.RequestP                  : EVERYONE
         PS.RequestS                  : AUTHORIZED
         PS.OutputP                   : EVERYONE
         PS.OutputS                   : AUTHORIZED
         SECUREPRINTER                : AUTHORIZED
       PUBLICPRINTER                  : EVERYONE
    Attachments
         U_A.PrintP as CONN_1.ClientP
         PS.RequestP  as CONN_1.ServerP
         U_B.PrintS  as CONN_2.ClientP
         PS.RequestS as CONN_2.ServerP
         U_B.PrintP  as CONN_3.ClientP
         PS.RequestP as CONN_3.ServerP
         PS.OutputP  as CPRINTP.ClientP
         PUBLICPRINTER.Receive as CPRINTP.ServerP
         PS.OutputS  as CPRINTS.ClientP
         SECUREPRINTER.Receive as CPRINTS.ServerP
End Configuration
```

Figure 2: Access Control Lattice Model and Wright/c description of Secure Print Server (continued)

Some cases for possible violations:

The description written above agrees with Bell LaPadula principles for preserving confidentiality:

- No read up: the connections are established such that the documents are directed to an unintended port. Moreover, the server reads secret data only from its authorized port and assumes that it is not public. Therefore, it selects the Secret printer, which is located in a secure room, for the output of documents read from authorized port. Then, unauthorized persons can not access these printouts of secret documents.

- No write down: The server computation is designed so that it does not produce secret printouts using the public printer which everbody can access.

If the description is created disregarding the principles, there may appear some situations that may cause violations for confidentiality. The algorithm that we will propose detects potential violations and produces warnings for the developers.

1. *Improper clearance might be assigned to the ports while instantiating the components*

   1.a. Components are instantiated and their ports are given clearance before attachments are made. In order to fulfill the rules of principles, sufficient clearance should be associated with the port instances. Otherwise, a component instance can try to read a secret document through an unauthorized port. Moreover, a component instance can try to write secret data through a public port. Both of these cases violate confidentiality principles. For example, in our Secure Print Server, assume that U_A is associated with a clearance value AUTHORIZED. Their ports, by default, inherit this clearance. In such a case, U_A (or its port *PrintP* in particular) will try to write public data which violates the *no write-down* rule of BLP model.

   1.b. Another case for improper clearance might be originated from the behaviour of the component, i.e. from its computation. For example, an authorized component instance can lower the secrecy label of some datum

and output through one of its ports. However, if the clearance of the port for such an output is not considered in parallel to this action, a violation to BLP appears. Assume that the computation part of component *PrintServer* is modified as below:

Computation = RequestP.Request?x →
(OutputS.Print!x → Computation
∏ OutputP.Print!x → Computation)
□ RequestS.Request?x → OutputS.Print!x → Computation

This modified computation, clearly, violates the BLP model. The server reads a public document from its public port and directs it to be printed by a secure printer using *OutputS* port. Since that port has a AUTHORIZED clearance, it violates *no write-down* principle.

2. *Improper attachments*

Once the components and connectors are instantiated, their ports are attached to suitable roles in the attachment section. Since ports have their own clearance, the attachments need to be established by respecting the principles. If a high clearance port (say an output port) is attached to a role of a connector whose some other roles are attached to ports (say input ports) with low clearance, a potential violation may appear. For example, assume that our configuration had an attachment like :

Attachments

U_B.PrintS as $CONN_1$.ClientP
PS.RequestP as $CONN_1$.ServerP

U_B is an authorized user. It sends SECRET documents through port *PrintS*. However, on the other side of the connection, the server tries to read this secure document through its *RequestP* port whose clearance is EVERYONE. Therefore, the *no read-up* principle is violated.

3. *To ignore the simple security property of Bell LaPadula model in Glue part of a connector*.

If the description of the glue unexpectedly changes the secrecy level of data flowing through it, this may also cause a violation. For example, suppose that the glue of PrintConnector is rewritten as below:

$$\textbf{Glue} = \text{ClientP.request!x} \rightarrow \overline{\text{ServerP.request?x}^{\text{SECRET}}} \rightarrow \textbf{Glue}$$

The modification says that whatever the secrecy label of data received by the connector is, it is carried to a port as a SECRET data. This may potentially cause a *no read-up* principle violation if the receiving port has the EVERYBODY clearance.

In the next section, the Secure Print Server is taken as an example application to illustrate the verification algorithm. The cases for possible violations are also applied and discussed.

Illustration of the Verification Process for SPS

In this section, an illustration of the verification process including iteration steps is presented. The variations of the Secure Print Server, given in the previous section, to show possible violations is also included in the illustration.

The reader is supposed to refer to the following remarks in order to follow the illustration tables given in this section:

- Each row of the tables depicts state transitions for a port of a component instance,
- A state consists of a *Received Label Set Assignment (rlsa)* and a *Sent Label Set Assignment (slsa)*. *rlsa* of the first state is constructed by applying the *flooding*,
- Each *rlsa* or *slsa* entry is a list of *sublattices* that are represented by their maximum and the minimum elements.
- *P* and *S* stand for PUBLIC and SECRET data labels, respectively. Therefore, an entry ‘P S’ denotes a sublattice with the maximum element *S,* and the minimum element *P*. A single data label is represented by either ‘P P’ (PUBLIC) or ‘S S’ (SECRET). An entry valued as *Empty* refers to an empty list.

- The strikethrough over a label denotes the *refusal* because of the violation prevention with respect to BLP model,
- The bold face emphasizes the updates during the state transitions, and if there appears no change in either *rlsa* or *slsa* lists, the process stops,
- At the termination of the process, if there is a potential violation to BLP principles, the *rlsa* or *slsa* entry that causes the violation is shaded.

Table 1 illustrates that the algorithm executes for three iteration steps since the content of the *rlsa* in step 3 does not change. There is no need to calculate *slsa* for step 3 since the *rlsa* is the same at this step. The process starts by flooding the *rlsa* regarding the clearance of the ports. Next, the *slsa* is computed for the initial step. Note that PUBLIC labels for *OutputP* port of *PS*, and *Receive* port of *PUBLICPRINTER* are refused by the violation checking algorithm since their clearance are not proper.

Table 1. Illustration of the iteration steps for the Secure Print Server

Component Instance Name	**Port Name**	**Clearance of the Port**	**STEP 1**		**STEP 2**		**STEP 3**	
			rlsa (***Flooded***)	**slsa**	**rlsa**	**slsa**	**rlsa** *(no change)*	**slsa**
U_1	PrintP	EVERYONE	P S	P P	*Empty*	P P	*Empty*	
U_2	PrintS	AUTHORIZED	P S	S S	*Empty*	S S	*Empty*	
U_2	PrintP	EVERYONE	P S	P P	*Empty*	P P	*Empty*	
PS	RequestS	AUTHORIZED	P S	*Empty*	**S** S	*Empty*	S S	
PS	RequestP	EVERYONE	P S	*Empty*	P **P**	*Empty*	P P	
PS	OutputP	EVERYONE	P S	P S	*Empty*	P **P**	*Empty*	
PS	OutputS	AUTHORIZED	P S	~~P~~ S S	*Empty*	S S	*Empty*	
SECURE PRINTER	Receive	AUTHORIZED	P S	*Empty*	**S** S	*Empty*	S S	
PUBLIC PRINTER	Receive	EVERYONE	P S	*Empty*	P P ~~S~~	*Empty*	P P	

Since there is no refused label left after termination of the process (i.e. after state is completed), the verification results with a success. That means, statically, there is no data flow that may potentially cause a violation to Bell LaPadula model.

In the previous section, we have presented some cases to show possible violations to Bell LaPadula model by modifying the SPS. Similar to the original description, their verification steps are depicted in Table 2, Table 3, Table 4, and Table 5, respectively.

In Table 2, the process terminates in step 3 where there is no modification in the *slsa.* It is shown that *PrintP* port of component instance U_A violates the '*no-write down*' principle since it tries to output a PUBLIC datum while it is given an AUTHORIZED clearance.

Table 2. Illustration of the iteration steps for Secure Print Server (improper clearance, case 1.a)

Component Instance Name	**Port Name**	**Clearance of the Port**	**STEP 1**		**STEP 2**		**STEP 3**	
			rlsa (***Flooded***)	**slsa**	**rlsa**	**slsa**	**rlsa**	**slsa** (***no change)***
U_A	PrintP	**AUTHORIZED**	P S	~~P~~ ~~P~~	*Empty*	~~P~~ ~~P~~	*Empty*	~~P~~ ~~P~~
U_B	PrintS	AUTHORIZED	P S	S S	*Empty*	S S	*Empty*	S S
U_B	PrintP	EVERYONE	P S	P P	*Empty*	P P	*Empty*	P P
PS	RequestS	AUTHORIZED	P S	*Empty*	**S** S	*Empty*	S S	*Empty*
PS	RequestP	EVERYONE	P S	*Empty*	P **P**	*Empty*	P P	*Empty*
PS	OutputP	EVERYONE	P S	P S	*Empty*	P **P**	*Empty*	P P
PS	OutputS	AUTHORIZED	P S	~~P~~ S S	*Empty*	S S	*Empty*	S S
SECURE PRINTER	Receive	AUTHORIZED	P S	*Empty*	**S** S	*Empty*	S S	*Empty*
PUBLIC PRINTER	Receive	EVERYONE	P S	*Empty*	P P ~~S~~	*Empty*	P **P**	*Empty*

Table 3 illustrates another case for improper clearance assignment (1.b). In this case, *OutputS* port of *PS* component also causes a potential violation '*no-write down'* principle.

Table 3. Illustration of the iteration steps for Secure Print Server (improper clearance, case 1.b)

Component Instance Name	**Port Name**	**Clearance of the Port**	**STEP 1**		**STEP 2**		**STEP 3**	
			rlsa (***Flooded***)	**slsa**	**rlsa**	**slsa**	**rlsa**	**slsa** (***no change)***
U_A	PrintP	EVERYONE	P S	P P	*Empty*	P P	*Empty*	P P
U_B	PrintS	AUTHORIZED	P S	S S	*Empty*	S S	*Empty*	S S
U_B	PrintP	EVERYONE	P S	P P	*Empty*	P P	*Empty*	P P
PS	RequestS	AUTHORIZED	P S	*Empty*	**S** S	*Empty*	S S	*Empty*
PS	RequestP	EVERYONE	P S	*Empty*	P **P**	*Empty*	P P	*Empty*
PS	OutputP	EVERYONE	P S	P S	*Empty*	P **P**	*Empty*	P P
PS	OutputS	AUTHORIZED	P S	~~P~~ S S	*Empty*	~~P~~ S S	*Empty*	~~P~~ S S
SECURE PRINTER	Receive	AUTHORIZED	P S	*Empty*	**S** S	*Empty*	S S	*Empty*
PUBLIC PRINTER	Receive	EVERYONE	P S	*Empty*	P P ~~S~~	*Empty*	P **P**	*Empty*

Table 4 is a trace of the verification for improper attachments. It shows the occurrence of the flow anomalies violation when an attachment is modified as given in the previous section (Case 2). *RequestP* port of *PS* component violates '*no-read up*' principle when such an improper attachment is established.

Table 4. Illustration of the iteration steps for Secure Print Server (improper attachment, case 2)

Component Instance Name	**Port Name**	**Clearance of the Port**	**STEP 1**		**STEP 2**		**STEP 3**	
			rlsa (***Flooded***)	**slsa**	**rlsa**	**slsa**	**rlsa**	**slsa** (***no change)***
U_A	PrintP	EVERYONE	P S	P P	*Empty*	P P	*Empty*	P P
U_B	PrintS	AUTHORIZED	P S	S S	*Empty*	S S	*Empty*	S S
U_B	PrintP	EVERYONE	P S	P P	*Empty*	P P	*Empty*	P P
PS	RequestS	AUTHORIZED	P S	*Empty*	**S** S	*Empty*	S S	*Empty*
PS	RequestP	EVERYONE	P S	*Empty*	P P ~~S~~	*Empty*	P P ~~S~~	*Empty*
PS	OutputP	EVERYONE	P S	P S	*Empty*	P **P**	*Empty*	P P
PS	OutputS	AUTHORIZED	P S	~~P~~ S S	*Empty*	S S	*Empty*	S S
SECURE PRINTER	Receive	AUTHORIZED	P S	*Empty*	**S** S	*Empty*	S S	*Empty*
PUBLIC PRINTER	Receive	EVERYONE	P S	*Empty*	P P ~~S~~	*Empty*	P **P**	*Empty*

Lastly, Table 5 shows the case where the glue of a connector causes a potential violation as in described in the previous section. The *RequestP* port of *PS* component violates '*no-read up*' principle.

Table 5. Illustration of the iteration steps for Secure Print Server (invalid glue description, case 3)

Component Instance Name	**Port Name**	**Clearance of the Port**	**STEP 1**		**STEP 2**		**STEP 3**	
			rlsa (***Flooded***)	**slsa**	**rlsa**	**slsa**	**rlsa**	**slsa** (***no change***)
U_A	PrintP	EVERYONE	P S	P P	*Empty*	P P	*Empty*	P P
U_B	PrintS	AUTHORIZED	P S	S S	*Empty*	S S	*Empty*	S S
U_B	PrintP	EVERYONE	P S	P P	*Empty*	P P	*Empty*	P P
PS	RequestS	AUTHORIZED	P S	*Empty*	**S** S	*Empty*	S S	*Empty*
PS	RequestP	EVERYONE	P S	*Empty*	~~S~~ ~~S~~	*Empty*	~~S~~ ~~S~~	*Empty*
PS	OutputP	EVERYONE	P S	P S	*Empty*	***Empty***	*Empty*	*Empty*
PS	OutputS	AUTHORIZED	P S	~~P~~ S S	*Empty*	S S	*Empty*	S S
SECURE PRINTER	Receive	AUTHORIZED	P S	*Empty*	**S** S	*Empty*	S S	*Empty*
PUBLIC PRINTER	Receive	EVERYONE	P S	*Empty*	~~S~~ ~~S~~	*Empty*	***Empty***	*Empty*

Analysis Results

The following output show the print server configuration analysis report, and the reports of the modified configuration to show the the violation cases.

A. Print Server Configuration (original configuration) Analysis Report

```
Iteration No: 0
RECEIVED LIST (0)
Component.Port: UA.PrintP  type: UNUSED  clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max): (SECRET,SECRET)

Component.Port: UA.PrintS  type: UNUSED  clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max): (SECRET,SECRET)

Component.Port: UB.PrintP  type: UNUSED  clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max): (SECRET,SECRET)

Component.Port: UB.PrintS  type: UNUSED  clearance:AUTHORIZED
  Allowed Security Labels (min,max): (PUBLIC,SECRET)
  Refused Security Labels (min,max):

Component.Port: PS.RequestS  type: UNUSED  clearance:AUTHORIZED
  Allowed Security Labels (min,max): (PUBLIC,SECRET)
  Refused Security Labels (min,max):

Component.Port: PS.RequestP  type: UNUSED  clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max): (SECRET,SECRET)

Component.Port: PS.OutputP  type: UNUSED  clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max): (SECRET,SECRET)

Component.Port: PS.OutputS  type: UNUSED  clearance:AUTHORIZED
  Allowed Security Labels (min,max): (PUBLIC,SECRET)
  Refused Security Labels (min,max):

Component.Port: SECUREPRINTER.Receive  type: UNUSED  clearance:AUTHORIZED
  Allowed Security Labels (min,max): (PUBLIC,SECRET)
  Refused Security Labels (min,max):

Component.Port: PUBLICPRINTER.Receive  type: UNUSED  clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max): (SECRET,SECRET)

----------------------------

SENT LIST (0)
Component.Port: UA.PrintP  type: OUTPUT_PORT  clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max):

Component.Port: UA.PrintS  type: OUTPUT_PORT  clearance:EVERYONE
  Allowed Security Labels (min,max): (SECRET,SECRET)
  Refused Security Labels (min,max):

Component.Port: UB.PrintP  type: OUTPUT_PORT  clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
```

Refused Security Labels (min,max):

Component.Port: UB.PrintS type: OUTPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: PS.RequestP type: INPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.RequestS type: INPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.OutputP type: OUTPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
Refused Security Labels (min,max):

Component.Port: PS.OutputS type: OUTPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max): (PUBLIC,PUBLIC)

Component.Port: SECUREPRINTER.Receive type: INPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PUBLICPRINTER.Receive type: INPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

****
Iteration No: 1
RECEIVED LIST (1)
Component.Port: UA.PrintP type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: UA.PrintS type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: UB.PrintP type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: UB.PrintS type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.RequestS type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: PS.RequestP type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
Refused Security Labels (min,max):

Component.Port: PS.OutputP type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.OutputS type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: SECUREPRINTER.Receive type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)

Refused Security Labels (min,max):

Component.Port: PUBLICPRINTER.Receive type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
Refused Security Labels (min,max):

SENT LIST (1)
Component.Port: UA.PrintP type: OUTPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
Refused Security Labels (min,max):

Component.Port: UA.PrintS type: OUTPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: UB.PrintP type: OUTPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
Refused Security Labels (min,max):

Component.Port: UB.PrintS type: OUTPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: PS.RequestP type: INPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.RequestS type: INPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.OutputP type: OUTPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
Refused Security Labels (min,max):

Component.Port: PS.OutputS type: OUTPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: SECUREPRINTER.Receive type: INPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PUBLICPRINTER.Receive type: INPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

****
Iteration No: 1)
STABLE RECEIVED LIST (1)
Component.Port: UA.PrintP type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: UA.PrintS type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: UB.PrintP type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: UB.PrintS type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.RequestS type: UNUSED clearance:AUTHORIZED
  Allowed Security Labels (min,max): (SECRET,SECRET)
  Refused Security Labels (min,max):

Component.Port: PS.RequestP type: UNUSED clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max):

Component.Port: PS.OutputP type: UNUSED clearance:EVERYONE
  Allowed Security Labels (min,max): (NONE,NONE)
  Refused Security Labels (min,max):

Component.Port: PS.OutputS type: UNUSED clearance:AUTHORIZED
  Allowed Security Labels (min,max): (NONE,NONE)
  Refused Security Labels (min,max):

Component.Port: SECUREPRINTER.Receive type: UNUSED clearance:AUTHORIZED
  Allowed Security Labels (min,max): (SECRET,SECRET)
  Refused Security Labels (min,max):

Component.Port: PUBLICPRINTER.Receive type: UNUSED clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max):

STABLE SENT LIST (1)
Component.Port: UA.PrintP type: OUTPUT_PORT clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max):

Component.Port: UA.PrintS type: OUTPUT_PORT clearance:EVERYONE
  Allowed Security Labels (min,max): (SECRET,SECRET)
  Refused Security Labels (min,max):

Component.Port: UB.PrintP type: OUTPUT_PORT clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max):

Component.Port: UB.PrintS type: OUTPUT_PORT clearance:AUTHORIZED
  Allowed Security Labels (min,max): (SECRET,SECRET)
  Refused Security Labels (min,max):

Component.Port: PS.RequestP type: INPUT_PORT clearance:EVERYONE
  Allowed Security Labels (min,max): (NONE,NONE)
  Refused Security Labels (min,max):

Component.Port: PS.RequestS type: INPUT_PORT clearance:AUTHORIZED
  Allowed Security Labels (min,max): (NONE,NONE)
  Refused Security Labels (min,max):

Component.Port: PS.OutputP type: OUTPUT_PORT clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max):

Component.Port: PS.OutputS type: OUTPUT_PORT clearance:AUTHORIZED
  Allowed Security Labels (min,max): (SECRET,SECRET)
  Refused Security Labels (min,max):

Component.Port: SECUREPRINTER.Receive type: INPUT_PORT clearance:AUTHORIZED
  Allowed Security Labels (min,max): (NONE,NONE)
  Refused Security Labels (min,max):

Component.Port: PUBLICPRINTER.Receive type: INPUT_PORT clearance:EVERYONE
  Allowed Security Labels (min,max): (NONE,NONE)
  Refused Security Labels (min,max):

VERIFICATION REPORT
****
Component.Port: UA.PrintP type :OUTPUT_PORT clearance:EVERYONE
  potentially output data security labels: PUBLIC

  potentially input data security labels: NONE

Component.Port: UB.PrintP type :OUTPUT_PORT clearance:EVERYONE
  potentially output data security labels: PUBLIC

  potentially input data security labels: NONE

Component.Port: UB.PrintS type :OUTPUT_PORT clearance:AUTHORIZED
  potentially output data security labels: SECRET

  potentially input data security labels: NONE

Component.Port: PS.RequestP type :INPUT_PORT clearance:EVERYONE
  potentially output data security labels: NONE
  potentially input data security labels: PUBLIC

Component.Port: PS.RequestS type :INPUT_PORT clearance:AUTHORIZED
  potentially output data security labels: NONE
  potentially input data security labels: SECRET

Component.Port: PS.OutputP type :OUTPUT_PORT clearance:EVERYONE
  potentially output data security labels: PUBLIC

  potentially input data security labels: NONE

Component.Port: PS.OutputS type :OUTPUT_PORT clearance:AUTHORIZED
  potentially output data security labels: SECRET

  potentially input data security labels: NONE

Component.Port: SECUREPRINTER.Receive type :INPUT_PORT clearance:AUTHORIZED
  potentially output data security labels: NONE
  potentially input data security labels: SECRET

Component.Port: PUBLICPRINTER.Receive type :INPUT_PORT clearance:EVERYONE
  potentially output data security labels: NONE
  potentially input data security labels: PUBLIC

********** The verification is SUCCESSFUL **********

 EXCESS PRIVILEGES
 ****
There is no excessive privileges...

B. Print Server Configuration (improper clearance, case 1.a) Analysis Report

Iteration No: 0
RECEIVED LIST (0)
Component.Port: UA.PrintP type: UNUSED clearance:AUTHORIZED
  Allowed Security Labels (min,max): (PUBLIC,SECRET)
  Refused Security Labels (min,max):

Component.Port: UA.PrintS type: UNUSED clearance:AUTHORIZED
  Allowed Security Labels (min,max): (SECRET,SECRET)
  Refused Security Labels (min,max):

Component.Port: UB.PrintP type: UNUSED clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max): (SECRET,SECRET)

Component.Port: UB.PrintS type: UNUSED clearance:AUTHORIZED
  Allowed Security Labels (min,max): (PUBLIC,SECRET)
  Refused Security Labels (min,max):

Component.Port: PS.RequestS type: UNUSED clearance:AUTHORIZED
  Allowed Security Labels (min,max): (PUBLIC,SECRET)
  Refused Security Labels (min,max):

Component.Port: PS.RequestP type: UNUSED clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max): (SECRET,SECRET)

Component.Port: PS.OutputP type: UNUSED clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max): (SECRET,SECRET)

Component.Port: PS.OutputS type: UNUSED clearance:AUTHORIZED
  Allowed Security Labels (min,max): (PUBLIC,SECRET)
  Refused Security Labels (min,max):

Component.Port: SECUREPRINTER.Receive type: UNUSED clearance:AUTHORIZED
  Allowed Security Labels (min,max): (PUBLIC,SECRET)
  Refused Security Labels (min,max):

Component.Port: PUBLICPRINTER.Receive type: UNUSED clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max): (SECRET,SECRET)

SENT LIST (0)
Component.Port: UA.PrintP type: OUTPUT_PORT clearance:AUTHORIZED
  Allowed Security Labels (min,max): (NONE,NONE)
  Refused Security Labels (min,max): (PUBLIC,PUBLIC)

Component.Port: UA.PrintS type: OUTPUT_PORT clearance:AUTHORIZED
  Allowed Security Labels (min,max): (SECRET,SECRET)
  Refused Security Labels (min,max):

Component.Port: UB.PrintP type: OUTPUT_PORT clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max):

Component.Port: UB.PrintS type: OUTPUT_PORT clearance:AUTHORIZED
  Allowed Security Labels (min,max): (SECRET,SECRET)
  Refused Security Labels (min,max):

Component.Port: PS.RequestP type: INPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.RequestS type: INPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.OutputP type: OUTPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
Refused Security Labels (min,max):

Component.Port: PS.OutputS type: OUTPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max): (PUBLIC,PUBLIC)

Component.Port: SECUREPRINTER.Receive type: INPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PUBLICPRINTER.Receive type: INPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

****
Iteration No: 1
RECEIVED LIST (1)
Component.Port: UA.PrintP type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: UA.PrintS type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: UB.PrintP type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: UB.PrintS type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.RequestS type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: PS.RequestP type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
Refused Security Labels (min,max): (SECRET,SECRET)

Component.Port: PS.OutputP type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.OutputS type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: SECUREPRINTER.Receive type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: PUBLICPRINTER.Receive type: UNUSED clearance:EVERYONE

Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
Refused Security Labels (min,max):

SENT LIST (1)
Component.Port: UA.PrintP type: OUTPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max): (PUBLIC,PUBLIC)

Component.Port: UA.PrintS type: OUTPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: UB.PrintP type: OUTPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
Refused Security Labels (min,max):

Component.Port: UB.PrintS type: OUTPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: PS.RequestP type: INPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.RequestS type: INPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.OutputP type: OUTPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
Refused Security Labels (min,max):

Component.Port: PS.OutputS type: OUTPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: SECUREPRINTER.Receive type: INPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PUBLICPRINTER.Receive type: INPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

****
Iteration No: 1)
STABLE RECEIVED LIST (1)
Component.Port: UA.PrintP type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: UA.PrintS type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: UB.PrintP type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: UB.PrintS type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.RequestS type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: PS.RequestP type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
Refused Security Labels (min,max): (SECRET,SECRET)

Component.Port: PS.OutputP type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.OutputS type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: SECUREPRINTER.Receive type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: PUBLICPRINTER.Receive type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
Refused Security Labels (min,max):

STABLE SENT LIST (1)
Component.Port: UA.PrintP type: OUTPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max): (PUBLIC,PUBLIC)

Component.Port: UA.PrintS type: OUTPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: UB.PrintP type: OUTPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
Refused Security Labels (min,max):

Component.Port: UB.PrintS type: OUTPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: PS.RequestP type: INPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.RequestS type: INPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.OutputP type: OUTPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
Refused Security Labels (min,max):

Component.Port: PS.OutputS type: OUTPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: SECUREPRINTER.Receive type: INPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PUBLICPRINTER.Receive type: INPUT_PORT clearance:EVERYONE
  Allowed Security Labels (min,max): (NONE,NONE)
  Refused Security Labels (min,max):

VERIFICATION REPORT
****
Component.Port: UA.PrintP type :OUTPUT_PORT clearance:AUTHORIZED
 potentially output data security labels: PUBLIC

 potentially input data security labels: NONE
!!!!.Security labels causing violation: PUBLIC

Component.Port: UB.PrintP type :OUTPUT_PORT clearance:EVERYONE
 potentially output data security labels: PUBLIC

 potentially input data security labels: NONE

Component.Port: UB.PrintS type :OUTPUT_PORT clearance:AUTHORIZED
 potentially output data security labels: SECRET

 potentially input data security labels: NONE

Component.Port: PS.RequestP type :INPUT_PORT clearance:EVERYONE
 potentially output data security labels: NONE
 potentially input data security labels: PUBLIC
SECRET

!!!!.Security labels causing violation: SECRET

Component.Port: PS.RequestS type :INPUT_PORT clearance:AUTHORIZED
 potentially output data security labels: NONE
 potentially input data security labels: SECRET

Component.Port: PS.OutputP type :OUTPUT_PORT clearance:EVERYONE
 potentially output data security labels: PUBLIC

 potentially input data security labels: NONE

Component.Port: PS.OutputS type :OUTPUT_PORT clearance:AUTHORIZED
 potentially output data security labels: SECRET

 potentially input data security labels: NONE

Component.Port: SECUREPRINTER.Receive type :INPUT_PORT clearance:AUTHORIZED
 potentially output data security labels: NONE
 potentially input data security labels: SECRET

Component.Port: PUBLICPRINTER.Receive type :INPUT_PORT clearance:EVERYONE
 potentially output data security labels: NONE
 potentially input data security labels: PUBLIC

WARNING :Potential confidentiality VIOLATION!..
 Please check the refused data security labels above...

 EXCESS PRIVILEGES
 ****
There is no excessive privileges...

C. Print Server Configuration (improper clearance, case 1.b) Analysis Report

Iteration No: 0
RECEIVED LIST (0)
Component.Port: UA.PrintP type: UNUSED clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max): (SECRET,SECRET)

Component.Port: UA.PrintS type: UNUSED clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max): (SECRET,SECRET)

Component.Port: UB.PrintP type: UNUSED clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max): (SECRET,SECRET)

Component.Port: UB.PrintS type: UNUSED clearance:AUTHORIZED
  Allowed Security Labels (min,max): (PUBLIC,SECRET)
  Refused Security Labels (min,max):

Component.Port: PS.RequestS type: UNUSED clearance:AUTHORIZED
  Allowed Security Labels (min,max): (PUBLIC,SECRET)
  Refused Security Labels (min,max):

Component.Port: PS.RequestP type: UNUSED clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max): (SECRET,SECRET)

Component.Port: PS.OutputP type: UNUSED clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max): (SECRET,SECRET)

Component.Port: PS.OutputS type: UNUSED clearance:AUTHORIZED
  Allowed Security Labels (min,max): (PUBLIC,SECRET)
  Refused Security Labels (min,max):

Component.Port: SECUREPRINTER.Receive type: UNUSED clearance:AUTHORIZED
  Allowed Security Labels (min,max): (PUBLIC,SECRET)
  Refused Security Labels (min,max):

Component.Port: PUBLICPRINTER.Receive type: UNUSED clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max): (SECRET,SECRET)

SENT LIST (0)
Component.Port: UA.PrintP type: OUTPUT_PORT clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max):

Component.Port: UA.PrintS type: OUTPUT_PORT clearance:EVERYONE
  Allowed Security Labels (min,max): (SECRET,SECRET)
  Refused Security Labels (min,max):

Component.Port: UB.PrintP type: OUTPUT_PORT clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max):

Component.Port: UB.PrintS type: OUTPUT_PORT clearance:AUTHORIZED
  Allowed Security Labels (min,max): (SECRET,SECRET)
  Refused Security Labels (min,max):

Component.Port: PS.RequestP type: INPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.RequestS type: INPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.OutputP type: OUTPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
Refused Security Labels (min,max):

Component.Port: PS.OutputS type: OUTPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max): (PUBLIC,PUBLIC)

Component.Port: SECUREPRINTER.Receive type: INPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PUBLICPRINTER.Receive type: INPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

****
Iteration No: 1
RECEIVED LIST (1)
Component.Port: UA.PrintP type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: UA.PrintS type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: UB.PrintP type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: UB.PrintS type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.RequestS type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: PS.RequestP type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
Refused Security Labels (min,max):

Component.Port: PS.OutputP type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.OutputS type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: SECUREPRINTER.Receive type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: PUBLICPRINTER.Receive type: UNUSED clearance:EVERYONE

Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
Refused Security Labels (min,max):

SENT LIST (1)
Component.Port: UA.PrintP type: OUTPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
Refused Security Labels (min,max):

Component.Port: UA.PrintS type: OUTPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: UB.PrintP type: OUTPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
Refused Security Labels (min,max):

Component.Port: UB.PrintS type: OUTPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: PS.RequestP type: INPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.RequestS type: INPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.OutputP type: OUTPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
Refused Security Labels (min,max):

Component.Port: PS.OutputS type: OUTPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max): (PUBLIC,PUBLIC)

Component.Port: SECUREPRINTER.Receive type: INPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PUBLICPRINTER.Receive type: INPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

****
Iteration No: 1)
STABLE RECEIVED LIST (1)
Component.Port: UA.PrintP type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: UA.PrintS type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: UB.PrintP type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: UB.PrintS type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.RequestS type: UNUSED clearance:AUTHORIZED
  Allowed Security Labels (min,max): (SECRET,SECRET)
  Refused Security Labels (min,max):

Component.Port: PS.RequestP type: UNUSED clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max):

Component.Port: PS.OutputP type: UNUSED clearance:EVERYONE
  Allowed Security Labels (min,max): (NONE,NONE)
  Refused Security Labels (min,max):

Component.Port: PS.OutputS type: UNUSED clearance:AUTHORIZED
  Allowed Security Labels (min,max): (NONE,NONE)
  Refused Security Labels (min,max):

Component.Port: SECUREPRINTER.Receive type: UNUSED clearance:AUTHORIZED
  Allowed Security Labels (min,max): (SECRET,SECRET)
  Refused Security Labels (min,max):

Component.Port: PUBLICPRINTER.Receive type: UNUSED clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max):

STABLE SENT LIST (1)
Component.Port: UA.PrintP type: OUTPUT_PORT clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max):

Component.Port: UA.PrintS type: OUTPUT_PORT clearance:EVERYONE
  Allowed Security Labels (min,max): (SECRET,SECRET)
  Refused Security Labels (min,max):

Component.Port: UB.PrintP type: OUTPUT_PORT clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max):

Component.Port: UB.PrintS type: OUTPUT_PORT clearance:AUTHORIZED
  Allowed Security Labels (min,max): (SECRET,SECRET)
  Refused Security Labels (min,max):

Component.Port: PS.RequestP type: INPUT_PORT clearance:EVERYONE
  Allowed Security Labels (min,max): (NONE,NONE)
  Refused Security Labels (min,max):

Component.Port: PS.RequestS type: INPUT_PORT clearance:AUTHORIZED
  Allowed Security Labels (min,max): (NONE,NONE)
  Refused Security Labels (min,max):

Component.Port: PS.OutputP type: OUTPUT_PORT clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max):

Component.Port: PS.OutputS type: OUTPUT_PORT clearance:AUTHORIZED
  Allowed Security Labels (min,max): (SECRET,SECRET)
  Refused Security Labels (min,max): (PUBLIC,PUBLIC)

Component.Port: SECUREPRINTER.Receive type: INPUT_PORT clearance:AUTHORIZED
  Allowed Security Labels (min,max): (NONE,NONE)
  Refused Security Labels (min,max):

Component.Port: PUBLICPRINTER.Receive type: INPUT_PORT clearance:EVERYONE
  Allowed Security Labels (min,max): (NONE,NONE)
  Refused Security Labels (min,max):

VERIFICATION REPORT
****
Component.Port: UA.PrintP type :OUTPUT_PORT clearance:EVERYONE
 potentially output data security labels: PUBLIC

 potentially input data security labels: NONE

Component.Port: UB.PrintP type :OUTPUT_PORT clearance:EVERYONE
 potentially output data security labels: PUBLIC

 potentially input data security labels: NONE

Component.Port: UB.PrintS type :OUTPUT_PORT clearance:AUTHORIZED
 potentially output data security labels: SECRET

 potentially input data security labels: NONE

Component.Port: PS.RequestP type :INPUT_PORT clearance:EVERYONE
 potentially output data security labels: NONE
 potentially input data security labels: PUBLIC

Component.Port: PS.RequestS type :INPUT_PORT clearance:AUTHORIZED
 potentially output data security labels: NONE
 potentially input data security labels: SECRET

Component.Port: PS.OutputP type :OUTPUT_PORT clearance:EVERYONE
 potentially output data security labels: PUBLIC

 potentially input data security labels: NONE

Component.Port: PS.OutputS type :OUTPUT_PORT clearance:AUTHORIZED
 potentially output data security labels: SECRET
PUBLIC

 potentially input data security labels: NONE
!!!!.Security labels causing violation: PUBLIC

Component.Port: SECUREPRINTER.Receive type :INPUT_PORT clearance:AUTHORIZED
 potentially output data security labels: NONE
 potentially input data security labels: SECRET

Component.Port: PUBLICPRINTER.Receive type :INPUT_PORT clearance:EVERYONE
 potentially output data security labels: NONE
 potentially input data security labels: PUBLIC

WARNING :Potential confidentiality VIOLATION!..
 Please check the refused data security labels above...

 EXCESS PRIVILEGES
 ****
There is no excessive privileges...

D. Print Server Configuration (improper attachment, case 2) Analysis Report

Iteration No: 0
RECEIVED LIST (0)
Component.Port: UA.PrintP type: UNUSED clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max): (SECRET,SECRET)

Component.Port: UA.PrintS type: UNUSED clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max): (SECRET,SECRET)

Component.Port: UB.PrintP type: UNUSED clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max): (SECRET,SECRET)

Component.Port: UB.PrintS type: UNUSED clearance:AUTHORIZED
  Allowed Security Labels (min,max): (PUBLIC,SECRET)
  Refused Security Labels (min,max):

Component.Port: PS.RequestS type: UNUSED clearance:AUTHORIZED
  Allowed Security Labels (min,max): (SECRET,SECRET)
  Refused Security Labels (min,max):

Component.Port: PS.RequestP type: UNUSED clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max): (SECRET,SECRET)

Component.Port: PS.OutputP type: UNUSED clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max): (SECRET,SECRET)

Component.Port: PS.OutputS type: UNUSED clearance:AUTHORIZED
  Allowed Security Labels (min,max): (PUBLIC,SECRET)
  Refused Security Labels (min,max):

Component.Port: SECUREPRINTER.Receive type: UNUSED clearance:AUTHORIZED
  Allowed Security Labels (min,max): (PUBLIC,SECRET)
  Refused Security Labels (min,max):

Component.Port: PUBLICPRINTER.Receive type: UNUSED clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max): (SECRET,SECRET)

SENT LIST (0)
Component.Port: UA.PrintP type: OUTPUT_PORT clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max):

Component.Port: UA.PrintS type: OUTPUT_PORT clearance:EVERYONE
  Allowed Security Labels (min,max): (SECRET,SECRET)
  Refused Security Labels (min,max):

Component.Port: UB.PrintP type: OUTPUT_PORT clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max):

Component.Port: UB.PrintS type: OUTPUT_PORT clearance:AUTHORIZED
  Allowed Security Labels (min,max): (SECRET,SECRET)
  Refused Security Labels (min,max):

Component.Port: PS.RequestP type: INPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.RequestS type: INPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.OutputP type: OUTPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
Refused Security Labels (min,max):

Component.Port: PS.OutputS type: OUTPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: SECUREPRINTER.Receive type: INPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PUBLICPRINTER.Receive type: INPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

****
Iteration No: 1
RECEIVED LIST (1)
Component.Port: UA.PrintP type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: UA.PrintS type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: UB.PrintP type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: UB.PrintS type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.RequestS type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.RequestP type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
Refused Security Labels (min,max): (SECRET,SECRET)

Component.Port: PS.OutputP type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.OutputS type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: SECUREPRINTER.Receive type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: PUBLICPRINTER.Receive type: UNUSED clearance:EVERYONE

Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
Refused Security Labels (min,max):

SENT LIST (1)
Component.Port: UA.PrintP type: OUTPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
Refused Security Labels (min,max):

Component.Port: UA.PrintS type: OUTPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: UB.PrintP type: OUTPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
Refused Security Labels (min,max):

Component.Port: UB.PrintS type: OUTPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: PS.RequestP type: INPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.RequestS type: INPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.OutputP type: OUTPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
Refused Security Labels (min,max):

Component.Port: PS.OutputS type: OUTPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: SECUREPRINTER.Receive type: INPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PUBLICPRINTER.Receive type: INPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

****
Iteration No: 1)
STABLE RECEIVED LIST (1)
Component.Port: UA.PrintP type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: UA.PrintS type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: UB.PrintP type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: UB.PrintS type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.RequestS type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.RequestP type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
Refused Security Labels (min,max): (SECRET,SECRET)

Component.Port: PS.OutputP type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.OutputS type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: SECUREPRINTER.Receive type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: PUBLICPRINTER.Receive type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
Refused Security Labels (min,max):

STABLE SENT LIST (1)
Component.Port: UA.PrintP type: OUTPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
Refused Security Labels (min,max):

Component.Port: UA.PrintS type: OUTPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: UB.PrintP type: OUTPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
Refused Security Labels (min,max):

Component.Port: UB.PrintS type: OUTPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: PS.RequestP type: INPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.RequestS type: INPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.OutputP type: OUTPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
Refused Security Labels (min,max):

Component.Port: PS.OutputS type: OUTPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: SECUREPRINTER.Receive type: INPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PUBLICPRINTER.Receive type: INPUT_PORT clearance:EVERYONE
  Allowed Security Labels (min,max): (NONE,NONE)
  Refused Security Labels (min,max):

VERIFICATION REPORT
****
Component.Port: UA.PrintP type :OUTPUT_PORT clearance:EVERYONE
 potentially output data security labels: PUBLIC

 potentially input data security labels: NONE

Component.Port: UB.PrintP type :OUTPUT_PORT clearance:EVERYONE
 potentially output data security labels: PUBLIC

 potentially input data security labels: NONE

Component.Port: UB.PrintS type :OUTPUT_PORT clearance:AUTHORIZED
 potentially output data security labels: SECRET

 potentially input data security labels: NONE

Component.Port: PS.RequestP type :INPUT_PORT clearance:EVERYONE
 potentially output data security labels: NONE
 potentially input data security labels: PUBLIC
SECRET

!!!!.Security labels causing violation: SECRET

Component.Port: PS.OutputP type :OUTPUT_PORT clearance:EVERYONE
 potentially output data security labels: PUBLIC

 potentially input data security labels: NONE

Component.Port: PS.OutputS type :OUTPUT_PORT clearance:AUTHORIZED
 potentially output data security labels: SECRET

 potentially input data security labels: NONE

Component.Port: SECUREPRINTER.Receive type :INPUT_PORT clearance:AUTHORIZED
 potentially output data security labels: NONE
 potentially input data security labels: SECRET

Component.Port: PUBLICPRINTER.Receive type :INPUT_PORT clearance:EVERYONE
 potentially output data security labels: NONE
 potentially input data security labels: PUBLIC

WARNING :Potential confidentiality VIOLATION!..
 Please check the refused data security labels above...

 EXCESS PRIVILEGES
 ****
There is no excessive privileges...

E. Print Server Configuration (iinvalid glue description , case 3) Analysis Report

Iteration No: 0
RECEIVED LIST (0)
Component.Port: UA.PrintP type: UNUSED clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max): (SECRET,SECRET)

Component.Port: UA.PrintS type: UNUSED clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max): (SECRET,SECRET)

Component.Port: UB.PrintP type: UNUSED clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max): (SECRET,SECRET)

Component.Port: UB.PrintS type: UNUSED clearance:AUTHORIZED
  Allowed Security Labels (min,max): (PUBLIC,SECRET)
  Refused Security Labels (min,max):

Component.Port: PS.RequestS type: UNUSED clearance:AUTHORIZED
  Allowed Security Labels (min,max): (PUBLIC,SECRET)
  Refused Security Labels (min,max):

Component.Port: PS.RequestP type: UNUSED clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max): (SECRET,SECRET)

Component.Port: PS.OutputP type: UNUSED clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max): (SECRET,SECRET)

Component.Port: PS.OutputS type: UNUSED clearance:AUTHORIZED
  Allowed Security Labels (min,max): (PUBLIC,SECRET)
  Refused Security Labels (min,max):

Component.Port: SECUREPRINTER.Receive type: UNUSED clearance:AUTHORIZED
  Allowed Security Labels (min,max): (PUBLIC,SECRET)
  Refused Security Labels (min,max):

Component.Port: PUBLICPRINTER.Receive type: UNUSED clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max): (SECRET,SECRET)

SENT LIST (0)
Component.Port: UA.PrintP type: OUTPUT_PORT clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max):

Component.Port: UA.PrintS type: OUTPUT_PORT clearance:EVERYONE
  Allowed Security Labels (min,max): (SECRET,SECRET)
  Refused Security Labels (min,max):

Component.Port: UB.PrintP type: OUTPUT_PORT clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max):

Component.Port: UB.PrintS type: OUTPUT_PORT clearance:AUTHORIZED
  Allowed Security Labels (min,max): (SECRET,SECRET)
  Refused Security Labels (min,max):

Component.Port: PS.RequestP type: INPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.RequestS type: INPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.OutputP type: OUTPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
Refused Security Labels (min,max):

Component.Port: PS.OutputS type: OUTPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max): (PUBLIC,PUBLIC)

Component.Port: SECUREPRINTER.Receive type: INPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PUBLICPRINTER.Receive type: INPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

****
Iteration No: 1
RECEIVED LIST (1)
Component.Port: UA.PrintP type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: UA.PrintS type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: UB.PrintP type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: UB.PrintS type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.RequestS type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: PS.RequestP type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max): (SECRET,SECRET)

Component.Port: PS.OutputP type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.OutputS type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: SECUREPRINTER.Receive type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: PUBLICPRINTER.Receive type: UNUSED clearance:EVERYONE

Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max): (SECRET,SECRET)

SENT LIST (1)
Component.Port: UA.PrintP type: OUTPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
Refused Security Labels (min,max):

Component.Port: UA.PrintS type: OUTPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: UB.PrintP type: OUTPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
Refused Security Labels (min,max):

Component.Port: UB.PrintS type: OUTPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: PS.RequestP type: INPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.RequestS type: INPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.OutputP type: OUTPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: PS.OutputS type: OUTPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: SECUREPRINTER.Receive type: INPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PUBLICPRINTER.Receive type: INPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

****
Iteration No: 2
RECEIVED LIST (2)
Component.Port: UA.PrintP type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: UA.PrintS type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: UB.PrintP type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: UB.PrintS type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.RequestS type: UNUSED clearance:AUTHORIZED
  Allowed Security Labels (min,max): (SECRET,SECRET)
  Refused Security Labels (min,max):

Component.Port: PS.RequestP type: UNUSED clearance:EVERYONE
  Allowed Security Labels (min,max): (NONE,NONE)
  Refused Security Labels (min,max): (SECRET,SECRET)

Component.Port: PS.OutputP type: UNUSED clearance:EVERYONE
  Allowed Security Labels (min,max): (NONE,NONE)
  Refused Security Labels (min,max):

Component.Port: PS.OutputS type: UNUSED clearance:AUTHORIZED
  Allowed Security Labels (min,max): (NONE,NONE)
  Refused Security Labels (min,max):

Component.Port: SECUREPRINTER.Receive type: UNUSED clearance:AUTHORIZED
  Allowed Security Labels (min,max): (SECRET,SECRET)
  Refused Security Labels (min,max):

Component.Port: PUBLICPRINTER.Receive type: UNUSED clearance:EVERYONE
  Allowed Security Labels (min,max): (NONE,NONE)
  Refused Security Labels (min,max): (SECRET,SECRET)

SENT LIST (2)
Component.Port: UA.PrintP type: OUTPUT_PORT clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max):

Component.Port: UA.PrintS type: OUTPUT_PORT clearance:EVERYONE
  Allowed Security Labels (min,max): (SECRET,SECRET)
  Refused Security Labels (min,max):

Component.Port: UB.PrintP type: OUTPUT_PORT clearance:EVERYONE
  Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
  Refused Security Labels (min,max):

Component.Port: UB.PrintS type: OUTPUT_PORT clearance:AUTHORIZED
  Allowed Security Labels (min,max): (SECRET,SECRET)
  Refused Security Labels (min,max):

Component.Port: PS.RequestP type: INPUT_PORT clearance:EVERYONE
  Allowed Security Labels (min,max): (NONE,NONE)
  Refused Security Labels (min,max):

Component.Port: PS.RequestS type: INPUT_PORT clearance:AUTHORIZED
  Allowed Security Labels (min,max): (NONE,NONE)
  Refused Security Labels (min,max):

Component.Port: PS.OutputP type: OUTPUT_PORT clearance:EVERYONE
  Allowed Security Labels (min,max): (SECRET,SECRET)
  Refused Security Labels (min,max):

Component.Port: PS.OutputS type: OUTPUT_PORT clearance:AUTHORIZED
  Allowed Security Labels (min,max): (SECRET,SECRET)
  Refused Security Labels (min,max):

Component.Port: SECUREPRINTER.Receive type: INPUT_PORT clearance:AUTHORIZED
  Allowed Security Labels (min,max): (NONE,NONE)
  Refused Security Labels (min,max):

Component.Port: PUBLICPRINTER.Receive type: INPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

****
Iteration No: 2)
STABLE RECEIVED LIST (2)
Component.Port: UA.PrintP type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: UA.PrintS type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: UB.PrintP type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: UB.PrintS type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.RequestS type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: PS.RequestP type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max): (SECRET,SECRET)

Component.Port: PS.OutputP type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.OutputS type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: SECUREPRINTER.Receive type: UNUSED clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: PUBLICPRINTER.Receive type: UNUSED clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max): (SECRET,SECRET)

STABLE SENT LIST (2)
Component.Port: UA.PrintP type: OUTPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
Refused Security Labels (min,max):

Component.Port: UA.PrintS type: OUTPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: UB.PrintP type: OUTPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (PUBLIC,PUBLIC)
Refused Security Labels (min,max):

Component.Port: UB.PrintS type: OUTPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)

Refused Security Labels (min,max):

Component.Port: PS.RequestP type: INPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.RequestS type: INPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PS.OutputP type: OUTPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: PS.OutputS type: OUTPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (SECRET,SECRET)
Refused Security Labels (min,max):

Component.Port: SECUREPRINTER.Receive type: INPUT_PORT clearance:AUTHORIZED
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

Component.Port: PUBLICPRINTER.Receive type: INPUT_PORT clearance:EVERYONE
Allowed Security Labels (min,max): (NONE,NONE)
Refused Security Labels (min,max):

VERIFICATION REPORT
****
Component.Port: UA.PrintP type :OUTPUT_PORT clearance:EVERYONE
potentially output data security labels: PUBLIC

potentially input data security labels: NONE

Component.Port: UB.PrintP type :OUTPUT_PORT clearance:EVERYONE
potentially output data security labels: PUBLIC

potentially input data security labels: NONE

Component.Port: UB.PrintS type :OUTPUT_PORT clearance:AUTHORIZED
potentially output data security labels: SECRET

potentially input data security labels: NONE

Component.Port: PS.RequestP type :INPUT_PORT clearance:EVERYONE
potentially output data security labels: NONE
potentially input data security labels: SECRET

!!!!.Security labels causing violation: SECRET

Component.Port: PS.RequestS type :INPUT_PORT clearance:AUTHORIZED
potentially output data security labels: NONE
potentially input data security labels: SECRET

Component.Port: PS.OutputP type :OUTPUT_PORT clearance:EVERYONE
potentially output data security labels: SECRET

potentially input data security labels: NONE

Component.Port: PS.OutputS type :OUTPUT_PORT clearance:AUTHORIZED
potentially output data security labels: SECRET

potentially input data security labels: NONE

Component.Port: SECUREPRINTER.Receive type :INPUT_PORT clearance:AUTHORIZED
  potentially output data security labels: NONE
  potentially input data security labels: SECRET

Component.Port: PUBLICPRINTER.Receive type :INPUT_PORT clearance:EVERYONE
  potentially output data security labels: NONE
  potentially input data security labels: SECRET

!!!!.Security labels causing violation: SECRET

WARNING :Potential confidentiality VIOLATION!..
 Please check the refused data security labels above...

 EXCESS PRIVILEGES
 ****
Excess privilege for PS.OutputP found:
   Current: EVERYONE Recommended: AUTHORIZED

WARNING : Some excessive privileges are associated with ports as given above!..
 Please check them and revise your system configuration...