Proposal for Backwards Compatibility of SCA Applications [Use Case 1.1]

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Slide 1

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Proposal

This document contains a proposal to change the SCAv4.0.1 specification to add support for SCAv2.2.2 applications. To be more precise, this proposal will allow SCAv2.2.2 applications to run on a SCA4.x Core Framework as a whole. The original version of this proposal was submitted by Gerald L Bickle (Raytheon) in January 2014. It was subsequently amended via a number of proposals/suggestions made by different members of the Wireless Innovation Forum Task Group on SCAv4.1 Backwards Compatibility.

List of contributors:
- Gerald L Bickle, Raytheon*
- Steve Bernier, NordiaSoft
- François Lévesque, NordiaSoft
- Hugues Latour, Communications Research Centre Canada
- Chuck Linn, Harris Corporation
- David Hagood, Aeroflex
- Wade Oram, Aeroflex

*Special thanks goes to Gerald Bickle for having prepared the bulk of the material including all the annotated specification documents part of this proposal.

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Recommendation

SCA V4 Backwards Compatible UOF

- The backwards compatible UOF gives the optional capability of deploying SCA V222 application within a SCA V4 operating environment.
  - Does this by using SCA V2.2.2 Resource, ResourceFactory, Port, and Port Supplier interfaces that is used only for SCA V4 backwards compatible UOF capability.
  - Other SCA V4 Base interfaces are backwards compatible
- Remove SCA V4 Resource interface
- Can allow for a mixture of SCA 2.2.2 application components with SCA 4 application as long as nested applications are supported.

SCA V4 Recommendations

- Separate SCA Version Descriptors
- Domain Manager Configuration Descriptor
- Device Configuration Descriptor
- Application Backwards Compatible Units of Functionality (UOF)
- Main Spec Changes
- Appendix C IDL Changes
- SCA Guidelines Doc
- Mixture Approach

Separate SCA Version Descriptors

Allow for Separate Software Assembly Descriptor Approach

- Allows both SCA 2.2.2 and SCA 4.X DTDs to be used in SCA Operating Environment.

SCA 2.2.2 and SCA 4.X DTD file names have to be uniquely qualified

- Only two SCA 4.0 DTDs are backwards compatible with SCA 2.2.2 DTDs
  - Properties
  - Software Package Descriptor
- DTD File Naming Conventions Recommendation
  - softwareassembly.2.2.2.dtd versus softwareassembly.4.1.dtd
  - softwarecomponent.2.2.2.dtd versus softwarecomponent.4.1.dtd
  - deviceconfiguration.2.2.2.dtd versus deviceconfiguration.4.1.dtd

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Separate SCA Version Descriptors

Add SCA Version attribute to SAD DTD to indicate the CDATA SCA version attribute with a default value (V4.1) in case CF run-time needs that information.

- D-1.10.1 softwareassembly
    - Add Text "The softwareassembly element's sca_version attribute is the version (i.e., V4.1) of the SCA"
    - Update Figure with sca_version attribute and format correctly
    - XML Change

  <!ATTLIST softwareassembly name ID #REQUIRED

  sca_version CDATA "V4.1"

  version CDATA #IMPLIED>

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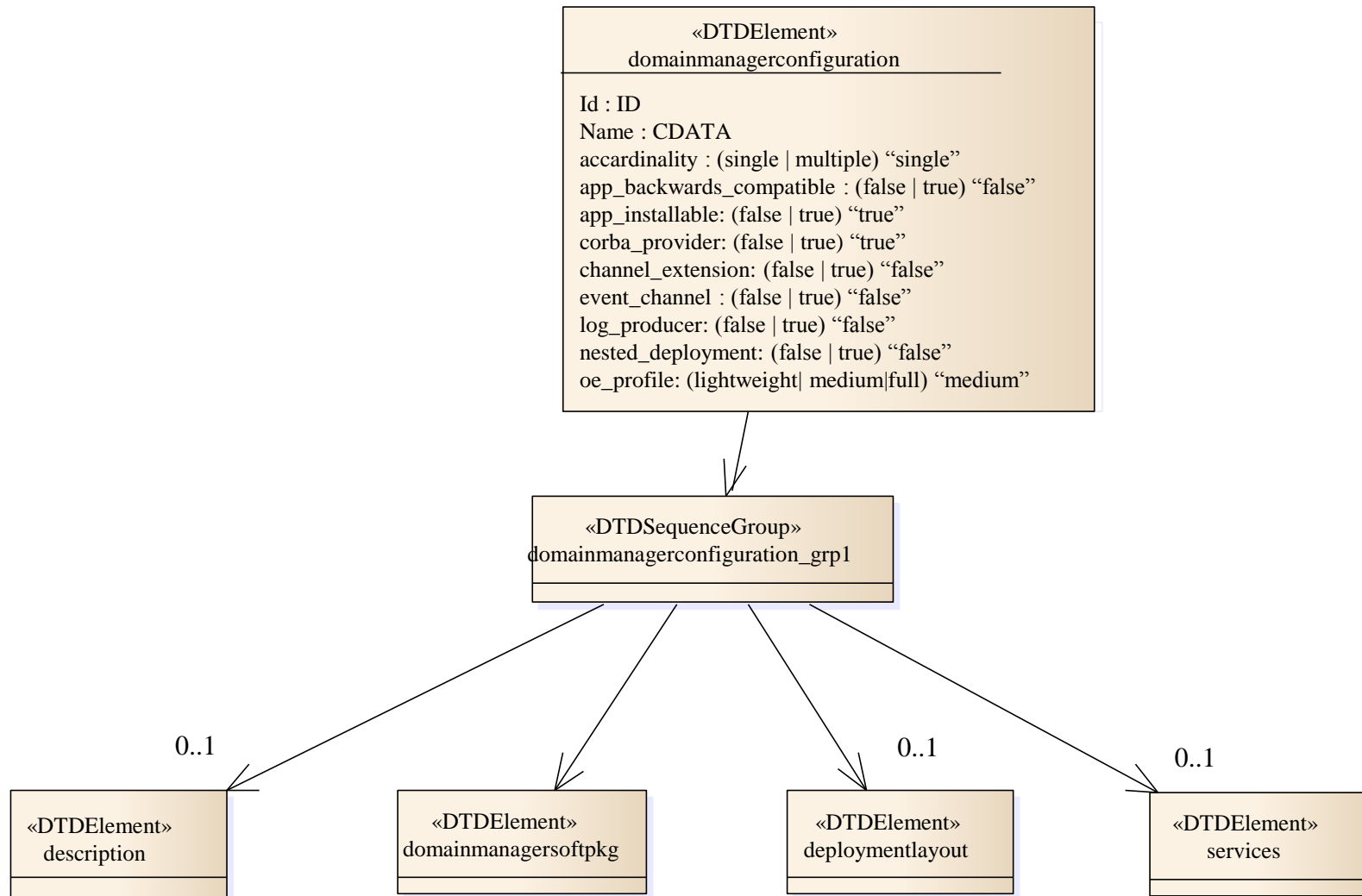
Domain Manager Configuration Descriptor

- **Add compatible attribute with default value of false to indicate whether or not compatible is supported. False means compatible is not supported while true means compatible is supported.**
  - SCA V4 Backwards Compatible supported indication
  - "app_backwards_compatible   (false | true) "false">"
- **The attribute allows SCA certification to know when to test for compatible UOF.**
- **Add other UOF attributes to DMD to D-1.12.1**
  - app_installable, corba_provider, channel_extension, event_channel, log_producer, and nested_deployment.
  - oe_profile attribute indicates the operating environment profile supported by the DomainManagerComponent.
- **Update Figure**
- **Update XML**

Appendix D 1.12.1 domainmanagerconfiguration

- **Add text to section.**
  - The app_backwards_compatible, app_installable, corba_provider, channel_extension, event_channel, log_producer, and nested_deployment attributes indicate the optional Units of Functionality (UOF) supported by the DomainManagerComponent. Accardinality indicated whether multiple assembly controllers are supported. The oe_profile attribute indicates the operating environment profile supported by the DomainManagerComponent.

Appendix D Figure 42 Changes

«DTDElement»
domainmanagerconfiguration

Id : ID
Name : CDATA
accardinality : (single | multiple) "single"
app_backwards_compatible : (false | true) "false"
app_installable: (false | true) "true"
corba_provider: (false | true) "true"
channel_extension: (false | true) "false"
event_channel : (false | true) "false"
log_producer: (false | true) "false"
nested_deployment: (false | true) "false"
oe_profile: (lightweight| medium|full) "medium"

«DTDSequenceGroup»
domainmanagerconfiguration_grp1

0..1

0..1

0..1

«DTDElement»
description

«DTDElement»
domainmanagersoftpkg

«DTDElement»
deploymentlayout

«DTDElement»
services

SCA V4.1 DMD DTD Changes

```
<!ELEMENT domainmanagerconfiguration
    ( description?
    , domainmanagersoftpkg
    , deploymentlayout?
    , services?
    )>
<!ATTLIST domainmanagerconfiguration
    id      ID          #REQUIRED
    name CDATA       #REQUIRED
    accardinality (single | multiple) "single"
    app_backwards_compatible  (false | true) "false"
    app_installable (false | true) "true"
    corba_provider (false | true) "true"
    channel_extension (false | true) "false"
    event_channel  (false | true) "false"
    log_producer (false | true) "false"
    nested_deployment (false | true) "false"
    oe_profile (lightweight| medium|full) "medium">
```

Device Manager Configuration Descriptor

- **If UOFs attributes are added to DMD then to be consistent UOFs are added to DCD.**

- **Update Element deviceconfiguration**

- **Add text to D-1.11.1**

- **Figure 36 could be updated to depict attributes**

SCA V4.1 DCD DTD Changes

```
<!ELEMENT deviceconfiguration
      ( description?
      , devicemanagersoftpkg
      , componentfiles?
      , partitioning?
      , connections?
      , domainmanager
      , filesystemnames?
      )>
<!ATTLIST deviceconfiguration
      id      ID      #REQUIRED
      name CDATA      #IMPLIED
      corba_provider (false | true) "true"
      log_capable (false | true) "false"
      log_producer (false | true) "false"
      oe_profile (lightweight| medium|full) "medium"
      platformcomponentfactorydeployment (false | true) "true">
```
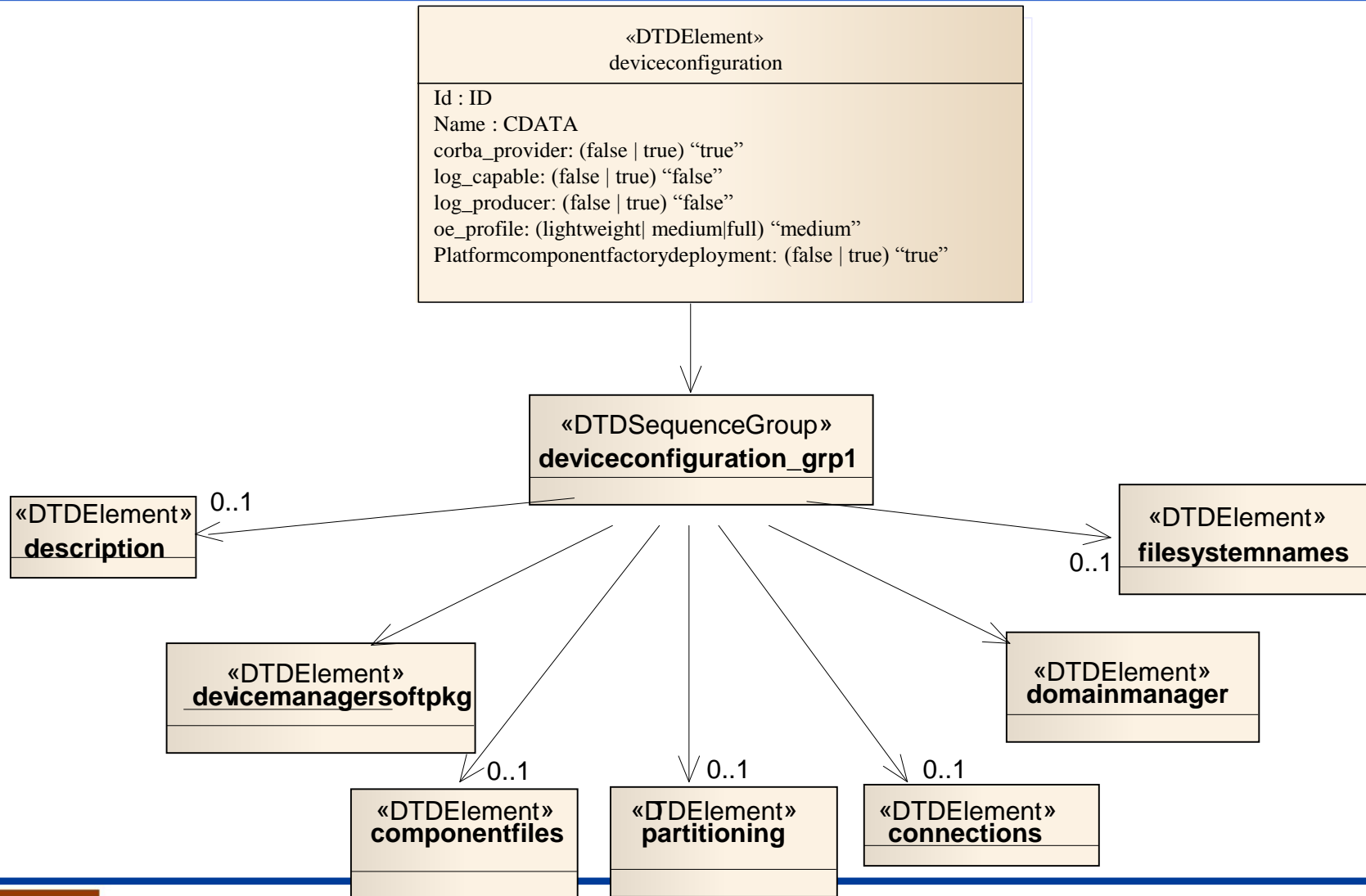
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Appendix D 1.11.1 deviceconfiguration

- **Add text to section.**
  - The corba_provider, log_capable, log_producer, and platformcomponentfactorydeployment attributes indicate the optional Units of Functionality (UOF) supported by the DeviceManagerComponent. The oe_profile attribute indicates the operating environment profile supported by the DeviceManagerComponent.

DCD Figure 36

«DTDElement»
deviceconfiguration

Id : ID
Name : CDATA
corba_provider: (false | true) "true"
log_capable: (false | true) "false"
log_producer: (false | true) "false"
oe_profile: (lightweight| medium|full) "medium"
Platformcomponentfactorydeployment: (false | true) "true"

«DTDSequenceGroup»
deviceconfiguration_grp1

0..1 «DTDElement» **description**

0..1 «DTDElement» **filesystemnames**

«DTDElement» **devicemanagersoftpkg**

«DTDElement» **domainmanager**

0..1 «DTDElement» **componentfiles**

0..1 «DTDElement» **partitioning**

0..1 «DTDElement» **connections**

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Application Backwards Compatible Units of Functionality (UOF)

- **Add an optional Backwards Compatible UOF to SCA 4.1 Appendix F Operating Environment (OE) profile to indicate a SCA 4.1 OE supports the install, uninstall, deploy and teardown a SCA 2.2.2 Application**
  - If mixture of app SCA versions components then another compatible would have to be defined to indicate this UOF.

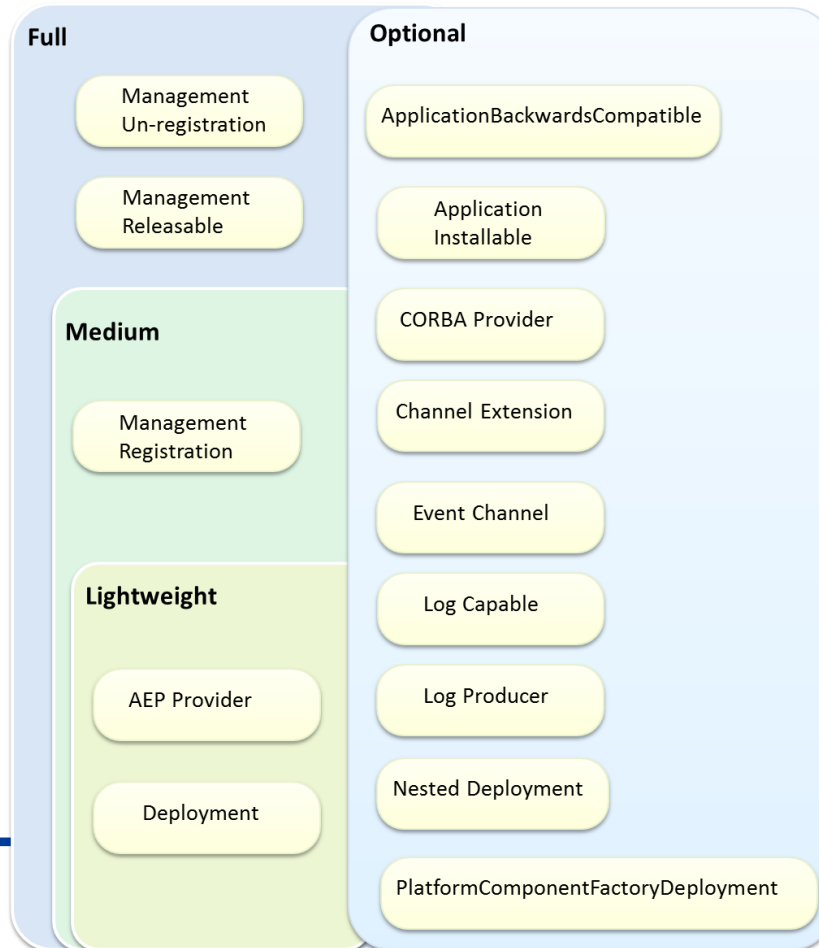- **F-6.1 Target Operating Environment Units of Functionality**

• **AEP Provider**	**– provides the SCA Application Environment Profiles (AEP) capability**
• **Application Backwards Compatible**	- **Provides SCA V2.2.2. Application backwards compatibility capability**

Application Backwards Compatible UOF - Appendix F Operating Environment Changes

F-7 SCA PROFILES

- Add optional Application Backwards Compatible UOF to figure

Main Spec Changes

- **Add SCA 2.2.2 Normative Reference**
- **Resource Interface**
- **Application Interface**
- **Application Factory Interface**
- **Domain Installation Interface**
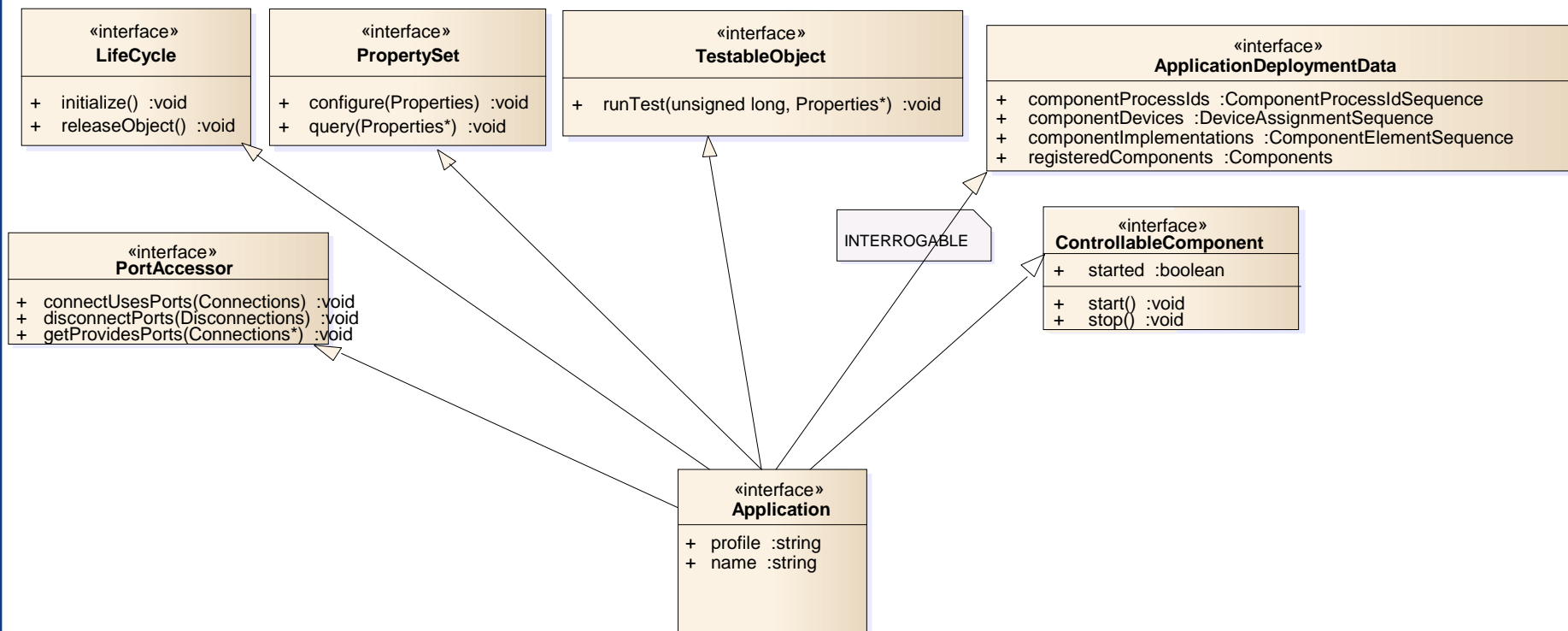- **Application Manager Component Constraints**
- **SCA OE Conformance**

Main Spec Changes – Normative Reference

- ## **1.4 NORMATIVE REFERENCES**
  - [3] SOFTWARE COMMUNICATIONS ARCHITECTURE SPECIFICATION, Version 2.2.2, 15 May 2006
  - Note other references in spec get affected by this insertion

Main Spec Changes – SCA V4 CF Resource Interface

- **The SCA4 Backwards Compatibility Task Group recommends not to define an interface that joins all the application sub-component interfaces of SCA4 together (as the Resource interface does for older SCA specifications)**
  - Remove Resource Interface from Spec.
  - The Scalable Component Changes will make changes to Resource Component types in spec.

Main Spec Changes – SCA V4 CF Application

«interface»
LifeCycle

+ initialize() :void
+ releaseObject() :void

«interface»
PropertySet

+ configure(Properties) :void
+ query(Properties*) :void

«interface»
TestableObject

+ runTest(unsigned long, Properties*) :void

«interface»
ApplicationDeploymentData

+ componentProcessIds :ComponentProcessIdSequence
+ componentDevices :DeviceAssignmentSequence
+ componentImplementations :ComponentElementSequence
+ registeredComponents :Components

INTERROGABLE

«interface»
PortAccessor

+ connectUsesPorts(Connections) :void
+ disconnectPorts(Disconnections) :void
+ getProvidesPorts(Connections*) :void

«interface»
ControllableComponent

+ started :boolean

+ start() :void
+ stop() :void

«interface»
Application

+ profile :string
+ name :string

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Main Spec Changes – Application Factory Interface Changes

- 3.1.3.3.1.3.5.1.3 Behavior

  - Add

    - SCA_TBD   The *create* operation shall create a SCA V2.2.2 Application [3]. A SCA V2.2.2 application being created adheres to the requirements in SCA V2.2.2.

    - Optional requirement – Application Backwards Compatible UOF

Main Spec Changes – DomainInstallation Interface Changes

- **3.1.3.3.1.5.5.1.3 installApplication Behavior**
  - Add
    - SCA_TBD The *installApplication* operation shall install a SCA V2.2.2 application [3]. A SCA V2.2.2 application being installed adheres to the requirements in SCA V2.2.2.
    - Optional requirement – Application Backwards Compatible UOF

- **Add exception requirement to D.1.3.3.1.5.5.1.5 Exceptions/Errors**
  - SCA_TBD The *installApplication* operation shall raise the ApplicationInstallationError exception when SCA 2.2.2 Application installation is not supported.

- **3.1.3.3.1.5.5.2.3 uninstallApplication Behavior**
  - Add
    - SCA_TBD The *uninstallApplication* operation shall uninstall a SCA V2.2.2 application [3]. A SCA V2.2.2 application being uninstalled adheres to the requirements in SCA V2.2.2.
    - Optional requirement – Application Backwards Compatible UOF

Main Spec Changes – Application Manager Component Changes

- **Add Application Backwards Compatible requirement to Constraints section 3.1.3.3.2.2.4**

  - SCA_TBD   An ApplicationManagerComponent shall release a SCA V2.2.2 application [3]. An SCA V2.2.2 application being release adheres to the requirements in SCA V2.2.2.

  - SCA_TBD An ApplicationManagerComponent shall delegate configure, query, start, stop, and runTest operations to a SCA V2.2.2 application assembly controller.

    - Optional requirements – Application Backwards Compatible UOF

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Main Spec Changes – SCA OE Component Conformance Changes
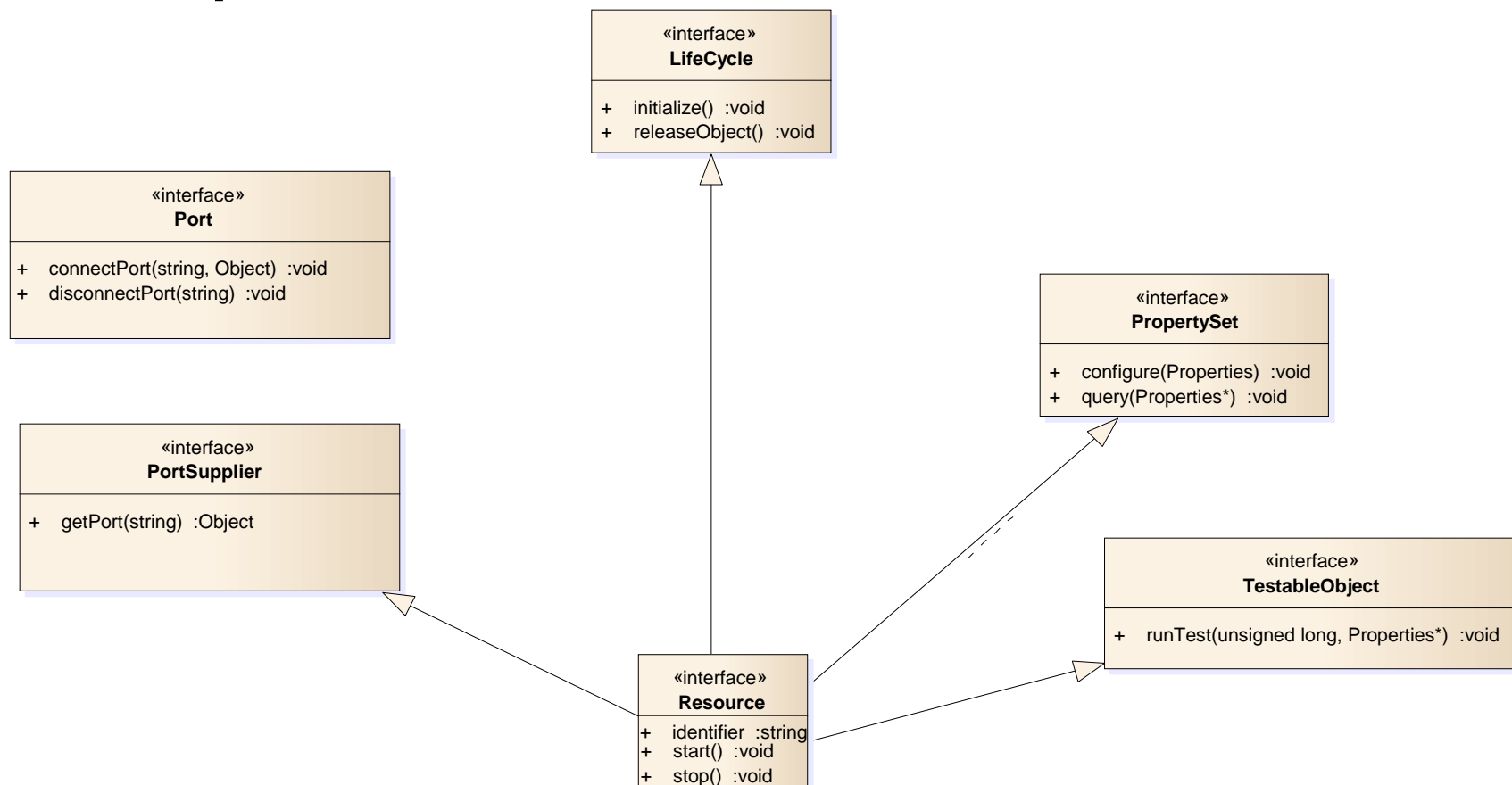
- **Section 4.1.2 – Add statements**

  - The DomainManagerComponent indicates the levels of Units of Functionality conformance by its DMD attributes.

  - The DeviceManagerComponent indicates the levels of Units of Functionality conformance by its DCD attributes

Appendix C IDL Changes

- **Remove SCA V4 Resource Interface**

- **SCA V4 CF Application Interface inherits CF Base interfaces not CF Resource.**

  - Modify C.7.4.1   CFApplication IDL

- **Add a SCA V2.2.2 CF IDL section (C.7.6 SCA 2.2.2 Base Application) to Appendix C.**

  - SCA V2.2.2 CF IDL only contains the CF::Resource, Port, PortSupplier, and CF::ResourceFactory interfaces that are needed for SCA 2.2.2 application deployment and teardown.

  - The Resource interface uses SCA V4 interfaces and SCA V2.2.2 Port interface.

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SCA V2.2.2 Resource

- **Uses SCA V4 Base Interfaces that are backwards compatible with SCA V2.2.2 base interfaces**

SCA V2.2.2 Resource

```
//Source file: CFResource.idl

#ifndef __CFRESOURCE_DEFINED
#define __CFRESOURCE_DEFINED

#include "CFLifeCycle.idl"
#include "CFPropertySet.idl"
#include "CFTestableObject.idl"

module CF {

  /* The Resource interface provides a common interface for the control
     and configuration of a software component. */
  interface Resource : LifeCycle, TestableObject, PropertySet, PortSupplier {
```

SCA V4 Guidelines Doc

- **Documentation needs to be updated to be address application backwards compatible and give guidance on application backwards compatible**

Mixture Approach

- **It is worth pointing out the current proposal would support the use of an SCAv222 application as a component within a SCAv4 nested application**
  - Simply relies on the optional support for nested applications

- **The support for a non-nested application contain a mix of SCAv4 and SCAv222 components is not supported by this proposal**
  - Discussion on this topic has been deferred to future discussion by the WinnF SCAv4 Backwards Compatibility Task Group

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