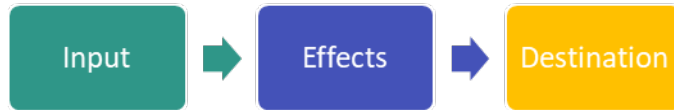


## General Pattern:



## X3D Audio Nodes Structure:

```

+- X3DAppearanceNode -- Appearance
/
+- X3DAppearanceChildNode -- FillProperties
  +- LineProperties
  +- AcousticProperties (absorption, specular, diffuse, refraction)
  /
  +- X3DMaterialNode -- Material
  +- TwoSidedMaterial
+- X3DChildNode -
  +- X3DBindableNode -- Fog (X3DFogObject)*
    +- GeoViewpoint
    +- NavigationInfo
    +- ListenerPoint (~Web Audio API: Audiolistener)
    +- X3DBackgroundNode -- Background
      +- TextureBackground
    +- X3DViewpointNode -- OrthoViewpoint
      +- Viewpoint
  +- ViewpointGroup
/
+- X3DSoundNode -- Sound
  +- SpatialSound (~Web Audio API: PannerNode)
+- X3DTimeDependentNode -- TimeSensor
  +- X3DSoundSourceNode -- AudioClip (~Web Audio API: MediaElementAudioSourceNode)
    +- MovieTexture
    +- AudioBufferSource (~Web Audio API: AudioBuffer + AudioBufferSourceNode)
    +- OscillatorSource (~Web Audio API: OscillatorNode)
    +- StreamAudioSource (~Web Audio API: MediaStreamAudioSourceNode)
    +- MicrophoneSource
  +- X3DSoundDestinationNode -- AudioDestination (~Web Audio API: AudioDestinationNode)
    +- StreamAudioDestination (~Web Audio API: MediaStreamAudioDestinationNode)
  +- X3DSoundProcessingNode -- BiquadFilter
    +- Convolver
    +- Delay
    +- DynamicsCompressor
    +- Gain
    +- WaveShaper
    +- PeriodicWave
  +- X3DSoundAnalysisNode -- Analyser
  +- X3DSoundChannelNode -- ChannelSplitter
    +- ChannelMerger
  
```

**Proposal add:**

MFNode [in, out] **audioGraph** [] [X3DChildNode]

In input nodes:

- AudioClip
- AudioBufferSource
- OscillatorSource
- StreamAudioSource
- MicrophoneSource

## X3D Audio Nodes matching with the corresponding Web Audio API nodes

	Web Audio API	X3D
Input	AudioBuffer	AudioBufferSource
	AudioBufferSourceNode	
	OscillatorNode	OscillatorSource
	MediaStreamAudioSourceNode	StreamAudioSource
	-	MicrophoneSource
Effects	-	AcousticProperties
	PannerNode	SpatialSound
	BiquadFilterNode	BiquadFilter
	ConvolverNode	Convolver
	DelayNode	Delay
	DynamicsCompressorNode	DynamicsCompressor
	GainNode	gain field
	WaveShaperNode	WaveShaper
	PeriodicWave	PeriodicWave
	AnalyserNode	Analyser
	ChannelSplitterNode	ChannelSplitter
	ChannelMergerNode	ChannelMerger
Destination	Audiolisterner	ListenerPoint
	AudioDestinationNode	AudioDestination
	MediaStreamAudioDestinationNode	StreamAudioDestination

Adaptation of the following Web Audio API examples/graphs in X3D:  
 Example 1:

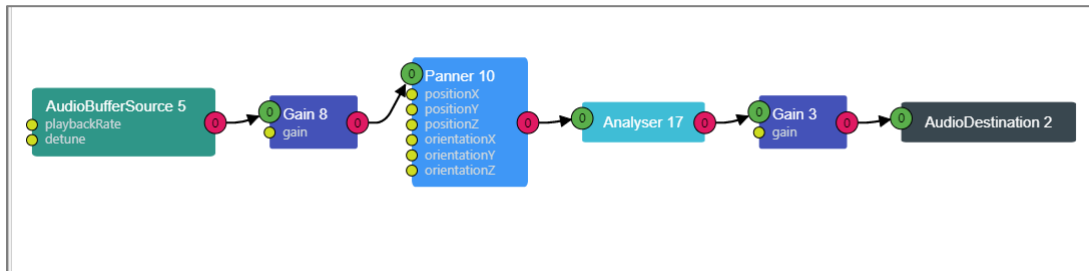


Figure 1: Web Audio API Graph - Example 1

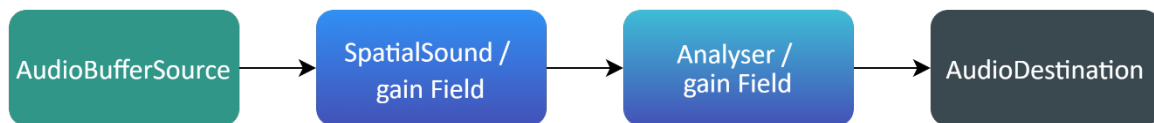


Figure 2: X3D Graph - Example 1

## Code

```
MFNode audioGraph=[<SpatialSound gain= '0.6' panningModel='HRTF' refDistance='1' rolloffFactor='1'>,
  <Analyser gain= '0.4' fftSize = '2048' />,
  <AudioDestrination channelInterpretation= 'speakers' />]
```

## Example 2

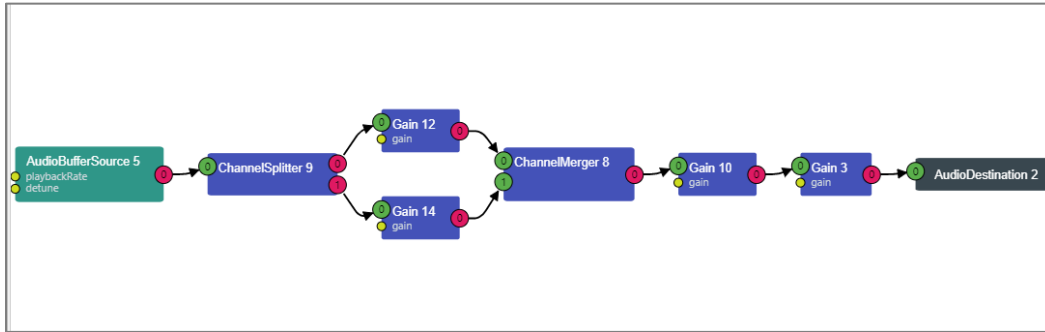


Figure 3: Web Audio API Graph - Example 2

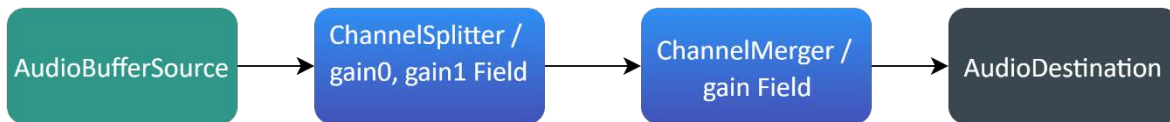


Figure 4: X3D Graph - Example 2

## Code

```
MFNode audioGraph=[<ChannelSplitter channelCountMode = 'explicit' gain='1.0'/>,  
  <ChannelMerger gain='0.7'/>  
  <AudioDestrination channelInterpretation= 'speakers'/>  
  ... ..  
] ???
```

## Example 3

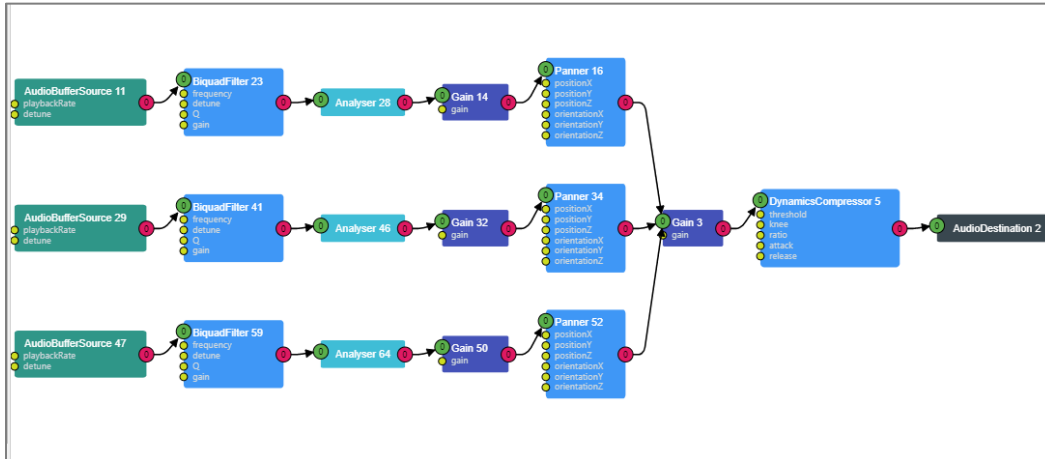


Figure 5: Web Audio API Graph - Example 3

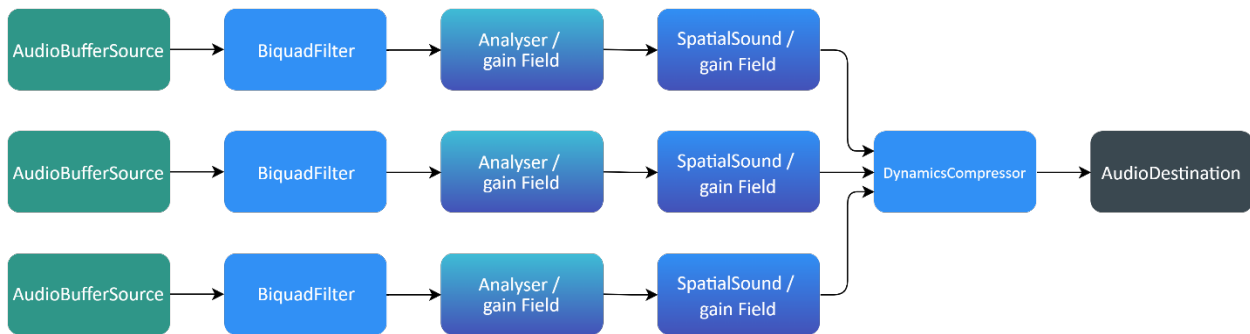


Figure 6: X3D Graph - Example 3

## Code

```
MFNode audioGraph=[<BiquadFilter frequency='600' detune='15.0' Q='15.0' gain='1.0' type='allpass'>,
    <Analyser gain = '0.8' fftSize = '2048'>,
    <SpatialSound gain = '0.7' panningModel='HRTF' refDistance='1' rolloffFactor='1'>/>
    ... ..
] ???
```

## Example 4

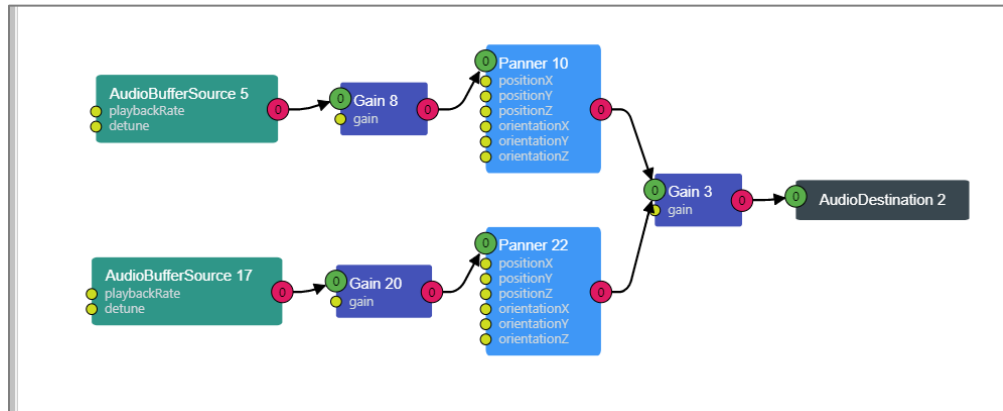


Figure 7: Web Audio API Graph - Example 4

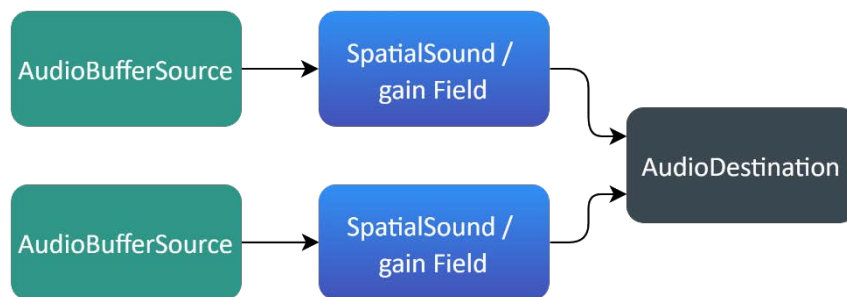


Figure 8: X3D Graph - Example 4

## Code

```
MFNode audioGraph=[<SpatialSound gain = '0.8' panningModel='HRTF' refDistance='1' rolloffFactor='1'/>  
...  
] ???
```

## Example 5

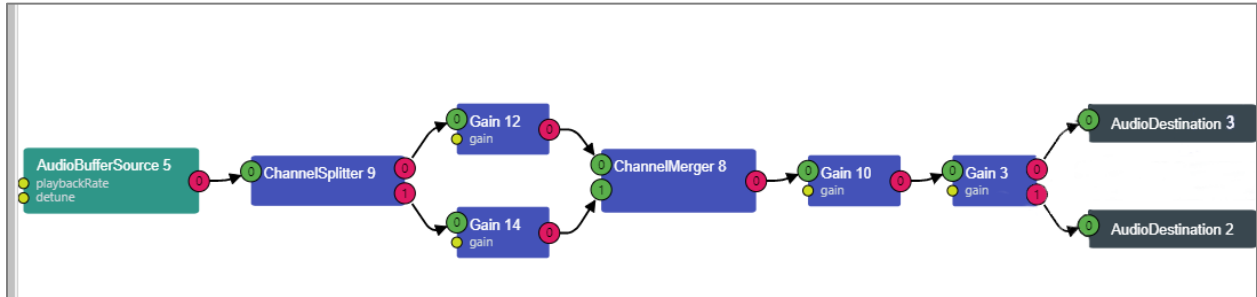


Figure 9: Web Audio API Graph - Example 5

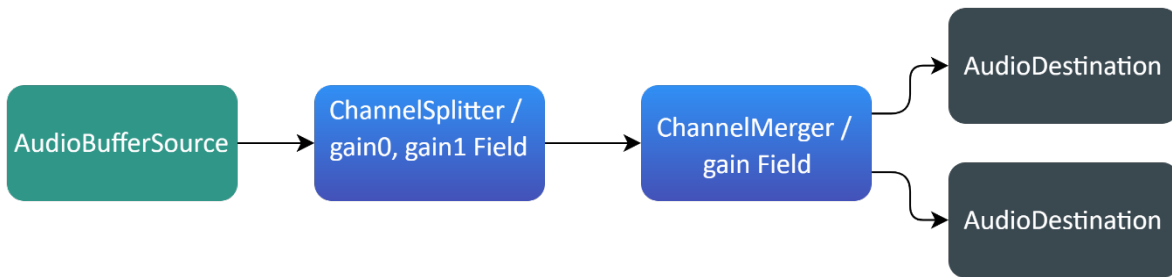


Figure 10: X3D Graph - Example 5

## Code

??? (two destination nodes)