**DAS Scenario 1: DAS is fully operational and there are no device alerts**

- **When** the connection to individual PoC devices is established to the alarm integrator by checking the connection state on a regular basis.
- And the connection to the relevant alarm communicator devices is established to the alarm integrator by checking the connection state on a regular basis.
- **Then** no further indication that the DAS is fully operational shall be announced to the user.
DAS Scenario 2: Connection to relevant alarm communicator lost, other ACs are available, and there are no device alerts

- **When** the connection to individual PoC devices is established to the alarm integrator by checking the connection state on a regular basis
  - **And** the connection to the relevant alarm communicator device has been lost
  - **And** other alarm communicators are available
- **Then** the user shall be notified on all connected, relevant alarm communicators that the connection to one or more ACs has been lost
  - **And** the user may be notified on all PoC devices that the connection to one or more ACs has been lost
  - **And** the audio alarm at all PoC devices shall be disabled
  - **And** the audio alarm at all connected, relevant alarm communicators shall be enabled
  - **And** the alarm communicator which is not connected to the alarm integrator shall notify the user visually and audibly about the lost connection
DAS Scenario 3: Connection to relevant alarm communicator lost, other ACs are unavailable, and there are no device alerts

- **When** the connection to individual PoC devices is established to the alarm integrator by checking the connection state on a regular basis
- **And** the connection to the relevant alarm communicator device has been lost
- **And** other alarm communicator are unavailable
- **Then** the user may be notified on all PoC devices that the connection to one or more ACs has been lost
- **And** the audio alarm at all PoC devices may be enabled
- **And** the alarm communicator which is not connected to the alarm integrator shall notify the user visually and audibly about the lost connection

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**Advantage:**
- Alarm Integrator does not need to prioritize PoC
- User may acknowledge on every (PoC) alarm device

**Disadvantage:**
- Three devices making noise
DAS Scenario 4: Connection to one PoC devices is lost, relevant alarm communicators are available, and there are no device alerts

- **When** the connection to one PoC device is lost
  - **And** the connection to the relevant alarm communicator devices are available
- **Then** the user shall be notified on all connected, relevant alarm communicators that the connection to one or more PoC devices has been lost
  - **And** the user may be notified on all PoC devices that the connection to one or more PoC devices has been lost
  - **And** the audio alarm at all connected PoC devices shall be disabled
  - **And** the audio alarm at all connected, relevant alarm communicators shall be enabled
  - **And** the PoC device which is not connected to the alarm integrator shall notify the user visually and audibly about the lost connection
DAS Scenario 4.1: Connections to multiple PoC devices are lost, relevant alarm communicators are available, and there are no device alerts

- **When** the connections to multiple PoC devices are lost
- **And** the connection to the relevant alarm communicator devices are available
- **Then** the user shall be notified on all connected, relevant alarm communicators that the connection to one or more PoC devices has been lost
  - **And** the user may be notified on all PoC devices that the connection to one or more PoC devices has been lost
  - **And** the audio alarm at all connected PoC devices shall be disabled
  - **And** the audio alarm at all connected, relevant alarm communicators shall be enabled
  - **And** the PoC device which is not connected to the alarm integrator shall notify the user visually and audibly about the lost connection
DAS Scenario 5: Connection to PoC devices are lost, relevant alarm communicators are unavailable, and there are no device alerts

- **When** the connection to individual PoC devices is lost
  - **And** the connection to the relevant alarm communicator devices are unavailable
- **Then** the user may be notified on all PoC devices that the connection to one or more PoC devices and relevant ACs has been lost
  - **And** the audio alarm at all connected PoC devices may be enabled
  - **And** the PoC device which is not connected to the alarm integrator shall notify the user visually and audibly about the lost connection
  - **And** the alarm communicator which is not connected to the alarm integrator shall notify the user visually and audibly about the lost connection
DAS Alarm Scenario 1: Alarm is active at PoC

- **When** there is an active alarm at a PoC device
- **Then** the alarm shall visually shown at the PoC device
  - **And** the audio alarm shall be disabled at the PoC device
  - **And** the alarm shall visually and audibly shown on all relevant remote alerting devices
**DAS Alarm Scenario 2: Acknowledge at PoC device**

- **When** there is an active alarm at a PoC device
  - **And** the alarm is shown visually and audibly on all relevant remote alerting devices
  - **And** the caregiver acknowledges the alarm at the POC device
- **Then** the alarm shall be shown as acknowledged at the PoC device
  - **And** the alarm shall be shown as acknowledged on all relevant alerting devices
  - **And** the audio signal for this alarm shall be disabled at the Poc device and all relevant alerting devices
DAS Alarm Scenario 3: Acknowledge at remote device

- **When** there is an active alarm at a PoC device
  - **And** the alarm is shown visually and audibly on all relevant remote alerting devices
  - **And** the caregiver acknowledges the alarm on any remote alerting device
- **Then** the alarm shall be shown as acknowledged at the PoC device
  - **And** the alarm shall be shown as acknowledged on all relevant alerting devices
  - **And** the audio signal for this alarm shall be disabled at the Poc device and all relevant alerting devices
DAS Alarm Scenario 4: Responsibility Accepted at any of the relevant alarm communicators

- **When** there is an active alarm at a PoC device
  - **And** the alarm is shown visually and audibly on all relevant remote alerting devices
  - **And** the caregiver accepts the alarm on any remote alerting device
- **Then** the alarm shall visually be shown as accepted on all remote alerting device
  - **And** the alarm audio shall be disabled on all other relevant remote alerting devices
  - **And** the alarm shall be shown at the PoC device
  - **And** the audio signal for this alarm shall be disabled at the Poc device
**DAS Alarm Scenario 4.1: Responsibility Accepted at the relevant alarm communicator device**

- **When** there is an active alarm at a PoC device
  - And the alarm is shown visually and audibly on the relevant remote alerting device
  - And the caregiver accepts the alarm on the remote alerting device
- **Then** the alarm shall visually be shown as accepted on the remote alerting device
  - And the alarm shall be shown at the PoC device
  - And the audio signal for this alarm shall be disabled at the PoC device
DAS Alarm Scenario 5: Responsibility Rejected at any of the relevant alarm communicators

- **When** there is an active alarm at a PoC device
  - And the alarm is shown visually and audibly on all relevant remote alerting devices
  - And the caregiver rejects the alarm on any remote alerting device
- **Then** the alarm shall visually be shown as rejected on this remote alerting device
  - And the audio signal for this alarm shall be disabled on this remote alerting device
  - And the alarm shall be shown at the PoC device
  - And the audio signal for this alarm shall be disabled at the PoC device
  - And the alarm shall visually and audibly be shown on all other relevant remote alerting devices
DAS Alarm Scenario 5.1: Responsibility Rejected at the relevant alarm communicator

- **When** there is an active alarm at a PoC device
  - And the alarm is shown visually and audibly at the relevant remote alerting device
  - And the caregiver rejects the alarm at the remote alerting device
- **Then** the alarm shall visually be shown as rejected on this remote alerting device
  - And the audio signal for this alarm shall be disabled on this remote alerting device
  - And the alarm shall be shown at the PoC device
  - And the audio signal for this alarm shall be enabled at the PoC device
SmartSys Scenario 1: Smart Alert System is fully operational and there are no alerts

- **When** the connection to individual PoC devices is established to the alarm integrator by checking the connection state on a regular basis
  
  And  the connection to the relevant alarm communicator devices is established to the alarm integrator by checking the connection state on a regular basis
  
- **Then** no further indication that the Smart Alert System is fully operational shall be announced to the user

![SmartAlertSystemDiagram]
**SmartSys Scenario 2: Smart Alert System is fully operational, there are smart alerts derived from patient data, and smart alerts are shown on all PoC devices**

- **When** the connection to individual PoC devices is established to the alarm integrator by checking the connection state on a regular basis
  
  - And the connection to the relevant alarm communicator devices is established to the alarm integrator by checking the connection state on a regular basis
  
  - And there is an alert generated by the smart alert system based on patient data

- **Then** the user shall be notified on all connected, relevant alarm communicators that there is an alert event generated by the smart alert system
  
  - And the user may be notified on all PoC devices that there is an alert event generated by the smart alert system
  
  - And the audio alarm at all connected PoC devices shall be disabled
  
  - And the audio alarm at all connected, relevant alarm communicators shall be enabled

### Diagram Description

- **Detected**
  - Ventilator
  - Infusion Pumps
  - Patient Monitor

- **Change Data**
  - SDC Cons.
  - SDC Provider

- **SDC Consumer**

- **Smart Alert Subsystem**

- **Alarm Integrator**
  - Relevant Alarm Communicator 1
  - Relevant Alarm Communicator 2
  - Alarm Communicator 3

- **Alert generated by Smart Alert System:**
  - Deterioration detected (medium priority)
**SmartSys Scenario 2.1: Smart Alert System is fully operational, connections to relevant ACs are lost, there are smart alerts derived from patient data, and smart alerts are shown on all PoC devices**

- **When** the connection to individual PoC devices is established to the alarm integrator by checking the connection state on a regular basis
  - **And** the connection to the relevant alarm communicator devices is lost
  - **And** there is an alert generated by the smart alert system based on patient data
- **Then** the user may be notified at all PoC devices that there is an alert event generated by the smart alert system
  - **And** the user may be notified at all PoC devices that the connections to all alert communicators are lost
  - **And** the audio alarm at all connected PoC devices shall be enabled
  - **And** the alarm communicator which is not connected to the alarm integrator shall notify the user visually and audibly about the lost connection

![Diagram of Smart Alert System and connected devices]
SmartSys Scenario 2.2: Smart Alert System is fully operational, there are smart alerts derived from patient data, and smart alert is only shown on one PoC device

- When the connection to individual PoC devices is established to the alarm integrator by checking the connection state on a regular basis
  And the connection to the relevant alarm communicator devices is established to the alarm integrator by checking the connection state on a regular basis
  And there is an alert generated by the smart alert system based on patient data
  And there is a prioritization on which PoC devices the alert shall be signaled
- Then the user shall be notified on all connected, relevant alarm communicators that there is an alert event generated by the smart alert system
  And the user shall only be notified on the PoC device with the highest priority that there is an alert event generated by the smart alert system
  And the audio alarm at all connected PoC devices shall be disabled
  And the audio alarm at all connected, relevant alarm communicators shall be enabled
**SmartSys Scenario 3: Smart Alert System is fully operational, there are smart alerts derived from PoC device alerts, and smart alerts are shown on all PoC devices**

- **When** the connection to individual PoC devices is established to the alarm integrator by checking the connection state on a regular basis
  - And the connection to the relevant alarm communicator devices is established to the alarm integrator by checking the connection state on a regular basis
  - And one or more PoC device alerts are active
  - And there is an alert generated by the smart alert system based on PoC device alerts
- **Then** the user shall be notified at all PoC devices and all connected, relevant alarm communicators that there is an alert event generated by the smart alert system
  - And the device alerts are only shown at the corresponding PoC devices
  - And the audio alarm at all connected PoC devices shall be disabled
  - And the audio alarm at all connected, relevant alarm communicators shall be enabled
**SmartSys Scenario 3.1: Smart Alert System is fully operational, connections to relevant ACs are lost, there are smart alerts derived from PoC device alerts, and smart alerts are shown on all PoC devices**

- **When** the connection to individual PoC devices is established to the alarm integrator by checking the connection state on a regular basis
  - **And** the connection to the relevant alarm communicator devices is lost
  - **And** one or more PoC device alerts are active
  - **And** there is an alert generated by the smart alert system based on PoC device alerts
- **Then** the user shall be notified at all PoC devices that there is an alert event generated by the smart alert system
  - **And** the device alerts are only shown at the corresponding PoC devices
  - **And** the user shall be notified at all PoC devices that the connections to all alert communicators are lost
  - **And** the alarm communicator which is not connected to the alarm integrator shall notify the user visually and audibly about the lost connection
  - **And** the audio alarm at all connected PoC devices shall be enabled
**SmartSys Scenario 3.2:** Smart Alert System is fully operational, there are smart alerts derived from PoC device alerts, and smart alerts are only shown on the relevant PoC devices

- **When** the connection to individual PoC devices is established to the alarm integrator by checking the connection state on a regular basis
  - And the connection to the relevant alarm communicator devices is established to the alarm integrator by checking the connection state on a regular basis
  - And one or more PoC device alerts are active
  - And there is an alert generated by the smart alert system based on PoC device alerts
  - And the smart alert relates to a specific PoC device
- **Then** the user shall be notified on all connected, relevant alarm communicators that there is an alert event generated by the smart alert system
  - And the user shall be notified on the PoC device that relates to the alert event generated by the smart alert system
  - And the original device alerts are only shown at the corresponding PoC devices
  - And the audio alarm at all connected PoC devices shall be disabled
  - And the audio alarm at all connected, relevant alarm communicators shall be enabled
**SmartSys Scenario 4: Smart Alert System is not operational and there are PoC device alerts**

- **When** the connection to individual PoC devices is established to the alarm integrator by checking the connection state on a regular basis
  - And the connection to the relevant alarm communicator devices is established to the alarm integrator by checking the connection state on a regular basis
  - And one or more PoC device alerts are active
  - But the smart alert system is not operational
- **Then** the user shall be notified at all PoC devices and all connected, relevant alarm communicators that there are PoC device alerts
  - And the user shall be notified at all PoC devices and all connected, relevant alarm communicators that the smart alert system is not operational
  - And the device alerts are shown at the corresponding PoC devices
  - And the audio alarm at all connected PoC devices shall be disabled
  - And the audio alarm at all connected, relevant alarm communicators shall be enabled
Alarm System Sequence Diagram 1: Connect / Disconnect to / from Alarm Integrator (ALI)

Establish connection

Connect to SDC provider

[PKP Consumer: Alarm Integrator]

Connect to SDC provider

Get alarm system state for current patient/location context

Subscribe for alarm system state updates for current patient / location context

Request connection to alarm integrator

Request disconnection from alarm integrator

Detect connection lost to alarm integrator SDC provider

Show inop that connection to alarm integrator is lost

Shut down connection

Disconnect from SDC Provider

Unsubscribe from updates

Disconnect from SDC provider

Opt [if connection to alarm integrator SDC provider is lost]
Alarm System Sequence Diagram 2: Display alarm integrator (ALI) alerts based on priority

Set priority context

Set ensemble context [DISPLAY_GENERIC_ALI_ALERTS]

Reset ensemble context [DISPLAY_GENERIC_ALI_ALERTS]

Remove generic ALI alerts from alert system / display

Get alarm system state for current patient/location context

Add generic ALI alerts to alert system / display

alt

[If new generic ALI alert reported]

Report new alert

Report new alert

Ignore generic ALI alert

Add generic ALI alert to alert system / display

[If new device related ALI alert reported]

Report new alert

Report new alert

If ALI alert relates to this device, add alert to alert system / display; otherwise ignore alert.
Alarm System Sequence Diagram 3: Display smart alert related to specific device(s)

- **Alarm Integrator**
  - SDC Provider

- **Medical Device 1**
  - SDC Consumer

- **Medical Device 2**
  - SDC Consumer

**Events:**
- Report new alert [Related device: Device_1]
- Add ALI alert to alert system / display
- Ignore ALI alert
Alarm System Sequence Diagram 4: Alarm integrator (ALI) alert delegation handling

1. Report new alert

2. [if this is an ALI alert]
   - Ignore ALI alert

3. [if this is a device alert]
   - Process alert according to smart alert system rules

4. Confirm alert delegation

5. [delegation is enabled]
   - Suppress audio signal
   - Enable audio signal

6. [delegation is disabled]