Cornell University College of Veterinary Medicine
Student Training Simulation Project

XML Scenario Specification

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Version 1.10

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2016-July-14 – V 1.1 – Update descriptions to latest status requests.

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Updated section 6 to include a new avatar element, color specifier for non vital controls, species and patient image.

Changed specifier for initial scene.

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Updated Sec 2 to describe scenario directories and zip archive format.

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Various

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Updated contact information, removed watermark

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Updated scenario management description
Updated Sec 10.4 – Scenario Triggers
Updated JSON Schema
Added Sec 10.5 – Trigger groupings
Added Sec 11.9 – Example Trigger Groupings

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Updated Section 11.3 for cardiac:rhythm API.

Cornell University College of Veterinary Medicine
Student Training Simulation Project
XML Scenario Specification

1. Introduction and Overview

This document will describe the XML Scenario Specification for the Cornell University College of Veterinary Medicine Student Training Simulation Project.

A scenario is used to manage mannequin actions and vital signs based on student responses to presented conditions. A scenario is composed of the following major components. Each component is described in detail further in this document:

- **Scenario XML Schema** – The schema for the XML document will be proprietary and described in this document. The syntax will follow established rules for well formed XML structures.
- **Scenario Header** – The header is used to provide descriptive information about the scenario such as time of creation, scenario name, author, etc.
- **Scenario Profile** – The profile is used to specify which animal image should be used on the instructor interface, patient description, placement of auxiliary controls, and other profile specific information.
- **Scenario Vocal Files** – The vocal files are used by the instructor interface to play animal sounds that a patient may produce during an examination such as a dog growl or cat hiss.
- **Scenario Media Files** – The media files are displayed on the student interface to provide additional diagnostic information about a patient such as MRI's, X-Rays, or other graphic information.
- **Scenario Init** – The init section is used to preset specific scenario conditions to a value other than the default value. The values in the init section are set before the scenario is started.
- **Scenario Events** – The events are scenario specific and may be selected when an action is performed by the students that represent the event (ie injecting a drug). Specific events may trigger an exit condition from a scenario scene. All events are logged in the event monitor. Events are grouped together with defined categories.
- **Scenario Scenes** – Each scenario will be made up of scenes which will present a set of conditions to the students. Each scene will contain entry conditions and exit conditions. The exit conditions will include actions such as an injection, CPR, administrating an AED shock, timeout form inaction or other event. Any parameter can be set within a scene including trends.

2. Synchronization and Scenario Management

There are three main components to the Simulator:

- Instructor Interface (II)
- Simulation Manager (SimMgr)
- Simulation Controller / Mannequin (SimCtrl)

The simulation manager is the main controller to the system. When all components are booting up, the SimMgr will attempt communication to the other two components. Upon a successful synchronization, a default scenario will be loaded and communicated to the II and SimCtrl. The II will then be able to tell the SimMgr that a new scenario has been selected, thus initiating a sequence of loading the new XML, setting up all vital signs and auxiliary controls, then beginning the scenario with the first scene.

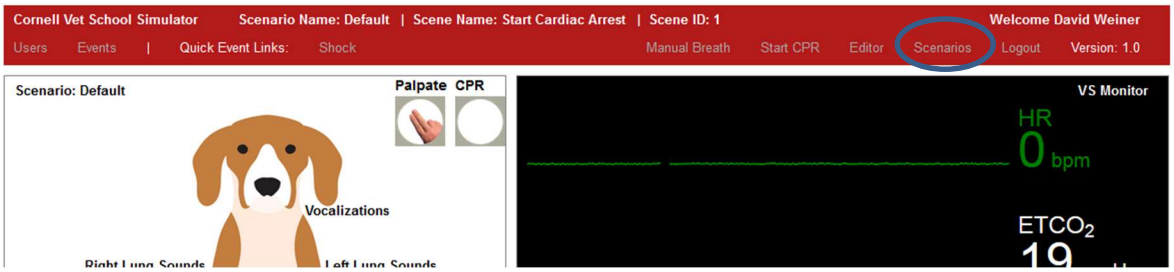
The II will present a list of available scenarios to the instructor, and provide feedback on the current scenario such as run time and current scene.

All scenario XML, profile images, and media files will be saved in predetermined directories.

2.1 Scenario Upload

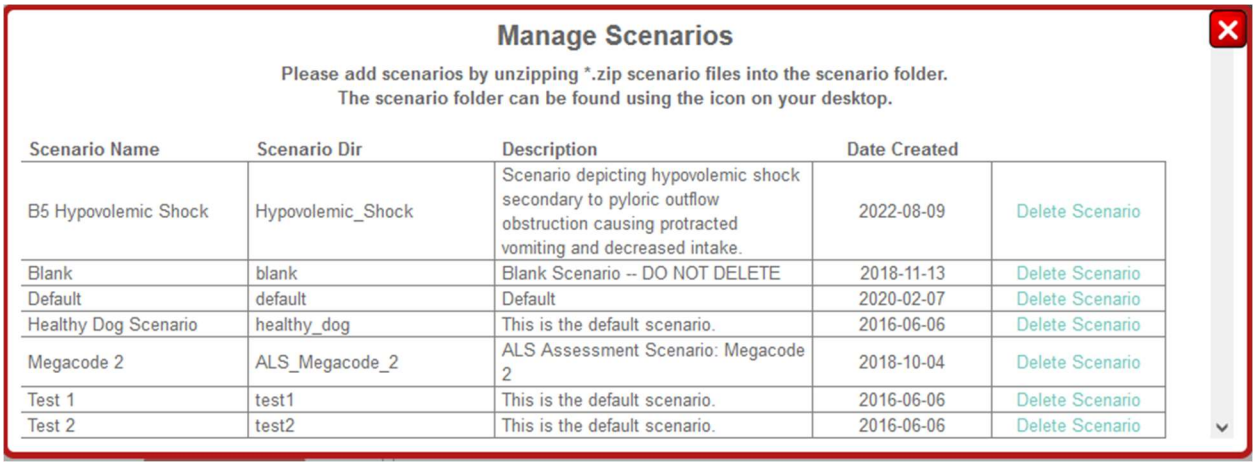
Scenarios can be uploaded using the “Scenarios” menu item in the Instructor Interface.

When clicked, the interface will provide a list of available scenarios with an option to delete.



The scenario summary shows the scenario directory the scenario can be found in, the scenario name as read from the xml file <header><title><name> section, the description found in the <header><description> section, and the date created found in the <header><date_of_creation> field.

The “Delete Scenario” link will delete that scenario



New scenarios can be added or existing scenarios can overwritten by navigating to the scenario directory. A desktop icon is available to go to this directory:

2.2 Scenario Format

A scenario must have a specific format:

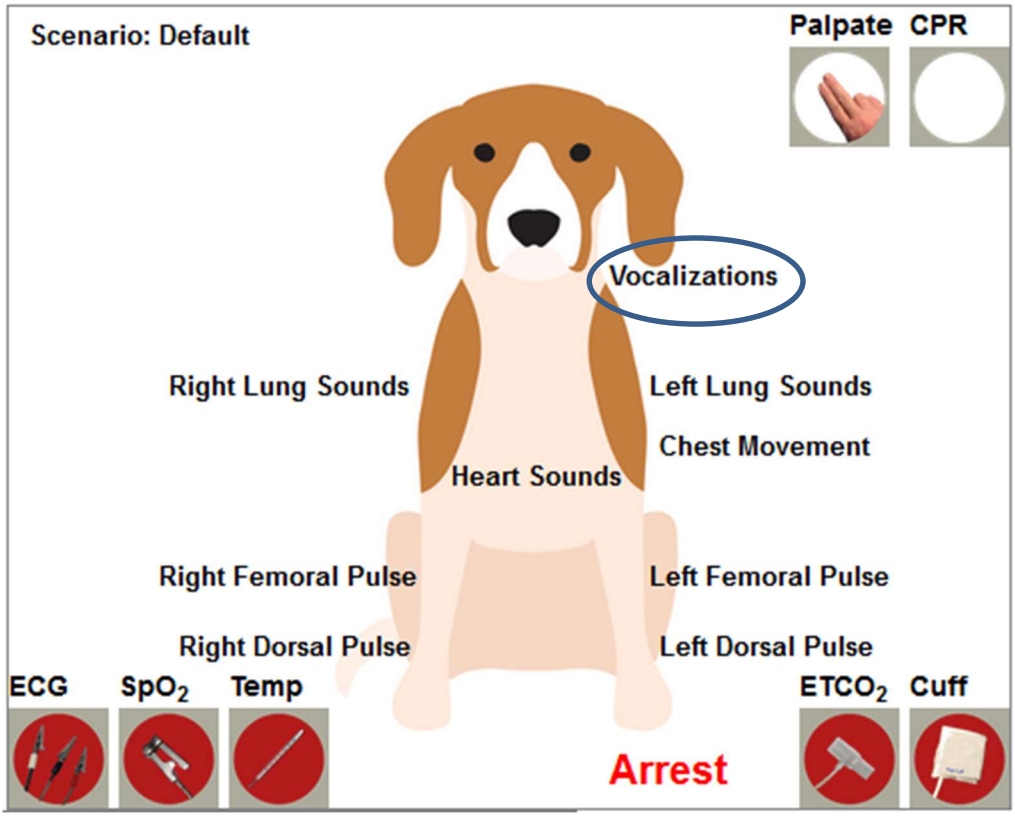
- There can only be one xml file. The file is expected to be called ‘main.xml’. If it is not called ‘main.xml’, it will be renamed.
- There must be three directories: images, vocals, and media.

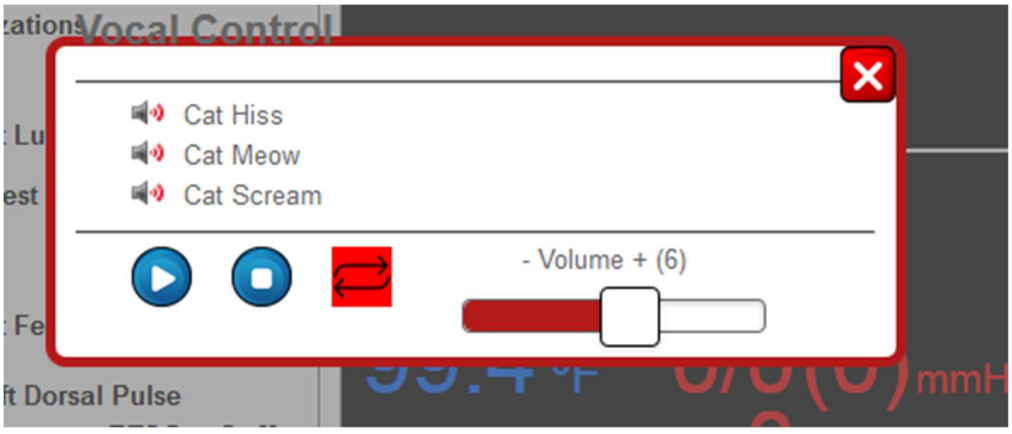
2.3 Scenario Images Directory

The scenario “images” directory will contain up to two files: The avatar file as specified in <profile><avatar><filename>. The second file is the image used for the summary presented at the beginning of a scenario: <profile><summary><image>

2.4 Scenario Vocals Directory

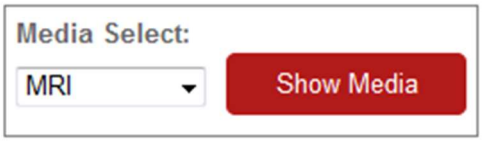
The scenario “vocals” directory will contain the vocalization files as specified in the <vocals><file><filename> section of the scenarios. There is no minimum or maximum number of files for this section, but the directory must exist. The actual files must be in a .wav format and will be made available under the “Vocalizations” function found in the avatar section.





2.5 Scenario Media Directory

The scenario “media” directory will contain the media files as specified in the <media><file><filename> section of the scenarios. There is no minimum or maximum number of files for this section, but the directory must exist. The actual files can be in any recognized portable format such as image, pdf, or other document format recognized by the OS browser.



3. Schema

The schema will be proprietary and follow the rules for well formed XML structures. The basic schema will be as follows:

```
<?xml version=”1.0” encoding=”UTF-8”?>
<scenario>
    <header>
    .
    .
    .
    </header>

    <profile>
    .
    .
    .
    </profile>

    <vocals>
    .
    .
    .
    </vocals>

    <media>
    .
    .
    .
    </media>

    <init>
    .
    .
    .
    </init>

    <events>
    .
    .
    .
    </events>

    <scene>
    .
    .
    .
```

```
        </scene>
        <scene>
        .
        .
        .
        </scene>
</scenario>
```

There will be only one header, profile, vocals, media, init, and events elements. There will be one or more scene elements. The details for each element will be presented below.

4. Scenario Header

The header is used to provide metadata or descriptive information about the scenario. The header will have the following elements:

There is one header section in the XML.

```
<header>
        <author>Terry Kelleher</author>

        <title>
                <name>Healthy 40kg Dog </name>
                <top>5</top> // Position from top of page in pixels
                <left>10</left> // Position from left of page in pixels
        </title>
        <date_of_creation>2016-06-03</date_of_creation >

        <description>
                This is a description of the scenario.  It can be a very long description or a
                short description.  Final format will depend on how information is
                displayed, if at all.
        </description>
</header>
```

5. Scenario Profile

The scenario profile is used to specify the background image name, summary information about the patient, placement of the non vital controls (ie vocals, lung sounds, etc), and available vocalizations. The image filename can specify any portable media format (ie jpg, gif, etc.). Vocalizations are assumed to be .wav format.

The avatar section specifies the background image used for the non-vital controls. The height_pct and width_pct elements specify the rendered size of the image for the background in a percentage from 0 – 100.

The color element in the control section specifies the rendered color for the non vital control labels. Any HTML5 compatible specifier can be used such as '#000000' for black, '#FFFFFF' for white, or any websafe color name.

There are currently 9 controls available which when clicked will open a control modal. Each control can be specified with any title but the id must be exactly specified as listed below:

1. Vocalizations (id: **vocals-dog-control**) – clicking on this control will open the vocalizations modal.
2. Right Lung Sound (id: **right-lung-dog-control**) – clicking on this control will open the right lung sound modal.
3. Left Lung Sound (id: **left-lung-dog-control**) – clicking on this control will open the right lung sound modal.
4. Left Femoral Pulse (id**: left-femoral-pulse-dog-control**) – clicking on this control will open the left femoral pulse control modal.
5. Right Femoral Pulse (id: **right-femoral-pulse-dog-control**) – clicking on this control will open the right femoral pulse control modal.
6. Left Dorsal Pulse (id: **left-dorsal-pulse-dog-control**) – clicking on this control will open the left dorsal pulse control modal.
7. Right Dorsal Pulse (id: **right-dorsal-pulse-dog-control**) – clicking on this control will open the right dorsal pulse control modal.
8. Heart Sounds (id: **heart-sound-dog-control**) – clicking on this control will open the heart sound control modal.
9. Chest Movement (id: **chest -dog-control**) – clicking on this control will open the chest movement control modal.

There are 7 buttons available which will either activate a function or indicate a specific response. These are listed below:

1. CPR (id: **button-cpr**) – this button will indicate when CPR is detected.
2. ECG (id: **button-ekg**) – when clicked this button will activate the ECG reading on the student monitor.
3. SpO2 (id: **button-SpO2**) – when clicked this button will activate the SpO2 reading on the student monitor.
4. ETCO2 (id: **button-CO2**) – when clicked this button will activate the ETCO2 reading on the student monitor.
5. Cuff (id: **button-cuff**) – when clicked this button will activate the NIBP reading on the student monitor. **NOTE:** Once activated the "Read NIBP" button still needs to be clicked to take a reading.
6. Palpate (id: **button-palpate**) – this button indicates when the srudents palpates a pulse point. The button will glow either yellow (light pressure), green (normal pressure), or red (hard pressure). The associated pulse control will also be highlighted when palpated.
7. Temp (id: **button-Tperi**) – when clicked this button will activate the Tperi reading on the student monitor.

NOTE: Any of the above controls can be hidden by removing the definition from the scenario file.

NOTE: The left and right dorsal pulse points are currently under development.

There is one profile section in the XML.

```
<profile>
	<avatar>
		<filename>stock-dog.jpg</filename>
		<height_pct>100</height_pct>
		<width_pct>50</width_pct>
	</avatar>

	<summary>
		<description>
			Lorem ipsum dolor sit amet, consectetur adipiscing elit. Vestibulum
			aliquet lectus id ante aliquet pharetra. Proin quis neque nisi. Integer
			sed odio congue, bibendum purus id, imperdiet leo. Morbi tempus
			nibh ac malesuada egestas. Quisque facilisis, purus suscipit
			tincidunt bibendum, purus leo auctor mauris, ac ullamcorper diam
			odio eget nulla. Mauris dignissim, lacus dapibus lobortis dignissim,
			odio velit volutpat nulla, ut convallis nisi urna eu nulla. Sed interdum
			nisi in orci ullamcorper tincidunt. Aliquam erat volutpat. Sed id
			efficitur tortor, tincidunt condimentum urna.
		</description>
		<breed>German Shepard</breed>
```

```
            <gender>Male</gender>
            <weight>35 kg</weight>
            <species>Canine</species>
            <symptoms>
                  Not eating, no energy, excessive panting.
            </symptoms>
            <image>case_12345.jpg</image>
      </summary>


      <controls>
            <color>#000000</color>
            <control>
                  <title>Vocals</title>
                  <id>vocals-dog-control</id>
                  <top>45</top>
                  <left>405</left>
            </control>
            <control>
                  <title>Right Lung Sounds</title>
                  <id>right-lung-dog-control</id>
                  <top>160</top>
                  <left>135</left>
            </control>
            *
            *
            *
      </controls>

</profile>
```

6. Scenario Vocals

The scenario vocals section provides the ability to download different animal sounds which might be used during a scenario (ie cat hiss, dog growl). There can be none or unlimited number of vocal files. The vocal files should be in a recognized audio format such as wav or mp3.

There is one vocal section in the scenario XML.

```
<vocals>
        <file>
                <filename>bark.wav</filename >
                <title>Barking</title>
        </file>
        <file>
                <filename >growl.wav</filename >
                <title>Growling</title>
        </file>
        *
        *
        *
</vocals>
```

7. Scenario Media Files

The scenario media files are used to visualize different images on the student monitor under instructor control. Files can be any displayable format recognized by browsers including non image files such as a pdf or a Word document.

There is one media section in the scenario XML.

```
<media>
        <file>
                <filename >mri.jpg</filename >
                <title>MRI of healthy dog</title>
        </file>
        <file>
                <filename >x-ray.pdf</filename >
                <title>X-Ray of healthy dog</title>
        </file>
        <file>
                <filename >blood_work.jpg</filename >
                <title>Blood work of healthy dog</title>
        </file>
        *
        *
        *
</media>
```

8. Scenario Init

The init section is used to initialize parameters when the scenario is loaded. The init will have initial values for any selected signals, the initial scene to be executed once the scenario is started, and a preset for the video record setting.

There is one init section in the scenario XML.

```
<init>
        <cardiac>
                *
                *
                *
        </cardiac>
        <respiration>
                *
                *
                *
        </respiration>
        *
        *
        *
        <initial_scene>1</initial_scene>
        <record>1</record>
</init>
```

9. Scenario Events

Scenario events are the list of events that can be manually selected by the instructor during the training session. When an event is selected it is entered into the log and used as a potential trigger for the current scene. The event id is used to identify the selected event. All event ID's must be unique. The events are listed under the specified category when the instructor selects 'Events' from the top menu.

Specific events can be selected as 'Priority'. If the priority element is added with a value of one ('1'), the event will be listed in the top navigation area as a convenience link for the instructor.

An optional hotkey can be added for an event. The hotkey can only be a single character.

There is one events section in the XML file. The number of events is not limited.

```
<events>
	<category>
		<name>drugs</name>
		<title>Injected Drugs</title>
		<event>
			<title>Morphine</title>
			<id>opiate_morphine</id>
			<priority>1</priority>
			<hotkey>a</hotkey>
		</event>
		<event>
			<title>Vicodin</title>
			<id>hydrocodone</id>
		</event>
		*
		*
		*
	</category>
	<category>
		<name>abc</name>
		<title>ABC</title>
		<event>
			<title>Intubate</title>
			<id>intubate</id>
		</event>
		<event>
			<title>CPR</title>
			<id>cpr</id>
		</event>
		<event>
```

```
                <title>Shock</title>
                <id>aed</id>
            </event>
            *
            *
            *
        </category>
        *
        *
        *
</events>
```

10. Scenario Scenes

Scenario scenes are used to control responses of the mannequin to student actions. There can be multiple scenes associated with a scenario. Each scene is divided into a title, id, a set of initialization conditions, and a set of optional triggers, events and timeouts used to branch to other scenes.

The title and id are used to uniquely identify the scene on the instructor interface. All scene ID's must be unique. The scene ID's are also used to identify which scene to jump to for a timeout or trigger.

All initialization parameters match the syntax used for the API. To see an example of the API go to the following URL:

http:// http://vet.newforce.us/cgi-bin/simstatus.cgi?status=1

An example status return in JSON format is shown below:


```
"cardiac" : {
      "rhythm":"sinus",
      "vpc":"none",
      "pea":"0",
      "vpc_freq":"0",
      "vpc_delay":"0",
      "vfib_amplitude":"high",
      "rate":"80",
      "avg_rate":"80",
      "nibp_rate":"80",
      "nibp_read":"-1",
      "nibp_linked_hr":"1",
      "nibp_freq":"0",
      "pulseCount":"36",
      "pulseCountVpc":"0",
      "pwave":"none",
      "pr_interval":"140",
      "qrs_interval":"85",
      "bps_sys":"105",
      "bps_dia":"70",
      "right_dorsal_pulse_strength":"medium",
      "left_dorsal_pulse_strength":"medium",
      "right_femoral_pulse_strength":"medium",
      "left_femoral_pulse_strength":"medium",
      "heart_sound_volume":"10",
      "heart_sound_mute":"0",
      "heart_sound":"none",
      "ecg_indicator":"0",
      "bp_cuff":"0",
      "arrest":"0"
}
"respiration" : {
      "left_lung_sound":"normal",
      "left_lung_sound_volume":"10",
      "left_lung_sound_mute":"0",
```

```
      "right_lung_sound":"normal",
      "right_lung_sound_volume":"10",
      "right_lung_sound_mute":"0",
      "inhalation_duration":"1050",
      "exhalation_duration":"1050",
      "breathCount":"9",
      "spo2":"95",
      "etco2":"34",
      "rate":"20",
      "awRR":"20",
      "etco2_indicator":"0",
      "spo2_indicator":"0",
      "chest_movement":"0",
      "manual_count":"0"
},
"general" : {
      "temperature":"1017",
      "temperature_units":"F",
      "temperature_enable":"0"
},
"pulse" : {
      "right_dorsal":"0",
      "left_dorsal":"0",
      "right_femoral":"0",
      "left_femoral":"0",
      "duration":"0",
      "active":"0"
},
```

NOTE: Not all parameters are writeable. Please see section 11 for full details.

To specify a new heart rhythm, the following XML elements would be used:

```
<cardiac>
      <rhythm>afib</rhythm>
</cardiac>
```

For some settings, an additional tag called “rate_trend” can be added in to specify a trend over a period of seconds to the specified value(s). See section 11 for a list of parameters that are trend-able.

See section 11 for a complete description of the values that can be used for scenarios.

10.1 Scenario Schema

A scenario scene will follow the specified format shown below:

```
<scene>
        <title>Displayed title of scene</title>
        <id>ID of scene (must be unique)</id>
        <init>
                Parameters to be initialized per API specification
        </init>
        <timeout>
                <timeout_value>Timeout value in seconds</timeout_value>
                <scene_id>
                        ID of scene to jump to if scene timeouts (ie no trigger)
                </scene_id>
        </timeout>
        <triggers_needed></triggers_needed>

        <triggers>
                <trigger>
                        *
                        *
                        *
                </trigger>
                <trigger>
                        *
                        *
                        *
                </trigger>
                <trigger>
                        *
                        *
                        *
                </trigger>
        </triggers>
</scene>
```

The scenario title and ID are used to identify the scene. **NOTE:** The scenario ID must be unique.

10.2 Scenario Init

The scenario init is used to set parameters before the scenario is executed. The parameters are specified using the API as specified in Section 11

10.3 Scenario Timeout

A scenario timeout is used to force a jump to another scene if none of the triggers are detected as follows:

```
<timeout>
        <timeout_value>timeout in seconds</timeout_value>
        <scene_id>id of scene to jump to</scene_id>
</timeout>
```

10.4 Scenario Triggers

Each scene within a scenario can specify any number of triggers. Triggers are used to specify a condition to force a jump to a new scene. There are three types of triggers:

CPR trigger, event trigger, and a parameter meeting a test criteria. Triggers may also be grouped to force multiple triggers to occur before a branch is taken.

A scene can also trigger on palpation of the femoral pulse, palpation duration, connecting a probe, and manual breaths.

10.4.1 Trigger Test Conditions

CPR and Parameter Triggers can use an optional test condition. This test condition allows a comparison of a dynamic comparison of a value to a test condition to determine if a trigger has occurred. The conditions are as follows:

EQ = specified parameter
GT > specified parameter
LT < specified parameter
LTE <= specified parameter
GTE >= specified parameter
INSIDE >= specified parameter && <= specified parameter
OUTSIDE < specified parameter || > specified parameter

Examples are provided below showing usage.

10.4.2 CPR Trigger

The CPR trigger has the following format:

```
<trigger>
        <test>Test Condition</test>
        <scene_id>Scene ID to jump to</scene_id>
        <cpr>
                <duration>Duration in seconds</duration>
        </cpr>
</trigger>
```

Where Test Condition is described in section 10.4.1, the scene ID is the unique identifier of the scene to jump to and the duration is the amount of time in seconds that there is detected CPR activity.

10.4.3 Event Trigger

An event trigger will respond to an event being logged by the instructor. When the event is logged, the scenario will branch as specified in the trigger. The event trigger has the following format:

```
<trigger>
        <event_id>id of event as specified in scenario</event_id>
        <scene_id>new scene id</scene_id>
</trigger>
```

10.4.4 Parameter Trigger

The parameter trigger is used to branch when a monitored parameter reaches a threshold value. The format of the parameter trigger is as follows:

```
<trigger>
        <test>Test Condition</test>
        <scene_id>Scene ID to jump to</scene_id>
        <Signal Group>
                <Signal Name>Value </ Signal Name>
        </ Signal Group >
</trigger>
```

Where test condition is as described in section 10.4.1 scene ID is the scene to jump to if the trigger conditions are met, and the signal group and signal name are as described in section 11.

10.5 Trigger Grouping

Triggers may be grouped together to form a single trigger. The following format is used to implement a group trigger:

```
<!—Specify number of triggers within the group -->
<triggers_needed>3</triggers_needed>
<triggers>
        <!—Non grouped triggers -->
        <trigger>
        </trigger>
        <trigger>
        </trigger>

        <!—Grouped triggers -->
        <trigger>
                <group>1</group>
                <scene_id>4</scene_id>
                <!—Trigger on something #1 -->
        </trigger>
        <trigger>
                <group>1</group>
                <scene_id>4</scene_id>
                <!—Trigger on something #2 -->
        </trigger>
        <trigger>
                <group>1</group>
                <scene_id>4</scene_id>
                <!—Trigger on something #3 -->
        </trigger>
</triggers>
```

10.6 Trigger Examples

Create a trigger that will branch to scene ID 12345 if CPR is detected for at least 30 seconds.

```
<trigger>
        <test>GTE</test>
        <scene_id>12345 </scene_id>
        <cpr>
                <duration>30</duration>
        </cpr>
</trigger>
```

Create a trigger that will branch to scene ID “Asystole” if the event “Defib” is logged by the instructor.

```
<trigger>
        <event_id>Defib</event_id>
        <scene_id>Asystole </scene_id>
</trigger>
```

Create a trigger that will branch to scene id “waiting-for-injection” if the heart rate goes under 10 bpm.

```
<trigger>
        <test>LT</test>
        <scene_id>waiting-for-injection</scene_id>
        <cardiac>
                <rate>10</rate>
        </cardiac>
</trigger>
```

Create a trigger using INSIDE range for awrr between 10 and 20 bpm.

```
<trigger>
        <test>INSIDE</test>
        <scene_id>waiting-for-injection</scene_id>
        <respiration>
                <awrr>10-20</awrr>
        </respiration>
</trigger>
```

Create a trigger where CPR needs to be performed for at least 60 seconds with 4 manual breaths:

```
<triggers_needed>2</triggers_needed>
<triggers>
```

```
        <trigger>
                <group>1</group>
                <test>GTE</test>
                <scene_id>12345 </scene_id>
                <cpr>
                        <duration>60</duration>
                </cpr>
        </trigger>
        <trigger>
                <group>1</group>
                <test>GTE</test>
                <scene_id>12345 </scene_id>
                <respiration>
                        <manual_count>4< /manual_count >
                </respiration>
        </trigger>
</triggers>
```

11. API Values

The following main categories are used for the API signal groups:

- Scenario – used to specify what scenario is being run, the state of the scenario, runtime, sceneID, and if the scenario is being recorded.
- Logfile – specifies the current logfile and record pointer.
- Cardiac – specifies all parameters associated with cardiac simulation.
- Respiration – specifies all parameters associated with respiration.
- General – specifies temperature.
- Vocals – specifies if a vocalization file is being played.
- Media – specifies if a media file is being displayed.
- CPR – specifies if CPR has been initiated with measured depth of compression and depth of release.

To specify a value in the xml, use the signal group, then the signal name. For example to specify etco2 create the following tags:

```
<respiration>
        <etco2>50<etco2>
</respiration>
```

Some parameters can have a trend by adding in “transfer_time” as follows:

```
<respiration>
        <etco2>50<etco2>
        <transfer_time>100</transfer_time>
</respiration>
```

Parameters that are trend-able are marked with a (T)

Details of parameters are specified in the following sections:

11.1 Scenario

scenario:active	Name of scenario selected. It is assumed that name is the base name of the scenario file. For example ‘test’ would mean that file test.xml is being selected.
scenario:start	Timestamp of when scenario began.
scenario:runtime	Runtime in format hh:mm:ss
scenario:scene_name	Name of current scene
scenario:scene_id	ID of current scene
scenario:state	State of current scenario: {Stopped | Paused | Terminate | Running }

11.2 Logfile

logfile:active	Specify if current logfile is active. {0 = inactive | 1 = active}
logfile:filename	Name of current logfile
logfile:lines_written	Pointer to current record

11.3 Cardiac

cardiac:rhythm	Specify selected rhythm of heart ecg. {sinus | afib | vfib | vtach1 | vtach2 | vtach3 | asystole } NOTE: vtach3 will initiate an R on T EKG waveform.
cardiac:vpc	Specify if vpc is selected. {none | 1-1 | 1-2 | 1-3 | 2-1 | 2-2 | 2-3 | 3-1 | 3-2 | 3-3}. First digit represents vpc type. 1 = vtach1, 2 = vtach2, 3 – ront. Second digit represents number of vpc pulses. 1 = singlet, 2 = couplet, 3 = triplet.
cardiac:pea	Specify pulseless electrical activity. {1 = on | 0 = off}
cardiac:vpc_freq	Specify how often vpc will be inserted after sinus complex. 0 – 100 in increments of 10 as a percentage of normal sinus pulses.
cardiac:vfib_amplitude	Specify amplitude of ventricular fibrillation signal. {low | medium | high}}
cardiac:rate (T)	Specify heart rate. Range from 0 – 300.
cardiac:nibp_rate	Specify heart rate displayed when blood pressure is taken.
cardiac:bps_sys (T)	Specify systolic blood pressure. 0 to 300.
cardiac:bps_dia (T)	Specify diastolic blood pressure. 0 to 290.
cardiac:left_dorsal_pulse_strength	Specify left dorsal pulse strength simulated in mannequin. {none weak | medium | strong}
cardiac:right_dorsal_pulse_strength	Specify right dorsal pulse strength simulated in mannequin. {none weak | medium | strong}
cardiac:left_femoral_pulse_strength	Specify left femoral pulse strength simulated in mannequin. {none weak | medium | strong}
cardiac:right_femoral_pulse_strength	Specifyright femoral pulse strength simulated in mannequin. {none weak | medium | strong}
cardiac:heart_sound_volume	Specify volume of heart sound generated in mannequin. 0 – 10.
cardiac:heart_sound	Specify heart sound to be played. {normal | systolic_murmur | pansystolic_ murmur | holosystolic_ murmur | continuous_ murmur | diastolic_ murmur | gallop }
cardiac:ecg_indicator	Specify if ECG Indicator is illuminated indicating that ecg probes have been attached. {0 = not

	illuminated | 1 = illuminated}
cardiac:bp_cuff	Specify if blood pressure cuff is attached. Indicator is illuminated indicating that blood pressure cuff has been attached. {0 = not illuminated | 1 = illuminated}
cardiac:arrest	Specify if arrest indicator is illuminated on Instructor Interface. {0 = not illuminated | 1 = illuminated}

11.4 Respiration

respiration:left_lung_sound	Specify selected sound for left lung {normal | coarse_crackles | fine_crackles | wheezes | stridor | stertor | same_as_right }
respiration:left_lung_sound_volume	Specify volume for left lung sound. 0 - 10
respiration:right_lung_sound	Specify selected sound for right lung {normal | coarse_crackles | fine_crackles | wheezes | stridor | stertor }
respiration:right_lung_sound_volume	Specify volume for right lung sound. 0 - 10
respiration:inhalation_duration	Specify time in msec of inhalation duration
respiration:exhalation_duration	Specify time in msec of expiration duration.
respiration:spo2 (T)	Specify SpO2 value. 0 – 100.
respiration:etco2 (T)	Specify etCO2 value: 0 - 150
respiration:rate (T)	Specify respiration rate (awRR) value 0 - 60
respiration:etco2_indicator	Specify if etCO2 monitor has been inserted. etCO2 image will be lit green. {0 = not connected | 1 = connected}
respiration:spo2_indicator	Specify if SpO2 monitor has been connected. SpO2 image will be lit green. {0 = not connected | 1 = connected}
respiration:chest_movement	Specify if chest movements will be shown in the mannequin. {0 = off | 1 = on}
respiration:manual_count	Count of how many manual breaths have been detected within a scene. Count is reset at the beginning of each scene.

11.5 General

General:temperature (T)	Specify current temperature. 0 – 110. Temperature is always expressed with the last digit representing .1 degrees. For example 975 = 97.5 deg F. 800 = 80.0 deg F
General:temperature_enable	Specify if temperature probe has been connected. Temperature icon will be illuminated. {0 = off | 1 = on}

11.6 Vocals

vocals:filename	Specify filename of vocalization to be played. Filename includes base and extension of filename. It is assumed file is located in vocals directory.
vocals:repeat	Specify if vocalization should be repeated. {0 = no repeat | 1 = repeat}
vocals:volume	Specify volume that vocalization should be played. 0 – 10.
vocals:play	Initiate playing of vocalization file. { 0 = do not play | 1 = play}
vocals:mute	Specify if vocalization should be muted at instructor interface. {0 = not muted | 1 = muted}}

11.7 Media

media:filename	Specify filename of media to be displayed. Filename includes base and extension of filename. It is assumed file is located in media directory.
media:play	Specify if media file should be displayed. {0 = not displayed | 1 = displayed}

11.8 CPR

cpr:last	Timestamp of last detected compression start
cpr:compression	% of chest displacement to ideal compressed position. 100% is ideal compressed position.
cpr:release	% of chest displacement to ideal released position. 0% is ideal released position.

11.9 Pulse

pulse:right_femoral	Specify if a right femoral pulse is being palpated on a scale from 0 – 4, where 0 is no touch, and 4 is heaviest touch.
pulse:left_femoral	Specify if a left femoral pulse is being palpated on a scale from 0 – 4, where 0 is no touch, and 4 is heaviest touch.
pulse:duration	Duration of latest pulse palpation in msec.
pulse:active	Indicator if any pulse is being palpated, 0 = no, 1 = yes.