Assignment #3 Code review

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Introduction

In this report I will go through and document my process of reviewing the Shark Cage secure Desktop. For doing this I will use a set of tools and manual code reading

Since the project is split up in three modules I will go through them as such

1 Processing

1.1 Reviewing the documentation

Usually the first thing to do in a code review is to go through the documentation, since this project is undocumented and uncommented it is not applicable with a review on it.

1.2 Static Code Analysis

In this analysis i used the tools ICARUS[3], Pascal Analyzer[4] and Pascal Browser[5]. I did not get a complete picture from this as Pascal Analyzer and Browser were only Evaluation versions.

1.2.1 Cage Manager

Using ICARUS for this module i was able to get the output of Appendix A[2.2 page: 4]. This information describes which global switches was turned on and which were not (+ = on and - = off). In itself most of those switches is unimportant but the switch $Q and $R the bufferOverflowCheck [1][2]. Since I don't have the documentation or reason for turning these of I see this as a serious vulnerability.

After this I used the Pascal Analyzer. Luckily no strong warnings were issued. There were still some warnings see [2.2 page: 6].

In this module there are as seen in Appendix B two places where variables are set but not referenced this is in itself a semantic error but if $R and $Q is set they pose no threat to the integrity of the application

On other notes there are possibilities for shortening the code by addressing the issues in Appendix C2.2, but its impossible to tell without the documentation.

1.2.2 Cage Labeller

Using ICARUS yields almost the same result as Cage Manager se Appendix D[2.2 page: 13].

While using Pascal Analyzer i found some of the same issues as in the manager. There are warnings about a System variable redeclaring, but yet again without documentation or commenting impossible to reason for or against for list of warnings se Appendix E[2.2 page 15].

On other notes there are also here possible for code reduction see Appendix F[2.2 page: 19] for info

1.2.3 Cage Service

Same as before on the ICARUS and the same fix for more info see Appendix G2.2. Some of the same warnings in Pascal Analyzer see Appendix F2.2. In this module there are possibilities for code reduction for more info se[2.2 page: 28].

2 Conclusion

2.1 Major Issues

- Documentation is a critical issue on this application as there are no argumentation for the choices made.
- Revision of the comments in the code should be done for maintenance and later revisions
- I see no reasons for allowing buffer overflows and the precompile switches $R and $Q should be turned on

2.2 Minor Issues

- Variables are set several times without beeing referenced. this should either be documented why or re factored
- Most of the interfaces is not used outside their unit. most likely used, but need doumentation
- System variables are redefined. needs argumentation or re factor

References

[1] *Compiler Directives*. URL: http://www.freepascal.org/docs-html/prog/progsu64.html#x71-700001.2.64.

[2] *Delphi Basics Compiler Directives*. URL: http://www.delphibasics.co.uk/ByType.asp?Type=Compiler%20Directive.

[3] *ICARUS*. URL: http://www.peganza.com/products_icarus.htm.

[4] *Pascal Analyzer*. URL: http://www.peganza.com/products_pal.htm.

[5] *Pascal Browser*. URL: http://www.peganza.com/products_pab.htm.

Appendices

Appendix A

```
*******************************************************************************
*                              Status Report for                              *
*C:\PROGRAMVARESIKKERHET\ASSIGNMENT3\SECUREDESKTOP-SOURCE\SDUSERSESSIONMANAGER.DPR*
*                             07.10.2014 23:21:03                             *
*******************************************************************************

Overview:
-------------------------------------------------------------------------------

Analyzed by:            ICARUS - Uses List Analyzer for Delphi version 3.6.0.0
Parse speed:            3226 lines in 0,06 seconds (53767 lines/sec)
Time for reports:       0,00 seconds
Total time:             0,06 seconds

Project:                C:\Users\Eirik\Documents\ICARUS\Projects\SDUserSessionManager.pap
Main file:              C:\PROGRAMVARESIKKERHET\ASSIGNMENT3\SECUREDESKTOP-SOURCE\SDUSERSESSIONMANAGER.DPR
Output folder:          C:\Users\Eirik\Documents\ICARUS\Projects\Output\SDUserSessionManager
Compiler:               Delphi XE4 (Win32)

Env. variables:         (none)

Searched folders:       (none)
Excluded search folders:(none)

Excluded files:         System.pas
                        Windows.pas


Unit aliases:           DbiErrs=BDE
                        DbiProcs=BDE
                        DbiTypes=BDE
                        WinProcs=Windows
                        WinTypes=Windows

Predefined:             _PEGANZA_
                        ASSEMBLER
                        CONDITIONALEXPRESSIONS
                        CPU386
                        CPUX86
                        DCC
                        MSWINDOWS
                        NATIVECODE
                        UNDERSCOREIMPORTNAME
                        UNICODE
                        VER250
                        WIN32
                        X86ASM

Conditional defines:    (none)
Global switches:        A+
                        B-
                        C+
                        D+
                        E-
                        F-
                        G+
                        H+
                        HINTS ON
                        I+
                        J-
                        K+
                        L+
                        M-
                        N+
                        O+
                        P+
                        Q-
                        R-
                        S+
                        T-
                        U-
                        V+
                        W-
                        WARNINGS ON
                        X+
                        YD
                        Z-
```

Appendix B

```
********************************************************************************
*                              Warnings Report for                             *
*C:\PROGRAMVARESIKKERHET\ASSIGNMENT3\SECUREDESKTOP-SOURCE\SDUSERSESSIONMANAGER.DPR*
*                              07.10.2014 23:32:56                             *
********************************************************************************

In this evaluation version, identifiers starting with J,K,L are excluded.
Also some report lines are displayed as "xxxxxx".

Interfaced identifiers that are used, but not outside of unit (20, was unknown):
--------------------------------------------------------------------------------

ApplicationDirectoryName : UnicodeString  Typed const, Interfaced SDCommon (15)

BackgroundBitmapFileName : UnicodeString  Typed const, Interfaced SDCommon (23)


The entire list is not shown in this evaluation version


Interfaced class identifiers that are public/published, but not used outside of unit (0, was unknown):
--------------------------------------------------------------------------------------------------------

            (none)


Variables that are referenced, but never set (0, was unknown):
--------------------------------------------------------------------------------

            (none)


Variables that are set, but never referenced (2, was unknown):
--------------------------------------------------------------------------------

Name : UnicodeString           RecField               SDInfoProcesses\SDDumpAccessMask\TAccessRight (626)

Value : Cardinal               RecField               SDInfoProcesses\SDDumpAccessMask\TAccessRight (625)


Local variables that are referenced before they are set (0, was unknown):
--------------------------------------------------------------------------------

            (none)


Var parameters that are used, but never set (0, was unknown):
--------------------------------------------------------------------------------

            (none)


Value parameters that are set (0, was unknown):
--------------------------------------------------------------------------------

            (none)


Interfaces passed as parameters without "const" directive (0, was unknown):
--------------------------------------------------------------------------------

            (none)


Variables with absolute directive (0, was unknown):
--------------------------------------------------------------------------------

            (none)


Constructors/destructors without calls to inherited (0, was unknown):
--------------------------------------------------------------------------------

            (none)


Destructors without override directive (0, was unknown):
--------------------------------------------------------------------------------

            (none)


Classes with more than one destructor (0, was unknown):
--------------------------------------------------------------------------------

            (none)


Function result not set (0, was unknown):
--------------------------------------------------------------------------------

            (none)


Recursive subprograms (0, was unknown):
--------------------------------------------------------------------------------
```

(none)

Dangerous Exit-statements (0, was unknown):

(none)

Dangerous Raise (0, was unknown):

(none)

Dangerous Label-locations inside for-loops (0, was unknown):

(none)

Dangerous Label-locations inside repeat/while-loops (0, was unknown):

(none)

Possible bad object creation (0, was unknown):

(none)

Bad thread-local variables (0, was unknown):

(none)

Instance created of class with abstract methods (0, was unknown):

(none)

Empty begin/end-blocks (1, was unknown):

SDInfoProcesses (405)

Empty case labels (0, was unknown):

(none)

Short-circuited for-statements (0, was unknown):

(none)

Short-circuited if-statements (0, was unknown):

(none)

Short-circuited on-statements (0, was unknown):

(none)

Short-circuited repeat-statements (0, was unknown):

(none)

Short-circuited while-statements (0, was unknown):

(none)

Empty except-block (0, was unknown):

(none)

Empty finally-block (1, was unknown):

SDInfoProcesses (414)

Forward directive in interface (0, was unknown):

(none)

Empty subprogram parameter list (0, was unknown):

(none)

Ambiguous references in with-blocks (0, was unknown):

(none)

Classes without overrides of abstract methods (0, was unknown):

(none)

Local for-loop variables read after loop (0, was unknown):

(none)

For-loop variables not used in loop (0, was unknown):

(none)

Non-public constructors/destructors (0, was unknown):

(none)

Functions called as procedures (32, was 32):

SDCommon.SDWriteToMailslot at SDUserSessionManager (130)
SDCommon.SDWriteToMailslot at SDUserSessionManager (162)

The entire list is not shown in this evaluation version

Mismatch property read/write specifiers (0, was unknown):

(none)

Local variables that are set but not later used (0, was unknown):

(none)

Duplicate lines (1, was unknown):
---

xxxxxxxxxxxxxxxxxxxxxxx xxxxxxx

Duplicate class types in except-block (0, was unknown):

(none)

Redeclared identifiers from System unit (1, was unknown):

PUnicodeString = PUNICODE_STRING Type, Global SDUserSessionManager (34)

Identifier with same name as keyword/directive (1, was unknown):

Name : UnicodeString RecField SDInfoProcesses\SDDumpAccessMask\TAccessRight (626)

Appendix C

```
*******************************************************************************
*                          Code Reduction Report for                          *
*C:\PROGRAMVARESIKKERHET\ASSIGNMENT3\SECUREDESKTOP-SOURCE\SDUSERSESSIONMANAGER.DPR*
*                            07.10.2014 23:32:56                              *
*******************************************************************************

In this evaluation version, identifiers starting with J,K,L are excluded.
Also some report lines are displayed as "xxxxxx".

Identifiers never used (94, was unknown):
-------------------------------------------------------------------------------

AddGroupToken                                          Func, Interfaced        SDInfoSecurity (15)
AllProcesses : TProcesses                              Var, Global             SDUserSessionManager (73)

The entire list is not shown in this evaluation version


Local identifiers only used at a lower scope (0, was unknown):
-------------------------------------------------------------------------------

            (none)


Local identifiers only used at a lower scope, but in more than one subprogram (0, was unknown):
-----------------------------------------------------------------------------------------------

            (none)


Local identifiers that are set and referenced once (0, was unknown):
-------------------------------------------------------------------------------

            (none)


Local identifiers that possibly are set and referenced once (0, was unknown):
-------------------------------------------------------------------------------

            (none)


Local identifiers that are set more than once without referencing in-between (2, was unknown):
-----------------------------------------------------------------------------------------------

Name : UnicodeString           RecField                SDInfoProcesses\SDDumpAccessMask\TAccessRight (626)

Value : Cardinal               RecField                SDInfoProcesses\SDDumpAccessMask\TAccessRight (625)


Local identifiers that possibly are set more than once without referencing in-between (9, was unknown):
-------------------------------------------------------------------------------------------------------

AccountName : UnicodeString        Var, Local              SDInfoProcesses\SDLookupAccountBySID (607)

cbSid : Cardinal                   Var, Local              SDModifiedTokens\SDGetSecureViewerProcessGroupSID (197)

The entire list is not shown in this evaluation version


Class fields that are zero-initialized in constructor (0, was unknown):
-------------------------------------------------------------------------------

            (none)


Class fields that possibly are zero-initialized in constructor (0, was unknown):
-------------------------------------------------------------------------------

            (none)


Local long strings that are initialized to empty string (0, was unknown):
-------------------------------------------------------------------------------

            (none)


Local long strings that possibly are initialized to empty strings (0, was unknown):
-------------------------------------------------------------------------------

            (none)


Functions called only as procedures (result ignored) (8, was unknown):
-------------------------------------------------------------------------------

GetTokenGroups                 Func, Interfaced        SDInfoProcesses (32)

SDCreateProcess                Func, Interfaced        SDModifiedTokens (21)

The entire list is not shown in this evaluation version


Functions/procedures (methods excluded) only called once (30, was unknown):
-------------------------------------------------------------------------------
```

```
AceTypeToText                   Func, Global            SDInfoSecurity (30)
ConvertSidToStringSid           Func, Global            SDModifiedTokens (82)

The entire list is not shown in this evaluation version

Methods only called once from other method of the same class (0, was unknown):
--------------------------------------------------------------------------------

            (none)

Unneeded boolean comparisons (0, was unknown):
--------------------------------------------------------------------------------

            (none)

Boolean assignment can be shortened (0, was unknown):
--------------------------------------------------------------------------------

            (none)
```

Appendix D

```
*************************************************************************
*                          Status Report for                            *
*  C:\PROGRAMVARESIKKERHET\ASSIGNMENT3\SECUREDESKTOP-SOURCE\SDAPPINFO.DPR  *
*                         08.10.2014 01:29:47                           *
*************************************************************************

Overview:
-------------------------------------------------------------------------

Analyzed by:            ICARUS - Uses List Analyzer for Delphi version 3.6.0.0
Parse speed:            709 lines in 0,02 seconds (38333 lines/sec)
Time for reports:       0,00 seconds
Total time:             0,02 seconds

Project:                C:\Users\Eirik\Documents\ICARUS\Projects\SDAppInfo.pap
Main file:              C:\PROGRAMVARESIKKERHET\ASSIGNMENT3\SECUREDESKTOP-SOURCE\SDAPPINFO.DPR
Output folder:          C:\Users\Eirik\Documents\ICARUS\Projects\Output\SDAppInfo
Compiler:               Delphi XE4 (Win32)

Env. variables:         (none)

Searched folders:       (none)
Excluded search folders:(none)

Excluded files:         System.pas
                        Windows.pas


Unit aliases:           DbiErrs=BDE
                        DbiProcs=BDE
                        DbiTypes=BDE
                        WinProcs=Windows
                        WinTypes=Windows

Predefined:             _PEGANZA_
                        ASSEMBLER
                        CONDITIONALEXPRESSIONS
                        CPU386
                        CPUX86
                        DCC
                        MSWINDOWS
                        NATIVECODE
                        UNDERSCOREIMPORTNAME
                        UNICODE
                        VER250
                        WIN32
                        X86ASM

Conditional defines:    (none)
Global switches:        A+
                        B-
                        C+
                        D+
                        E-
                        F-
                        G+
                        H+
                        HINTS ON
                        I+
                        J-
                        K+
                        L+
                        M-
                        N+
                        O+
                        P+
                        Q-
                        R-
                        S+
                        T-
                        U-
                        V+
                        W-
                        WARNINGS ON
                        X+
                        YD
                        Z-
```

Appendix E

```
********************************************************************************
*                          Warnings Report for                                 *
*  C:\PROGRAMVARESIKKERHET\ASSIGNMENT3\SECUREDESKTOP-SOURCE\SDAPPINFO.DPR  *
*                          08.10.2014 11:16:24                                 *
********************************************************************************

In this evaluation version, identifiers starting with J,K,L are excluded.
Also some report lines are displayed as "xxxxxx".

Interfaced identifiers that are used, but not outside of unit (13, was 13):
--------------------------------------------------------------------------------

ApplicationDirectoryName : UnicodeString         Typed const, Interfaced SDCommon (15)

BackgroundBitmapFileName : UnicodeString         Typed const, Interfaced SDCommon (23)

The entire list is not shown in this evaluation version

Interfaced class identifiers that are public/published, but not used outside of unit (7, was 7):
--------------------------------------------------------------------------------------------------

GetBitmap                              Func, Method            dmScreenshot\TScreenshot (15)

imgApplicationLogo : Simple (unknown) ClassField              fmSDAppInfo\TfmAppInfo (16)

The entire list is not shown in this evaluation version

Variables that are referenced, but never set (0, was 0):
--------------------------------------------------------------------------------

            (none)

Variables that are set, but never referenced (0, was 0):
--------------------------------------------------------------------------------

            (none)

Local variables that are referenced before they are set (0, was 0):
--------------------------------------------------------------------------------

            (none)

Var parameters that are used, but never set (0, was 0):
--------------------------------------------------------------------------------

            (none)

Value parameters that are set (0, was 0):
--------------------------------------------------------------------------------

            (none)

Interfaces passed as parameters without "const" directive (0, was 0):
--------------------------------------------------------------------------------

            (none)

Variables with absolute directive (0, was 0):
--------------------------------------------------------------------------------

            (none)

Constructors/destructors without calls to inherited (0, was 0):
--------------------------------------------------------------------------------

            (none)

Destructors without override directive (0, was 0):
--------------------------------------------------------------------------------

            (none)

Classes with more than one destructor (0, was 0):
--------------------------------------------------------------------------------

            (none)

Function result not set (0, was 0):
--------------------------------------------------------------------------------

            (none)

Recursive subprograms (0, was 0):
```

(none)

Dangerous Exit-statements (0, was 0):

(none)

Dangerous Raise (0, was 0):

(none)

Dangerous Label-locations inside for-loops (0, was 0):

(none)

Dangerous Label-locations inside repeat/while-loops (0, was 0):

(none)

Possible bad object creation (0, was 0):

(none)

Bad thread-local variables (0, was 0):

(none)

Instance created of class with abstract methods (0, was 0):

(none)

Empty begin/end-blocks (0, was 0):

(none)

Empty case labels (0, was 0):

(none)

Short-circuited for-statements (0, was 0):

(none)

Short-circuited if-statements (0, was 0):

(none)

Short-circuited on-statements (0, was 0):

(none)

Short-circuited repeat-statements (0, was 0):

(none)

Short-circuited while-statements (0, was 0):

(none)

Empty except-block (0, was 0):

(none)

Empty finally-block (0, was 0):

(none)

Forward directive in interface (0, was 0):

(none)

Empty subprogram parameter list (0, was 0):

(none)

Ambiguous references in with-blocks (0, was 0):

(none)

Classes without overrides of abstract methods (0, was 0):

(none)

Local for-loop variables read after loop (0, was 0):

(none)

For-loop variables not used in loop (0, was 0):

(none)

Non-public constructors/destructors (0, was 0):

(none)

Functions called as procedures (4, was 4):
---

fmSDAppInfo.TfmAppInfo.DisplayAppInfo at fmSDAppInfo (134)
fmSDAppInfo.TfmAppInfo.RemoveAppBar at fmSDAppInfo (148)

The entire list is not shown in this evaluation version

Mismatch property read/write specifiers (0, was 0):

(none)

Local variables that are set but not later used (0, was 0):

(none)

Duplicate lines (0, was 0):

(none)

Duplicate class types in except-block (0, was 0):

(none)

Redeclared identifiers from System unit (1, was 1):

PI : Simple (unknown) Var, Local fmSDAppInfo\TfmAppInfo\StartApp (199)

Identifier with same name as keyword/directive (0, was 0):

(none)

Appendix F

```
********************************************************************************
*                        Code Reduction Report for                             *
*  C:\PROGRAMVARESIKKERHET\ASSIGNMENT3\SECUREDESKTOP-SOURCE\SDAPPINFO.DPR  *
*                          08.10.2014 11:16:24                                 *
********************************************************************************

In this evaluation version, identifiers starting with J,K,L are excluded.
Also some report lines are displayed as "xxxxxx".

Identifiers never used (25, was 25):
------------------------------------------------------------------------------

CloseTimer : Simple (unknown)                          ClassField             fmSDAppInfo\TfmAppInfo (11)
CloseTimerTimer                                        Proc, Method           fmSDAppInfo\TfmAppInfo (19)

The entire list is not shown in this evaluation version


Local identifiers only used at a lower scope (0, was 0):
------------------------------------------------------------------------------

            (none)


Local identifiers only used at a lower scope, but in more than one subprogram (0, was 0):
------------------------------------------------------------------------------------------

            (none)


Local identifiers that are set and referenced once (0, was 0):
------------------------------------------------------------------------------

            (none)


Local identifiers that possibly are set and referenced once (0, was 0):
------------------------------------------------------------------------------

            (none)


Local identifiers that are set more than once without referencing in-between (0, was 0):
------------------------------------------------------------------------------------------

            (none)


Local identifiers that possibly are set more than once without referencing in-between (1, was 1):
--------------------------------------------------------------------------------------------------

BlendBitmap : Simple (unknown) Var, Local              dmScreenshot\TScreenshot\GetDimmed (45)


Class fields that are zero-initialized in constructor (0, was 0):
------------------------------------------------------------------------------

            (none)


Class fields that possibly are zero-initialized in constructor (0, was 0):
------------------------------------------------------------------------------

            (none)


Local long strings that are initialized to empty string (0, was 0):
------------------------------------------------------------------------------

            (none)


Local long strings that possibly are initialized to empty strings (0, was 0):
------------------------------------------------------------------------------

            (none)


Functions called only as procedures (result ignored) (4, was 4):
------------------------------------------------------------------------------

DisplayAppInfo                Func, Method           fmSDAppInfo\TfmAppInfo (27)

RemoveAppBar                  Func, Method           fmSDAppInfo\TfmAppInfo (29)

The entire list is not shown in this evaluation version


Functions/procedures (methods excluded) only called once (5, was 5):
------------------------------------------------------------------------------

SDAppInfoApplicationExecutable    Func, Interfaced        SDCommon (52)
SDAppInfoApplicationName          Func, Interfaced        SDCommon (51)

The entire list is not shown in this evaluation version
```

```
-------------------------------------------------------------------------------

DisplayAppInfo                  Func, Method            fmSDAppInfo\TfmAppInfo (27)

GetBitmap                       Func, Method            dmScreenshot\TScreenshot (15)

The entire list is not shown in this evaluation version

Unneeded boolean comparisons (0, was 0):
-------------------------------------------------------------------------------

            (none)

Boolean assignment can be shortened (0, was 0):
-------------------------------------------------------------------------------

            (none)
```

Appendix G

```
********************************************************************************
*                              Status Report for                               *
*C:\PROGRAMVARESIKKERHET\ASSIGNMENT3\SECUREDESKTOP-SOURCE\SDSECUREDISPLAYSVC.DPR*
*                             08.10.2014 02:16:57                              *
********************************************************************************

Overview:
--------------------------------------------------------------------------------

Analyzed by:            ICARUS - Uses List Analyzer for Delphi version 3.6.0.0
Parse speed:            3593 lines in 0,05 seconds (68577 lines/sec)
Time for reports:       0,00 seconds
Total time:             0,05 seconds

Project:                C:\Users\Eirik\Documents\ICARUS\Projects\SDSecureDisplaySvc.pap
Main file:              C:\PROGRAMVARESIKKERHET\ASSIGNMENT3\SECUREDESKTOP-SOURCE\SDSECUREDISPLAYSVC.DPR
Output folder:          C:\Users\Eirik\Documents\ICARUS\Projects\Output\SDSecureDisplaySvc
Compiler:               Delphi XE4 (Win32)

Env. variables:         (none)

Searched folders:       (none)
Excluded search folders:(none)

Excluded files:         System.pas
                        Windows.pas


Unit aliases:           DbiErrs=BDE
                        DbiProcs=BDE
                        DbiTypes=BDE
                        WinProcs=Windows
                        WinTypes=Windows

Predefined:             _PEGANZA_
                        ASSEMBLER
                        CONDITIONALEXPRESSIONS
                        CPU386
                        CPUX86
                        DCC
                        MSWINDOWS
                        NATIVECODE
                        UNDERSCOREIMPORTNAME
                        UNICODE
                        VER250
                        WIN32
                        X86ASM

Conditional defines:    (none)
Global switches:        A+
                        B-
                        C+
                        D+
                        E-
                        F-
                        G+
                        H+
                        HINTS ON
                        I+
                        J-
                        K+
                        L+
                        M-
                        N+
                        O+
                        P+
                        Q-
                        R-
                        S+
                        T-
                        U-
                        V+
                        W-
                        WARNINGS ON
                        X+
                        YD
                        Z-
```

Appendix H

```
********************************************************************************
*                            Warnings Report for                               *
*C:\PROGRAMVARESIKKERHET\ASSIGNMENT3\SECUREDESKTOP-SOURCE\SDSECUREDISPLAYSVC.DPR*
*                            08.10.2014 02:09:13                               *
********************************************************************************

In this evaluation version, identifiers starting with J,K,L are excluded.
Also some report lines are displayed as "xxxxxx".

Interfaced identifiers that are used, but not outside of unit (22, was 22):
--------------------------------------------------------------------------------

ApplicationDirectoryName : UnicodeString  Typed const, Interfaced SDCommon (15)

BackgroundBitmapFileName : UnicodeString  Typed const, Interfaced SDCommon (23)

The entire list is not shown in this evaluation version

Interfaced class identifiers that are public/published, but not used outside of unit (1, was 1):
--------------------------------------------------------------------------------------------------

StartAsLocalSystemInSession    Proc, Method            SDSecureDisplaySvcUnit\TSDSecureDisplayService (29)

Variables that are referenced, but never set (0, was 0):
--------------------------------------------------------------------------------

            (none)

Variables that are set, but never referenced (2, was 2):
--------------------------------------------------------------------------------

Name : UnicodeString           RecField                SDInfoProcesses\SDDumpAccessMask\TAccessRight (626)

Value : Cardinal               RecField                SDInfoProcesses\SDDumpAccessMask\TAccessRight (625)

Local variables that are referenced before they are set (0, was 0):
--------------------------------------------------------------------------------

            (none)

Var parameters that are used, but never set (0, was 0):
--------------------------------------------------------------------------------

            (none)

Value parameters that are set (0, was 0):
--------------------------------------------------------------------------------

            (none)

Interfaces passed as parameters without "const" directive (0, was 0):
--------------------------------------------------------------------------------

            (none)

Variables with absolute directive (0, was 0):
--------------------------------------------------------------------------------

            (none)

Constructors/destructors without calls to inherited (0, was 0):
--------------------------------------------------------------------------------

            (none)

Destructors without override directive (0, was 0):
--------------------------------------------------------------------------------

            (none)

Classes with more than one destructor (0, was 0):
--------------------------------------------------------------------------------

            (none)

Function result not set (0, was 0):
--------------------------------------------------------------------------------

            (none)

Recursive subprograms (0, was 0):
--------------------------------------------------------------------------------
```

(none)

Dangerous Exit-statements (0, was 0):

(none)

Dangerous Raise (0, was 0):

(none)

Dangerous Label-locations inside for-loops (0, was 0):

(none)

Dangerous Label-locations inside repeat/while-loops (0, was 0):

(none)

Possible bad object creation (0, was 0):

(none)

Bad thread-local variables (0, was 0):

(none)

Instance created of class with abstract methods (0, was 0):

(none)

Empty begin/end-blocks (1, was 1):

SDInfoProcesses (405)

Empty case labels (0, was 0):

(none)

Short-circuited for-statements (0, was 0):

(none)

Short-circuited if-statements (0, was 0):

(none)

Short-circuited on-statements (0, was 0):

(none)

Short-circuited repeat-statements (0, was 0):

(none)

Short-circuited while-statements (0, was 0):

(none)

Empty except-block (0, was 0):

(none)

Empty finally-block (1, was 1):

SDInfoProcesses (414)

Forward directive in interface (0, was 0):

(none)

Empty subprogram parameter list (0, was 0):

(none)

Ambiguous references in with-blocks (0, was 0):

(none)

Classes without overrides of abstract methods (0, was 0):

(none)

Local for-loop variables read after loop (0, was 0):

(none)

For-loop variables not used in loop (0, was 0):

(none)

Non-public constructors/destructors (0, was 0):

(none)

Functions called as procedures (29, was 29):

SDCommon.SDWriteToMailslot at SDSecureDisplaySvcUnit (247)
SDCommon.SDWriteToMailslot at SDSecureDisplaySvcUnit (254)

The entire list is not shown in this evaluation version

Mismatch property read/write specifiers (0, was 0):

(none)

Local variables that are set but not later used (0, was 0):

(none)

Duplicate lines (0, was 0):

(none)

Duplicate class types in except-block (0, was 0):

(none)

Redeclared identifiers from System unit (0, was 0):

(none)

Identifier with same name as keyword/directive (1, was 1):

Name : UnicodeString RecField SDInfoProcesses\SDDumpAccessMask\TAccessRight (626)

Appendix I

```
********************************************************************************
*                          Code Reduction Report for                           *
*C:\PROGRAMVARESIKKERHET\ASSIGNMENT3\SECUREDESKTOP-SOURCE\SDSECUREDISPLAYSVC.DPR*
*                            08.10.2014 11:33:27                               *
********************************************************************************

In this evaluation version, identifiers starting with J,K,L are excluded.
Also some report lines are displayed as "xxxxxx".

Identifiers never used (97, was 97):
------------------------------------------------------------------------------

AddGroupToToken                                 Func, Interfaced        SDInfoSecurity (15)
Attributes : Simple (unknown)                   RecField                SDModifiedTokens\SDCreateProcessOnDesktop\_OBJ
ECT_ATTRIBUTES (507)

The entire list is not shown in this evaluation version


Local identifiers only used at a lower scope (0, was 0):
------------------------------------------------------------------------------

            (none)


Local identifiers only used at a lower scope, but in more than one subprogram (0, was 0):
------------------------------------------------------------------------------------------

            (none)


Local identifiers that are set and referenced once (0, was 0):
------------------------------------------------------------------------------

            (none)


Local identifiers that possibly are set and referenced once (0, was 0):
------------------------------------------------------------------------------

            (none)


Local identifiers that are set more than once without referencing in-between (2, was 2):
------------------------------------------------------------------------------------------

Name : UnicodeString          RecField              SDInfoProcesses\SDDumpAccessMask\TAccessRight (626)

Value : Cardinal              RecField              SDInfoProcesses\SDDumpAccessMask\TAccessRight (625)


Local identifiers that possibly are set more than once without referencing in-between (9, was 9):
---------------------------------------------------------------------------------------------------

AccountName : UnicodeString       Var, Local            SDInfoProcesses\SDLookupAccountBySID (607)

cbSid : Cardinal                  Var, Local            SDModifiedTokens\SDGetSecureViewerProcessGroupSID (197)

The entire list is not shown in this evaluation version


Class fields that are zero-initialized in constructor (0, was 0):
------------------------------------------------------------------------------

            (none)


Class fields that possibly are zero-initialized in constructor (0, was 0):
------------------------------------------------------------------------------

            (none)


Local long strings that are initialized to empty string (0, was 0):
------------------------------------------------------------------------------

            (none)


Local long strings that possibly are initialized to empty strings (0, was 0):
------------------------------------------------------------------------------

            (none)


Functions called only as procedures (result ignored) (8, was 8):
------------------------------------------------------------------------------

GetTokenGroups                Func, Interfaced      SDInfoProcesses (32)

SDDumpAccessMask              Func, Interfaced      SDInfoProcesses (44)

The entire list is not shown in this evaluation version


Functions/procedures (methods excluded) only called once (25, was 25):
```

```
--------------------------------------------------------------------------------

AceTypeToText                    Func, Global            SDInfoSecurity (30)

ConvertSidToStringSid            Func, Global            SDModifiedTokens (82)

The entire list is not shown in this evaluation version

Methods only called once from other method of the same class (1, was 1):
--------------------------------------------------------------------------------

StartAsLocalSystemInSession    Proc, Method            SDSecureDisplaySvcUnit\TSDSecureDisplayService (29)

Unneeded boolean comparisons (0, was 0):
--------------------------------------------------------------------------------

            (none)

Boolean assignment can be shortened (0, was 0):
--------------------------------------------------------------------------------

            (none)
```