**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 device 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

- Alert generated by Smart Alert System:
  - None
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
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
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

```
Ventilator
	SDC
	Cons.
	SDC
Provider

Infusion Pumps
	SDC
	Cons.
	SDC
Provider

Patient Monitor
	SDC
	Cons.
	SDC
Provider

Alarm Integrator
	SDC
Consumer
	SDC
Provider

Relevant Alarm Communicator 1

Relevant Alarm Communicator 2

Alarm Communicator 3

Alert generated by Smart Alert System:
- Deterioration detected (medium priority)
```
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

Alert generated by Smart Alert System:
- Check ventilation hose (medium priority)
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)

1. Establish connection
   - Connect to SDC provider [PKP Consumer: Alarm Integrator]
   - Get alarm system state for current patient/location context
   - Subscribe for alarm system state updates for current patient / location context

2. Opt [if connection to alarm integrator SDC provider is lost]
   - Detect connection lost to alarm integrator SDC provider
   - Show inop that connection to alarm integrator is lost

3. Shut down connection
   - Disconnect from SDC Provider
   - Unsubscribe from updates
   - Disconnect from SDC provider

4. Request disconnection from alarm integrator
Alarm System Sequence Diagram 2: Display alarm integrator (ALI) alerts based on priority

**Alarm Integrator SDC Provider**

1. Set priority context
2. Set ensemble context [DISPLAY GENERIC ALI ALERTS]
3. Reset ensemble context [DISPLAY GENERIC ALI ALERTS]
4. Get alarm system state for current patient/location context
5. Report new alert

**Medical Device 1 SDC Consumer**

1. Remove generic ALI alerts from alert system / display
2. Add generic ALI alerts to alert system / display
3. Ignore generic ALI alert
4. If ALI alert relates to this device, add alert to alert system / display; otherwise ignore alert.

**Medical Device 2 SDC Consumer**

1. Add generic ALI alert to alert system / display
2. Ignore generic ALI alert
3. If ALI alert is relates to this device, add alert to alert system / display; otherwise ignore alert.

**alt**

1. [If new generic ALI alert reported]
2. Report new alert
3. If ALI alert relates to this device, add alert to alert system / display; otherwise ignore alert.

1. [If new device related ALI alert reported]
2. Report new alert
3. 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)

- 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

- **Alarm Integrator**
  - SDC Consumer
  - Report new alert

- **Medical Device**
  - SDC Provider

- **alt**
  - [if this is a ALI alert]
    - Ignore ALI alert
  - [if this is a device alert]
    - Process alert according to smart alert system rules

- **loop**
  - **alt**
    - [delegation is enabled]
      - Confirm alert delegation
    - [delegation is disabled]
      - Suppress audio signal
      - Enable audio signal