reference

abstraction and grouping

abstraction
Inline Switch*

grouping
Billboard, Collision Group, Transform*

scene
Background LOD NavigationInfo Viewpoint* WorldInfo

geometry and appearance

geometry
Box* Cone Coordinate Cylinder ElevationGrid Extrusion IndexedFaceSet IndexedLineSet Normal PointSet Shape* Sphere*

appearance
Appearance* Color* Imagetexture* Material* MovieTexture PictureTexture TextureCoordinate TextureTransform

text
FontStyle Text*

interaction and behavior

sensors
Anchor CylinderSensor PlaneSensor ProximitySensor SphereSensor TimeSensor* TouchSensor* VisibilitySensor

behavior
Script*

interpolators
ColorInterpolator* CoordinateInterpolator NormalInterpolator OrientationInterpolator* PositionInterpolator* ScalarInterpolator

special effects

sound
AudioClip Sound

light
DirectionalLight Fog PointLight Spotlight

extensions

blaxxun Camera DeviceSensor Event KeySensor Layer2D Layer3D MouseSensor MultiTexture Particles TextureCoordGen

Anchor

```
Anchor {
  eventIn      MFNode   addChildren
  eventIn      MFNode   removeChildren
  exposedField MFNode   children      []
```

```
  exposedField SFString description     ""
  exposedField MFString parameter       []
  exposedField MFString url             []
  field        SFVec3f  bboxCenter      0 0 0     # (-,)
  field        SFVec3f  bboxSize        -1 -1 -1  # (0,) or -1,-1,-1
}
```

Appearance

```
Appearance {
  exposedField SFNode material          NULL
  exposedField SFNode texture           NULL
  exposedField SFNode textureTransform  NULL
}
```

AudioClip

```
AudioClip {
  exposedField   SFString description     ""
  exposedField   SFBool   loop            FALSE
  exposedField   SFFloat  pitch           1.0       # (0,)
  exposedField   SFTime   startTime       0         # (-,)
  exposedField   SFTime   stopTime        0         # (-,)
  exposedField   MFString url             []
  eventOut       SFTime   duration_changed
  eventOut       SFBool   isActive
}
```

Background

```
Background {
  eventIn      SFBool   set_bind
  exposedField MFFloat  groundAngle  []           # [0,/2]
  exposedfield MFColor  groundColor  []           # [0,1]
  exposedField MFString backUrl      []
  exposedField MFString bottomUrl    []
  exposedField MFString frontUrl     []
  exposedField MFString leftUrl      []
  exposedField MFString rightUrl     []
  exposedField MFString topUrl       []
  exposedField MFFloat  skyAngle     []           # [0,]
  exposedField MFColor  skyColor     [ 0 0 0 ]    # [0,1]
  eventOut     SFBool   isBound
}
```

Billboard

```
Billboard {
```

```
  eventIn      MFNode   addChildren
  eventIn      MFNode   removeChildren
  exposedField SFVec3f  axisOfRotation  0 1 0      # (-,)
  exposedField MFNode   children        []
  field        SFVec3f  bboxCenter      0 0 0      # (-,)
  field        SFVec3f  bboxSize        -1 -1 -1   # (0,) or -1,-1,-1
}
```

Box

```
Box {
  field    SFVec3f size  2 2 2        # (0, )
}
```

Collision

```
Collision {
  eventIn      MFNode   addChildren
  eventIn      MFNode   removeChildren
  exposedField MFNode   children        []
  exposedField SFBool   collide         TRUE
  field        SFVec3f  bboxCenter      0 0 0      # (-,)
  field        SFVec3f  bboxSize        -1 -1 -1   # (0,) or -1,-1,-1
  field        SFNode   proxy           NULL
  eventOut     SFTime   collideTime
}
```

Color

```
Color {
  exposedField MFColor color  []         # [0,1]
}
```

ColorInterpolator

```
ColorInterpolator {
  eventIn      SFFloat set_fraction      # (-,)
  exposedField MFFloat key           []  # (-,)
  exposedField MFColor keyValue      []  # [0,1]
  eventOut     SFColor value_changed
}
```

Cone

```
Cone {
  field    SFFloat   bottomRadius 1       # (0,)
  field    SFFloat   height       2       # (0,)
```

```
  field     SFBool    side          TRUE
  field     SFBool    bottom        TRUE
 }
```

Coordinate

```
Coordinate {
  exposedField MFVec3f point  []      # (-,)
 }
```

CoordinateInterpolator

```
CoordinateInterpolator {
  eventIn      SFFloat set_fraction        # (-,)
  exposedField MFFloat key           []    # (-,)
  exposedField MFVec3f keyValue      []    # (-,)
  eventOut     MFVec3f value_changed
 }
```

Cylinder

```
Cylinder {
  field    SFBool    bottom  TRUE
  field    SFFloat   height  2         # (0,)
  field    SFFloat   radius  1         # (0,)
  field    SFBool    side    TRUE
  field    SFBool    top     TRUE
 }
```

CylinderSensor

```
CylinderSensor {
  exposedField SFBool     autoOffset TRUE
  exposedField SFFloat    diskAngle  0.262      # (0,/2)
  exposedField SFBool     enabled    TRUE
  exposedField SFFloat    maxAngle   -1         # [-2,2]
  exposedField SFFloat    minAngle   0          # [-2,2]
  exposedField SFFloat    offset     0          # (-,)
  eventOut     SFBool     isActive
  eventOut     SFRotation rotation_changed
  eventOut     SFVec3f    trackPoint_changed
 }
```

DirectionalLight

```
DirectionalLight {
  exposedField SFFloat ambientIntensity  0       # [0,1]
```

```
  exposedField SFColor color            1 1 1    # [0,1]
  exposedField SFVec3f direction        0 0 -1   # (-,)
  exposedField SFFloat intensity        1        # [0,1]
  exposedField SFBool  on               TRUE
}
```

ElevationGrid

```
ElevationGrid {
  eventIn      MFFloat  set_height
  exposedField SFNode   color            NULL
  exposedField SFNode   normal           NULL
  exposedField SFNode   texCoord         NULL
  field        MFFloat  height           []      # (-,)
  field        SFBool   ccw              TRUE
  field        SFBool   colorPerVertex   TRUE
  field        SFFloat  creaseAngle      0       # [0,]
  field        SFBool   normalPerVertex  TRUE
  field        SFBool   solid            TRUE
  field        SFInt32  xDimension       0       # [0,)
  field        SFFloat  xSpacing         1.0     # (0,)
  field        SFInt32  zDimension       0       # [0,)
  field        SFFloat  zSpacing         1.0     # (0,)
}
```

Extrusion

```
Extrusion {
  eventIn MFVec2f    set_crossSection
  eventIn MFRotation set_orientation
  eventIn MFVec2f    set_scale
  eventIn MFVec3f    set_spine
  field   SFBool     beginCap         TRUE
  field   SFBool     ccw              TRUE
  field   SFBool     convex           TRUE
  field   SFFloat    creaseAngle      0                # [0,)
  field   MFVec2f    crossSection     [ 1 1, 1 -1, -1 -1,
                                       -1 1, 1  1 ]    # (-,)
  field   SFBool     endCap           TRUE
  field   MFRotation orientation      0 0 1 0          # [-1,1],(-,)
  field   MFVec2f    scale            1 1              # (0,)
  field   SFBool     solid            TRUE
  field   MFVec3f    spine            [ 0 0 0, 0 1 0 ] # (-,)
}
```

Fog

```
Fog {
  exposedField SFColor  color          1 1 1      # [0,1]
```

```
  exposedField SFString fogType          "LINEAR"
  exposedField SFFloat  visibilityRange  0          # [0,)
  eventIn      SFBool   set_bind
  eventOut     SFBool   isBound
}
```

FontStyle

```
FontStyle {
  field MFString family       ["SERIF"]
  field SFBool   horizontal   TRUE
  field MFString justify      "BEGIN"
  field SFString language     ""
  field SFBool   leftToRight  TRUE
  field SFFloat  size         1.0          # (0,)
  field SFFloat  spacing      1.0          # [0,)
  field SFString style        "PLAIN"
  field SFBool   topToBottom  TRUE
}
```

Group

```
Group {
  eventIn      MFNode  addChildren
  eventIn      MFNode  removeChildren
  exposedField MFNode  children       []
  field        SFVec3f bboxCenter     0 0 0     # (-,)
  field        SFVec3f bboxSize       -1 -1 -1  # (0,) or -1,-1,-1
}
```

ImageTexture

```
ImageTexture {
  exposedField MFString url     []
  field        SFBool   repeatS TRUE
  field        SFBool   repeatT TRUE
}
```

IndexedFaceSet

```
IndexedFaceSet {
  eventIn       MFInt32 set_colorIndex
  eventIn       MFInt32 set_coordIndex
  eventIn       MFInt32 set_normalIndex
  eventIn       MFInt32 set_texCoordIndex
  exposedField  SFNode  color             NULL
  exposedField  SFNode  coord             NULL
  exposedField  SFNode  normal            NULL
```

```
  exposedField  SFNode  texCoord          NULL
  field         SFBool  ccw               TRUE
  field         MFInt32 colorIndex        []        # [-1,)
  field         SFBool  colorPerVertex    TRUE
  field         SFBool  convex            TRUE
  field         MFInt32 coordIndex        []        # [-1,)
  field         SFFloat creaseAngle       0         # [0,)
  field         MFInt32 normalIndex       []        # [-1,)
  field         SFBool  normalPerVertex   TRUE
  field         SFBool  solid             TRUE
  field         MFInt32 texCoordIndex     []        # [-1,)
}
```

IndexedLineSet

```
IndexedLineSet {
  eventIn       MFInt32 set_colorIndex
  eventIn       MFInt32 set_coordIndex
  exposedField  SFNode  color             NULL
  exposedField  SFNode  coord             NULL
  field         MFInt32 colorIndex        []     # [-1,)
  field         SFBool  colorPerVertex    TRUE
  field         MFInt32 coordIndex        []     # [-1,)
}
```

Inline

```
Inline {
  exposedField MFString url        []
  field        SFVec3f  bboxCenter 0 0 0     # (-,)
  field        SFVec3f  bboxSize   -1 -1 -1  # (0,) or -1,-1,-1
}
```

LOD

```
LOD {
  exposedField MFNode  level    []
  field        SFVec3f center    0 0 0    # (-,)
  field        MFFloat range     []       # (0,)
}
```

Material

```
Material {
  exposedField SFFloat ambientIntensity  0.2          # [0,1]
  exposedField SFColor diffuseColor      0.8 0.8 0.8 # [0,1]
  exposedField SFColor emissiveColor     0 0 0       # [0,1]
  exposedField SFFloat shininess         0.2         # [0,1]
```

```
  exposedField SFColor specularColor     0 0 0       # [0,1]
  exposedField SFFloat transparency      0           # [0,1]
}
```

MovieTexture

```
MovieTexture {
  exposedField SFBool   loop            FALSE
  exposedField SFFloat  speed           1.0      # (-,)
  exposedField SFTime   startTime       0        # (-,)
  exposedField SFTime   stopTime        0        # (-,)
  exposedField MFString url             []
  field        SFBool   repeatS         TRUE
  field        SFBool   repeatT         TRUE
  eventOut     SFTime   duration_changed
  eventOut     SFBool   isActive
}
```

NavigationInfo

```
NavigationInfo {
  eventIn      SFBool   set_bind
  exposedField MFFloat  avatarSize      [0.25, 1.6, 0.75] # [0,)
  exposedField SFBool   headlight       TRUE
  exposedField SFFloat  speed           1.0               # [0,)
  exposedField MFString type            ["WALK", "ANY"]
  exposedField SFFloat  visibilityLimit 0.0               # [0,)
  eventOut     SFBool   isBound
}
```

Normal

```
Normal {
  exposedField MFVec3f vector  []   # (-,)
}
```

NormalInterpolator

```
NormalInterpolator {
  eventIn      SFFloat set_fraction      # (-,)
  exposedField MFFloat key           []  # (-,)
  exposedField MFVec3f keyValue      []  # (-,)
  eventOut     MFVec3f value_changed
}
```

OrientationInterpolator

```
OrientationInterpolator {
  eventIn      SFFloat    set_fraction      # (-,)
  exposedField MFFloat    key           []  # (-,)
  exposedField MFRotation keyValue      []  # [-1,1],(-,)
  eventOut     SFRotation value_changed
}
```

PixelTexture

```
PixelTexture {
  exposedField SFImage  image     0 0 0    # see "4.5 SFImage"
  field        SFBool   repeatS   TRUE
  field        SFBool   repeatT   TRUE
}
```

PlaneSensor

```
PlaneSensor {
  exposedField SFBool  autoOffset          TRUE
  exposedField SFBool  enabled             TRUE
  exposedField SFVec2f maxPosition         -1 -1     # (-,)
  exposedField SFVec2f minPosition         0 0       # (-,)
  exposedField SFVec3f offset              0 0 0     # (-,)
  eventOut     SFBool  isActive
  eventOut     SFVec3f trackPoint_changed
  eventOut     SFVec3f translation_changed
}
```

PointLight

```
PointLight {
  exposedField SFFloat ambientIntensity  0       # [0,1]
  exposedField SFVec3f attenuation       1 0 0   # [0,)
  exposedField SFColor color             1 1 1   # [0,1]
  exposedField SFFloat intensity         1       # [0,1]
  exposedField SFVec3f location          0 0 0   # (-,)
  exposedField SFBool  on                TRUE
  exposedField SFFloat radius            100     # [0,)
}
```

PointSet

```
PointSet {
  exposedField  SFNode  color      NULL
  exposedField  SFNode  coord      NULL
}
```

PositionInterpolator

```
PositionInterpolator {
  eventIn      SFFloat set_fraction        # (-,)
  exposedField MFFloat key           []    # (-,)
  exposedField MFVec3f keyValue      []    # (-,)
  eventOut     SFVec3f value_changed
}
```

ProximitySensor

```
ProximitySensor {
  exposedField SFVec3f    center      0 0 0    # (-,)
  exposedField SFVec3f    size        0 0 0    # [0,)
  exposedField SFBool     enabled     TRUE
  eventOut     SFBool     isActive
  eventOut     SFVec3f    position_changed
  eventOut     SFRotation orientation_changed
  eventOut     SFTime     enterTime
  eventOut     SFTime     exitTime
}
```

ScalarInterpolator

```
ScalarInterpolator {
  eventIn      SFFloat set_fraction        # (-,)
  exposedField MFFloat key           []    # (-,)
  exposedField MFFloat keyValue      []    # (-,)
  eventOut     SFFloat value_changed
}
```

Script

```
Script {
  exposedField MFString url           []
  field        SFBool   directOutput  FALSE
  field        SFBool   mustEvaluate  FALSE
  # And any number of:
  eventIn      eventType eventName
  field        fieldType fieldName initialValue
  eventOut     eventType eventName
}
```

Shape

```
Shape {
  exposedField SFNode appearance NULL
  exposedField SFNode geometry   NULL
}
```

Sound

```
Sound {
   exposedField SFVec3f  direction     0 0 1   # (-,)
   exposedField SFFloat  intensity     1       # [0,1]
   exposedField SFVec3f  location      0 0 0   # (-,)
   exposedField SFFloat  maxBack       10      # [0,)
   exposedField SFFloat  maxFront      10      # [0,)
   exposedField SFFloat  minBack       1       # [0,)
   exposedField SFFloat  minFront      1       # [0,)
   exposedField SFFloat  priority      0       # [0,1]
   exposedField SFNode   source        NULL
   field        SFBool   spatialize    TRUE
 }
```

Sphere

```
Sphere {
   field SFFloat radius  1    # (0,)
 }
```

SphereSensor

```
SphereSensor {
   exposedField SFBool     autoOffset        TRUE
   exposedField SFBool     enabled           TRUE
   exposedField SFRotation offset            0 1 0 0  # [-1,1],(-,)
   eventOut     SFBool     isActive
   eventOut     SFRotation rotation_changed
   eventOut     SFVec3f    trackPoint_changed
 }
```

SpotLight

```
SpotLight {
   exposedField SFFloat ambientIntensity  0         # [0,1]
   exposedField SFVec3f attenuation       1 0 0     # [0,)
   exposedField SFFloat beamWidth         1.570796  # (0,/2]
   exposedField SFColor color             1 1 1     # [0,1]
   exposedField SFFloat cutOffAngle       0.785398  # (0,/2]
   exposedField SFVec3f direction         0 0 -1    # (-,)
   exposedField SFFloat intensity         1         # [0,1]
   exposedField SFVec3f location          0 0 0     # (-,)
   exposedField SFBool  on                TRUE
   exposedField SFFloat radius            100       # [0,)
 }
```

Switch

```
Switch {
   exposedField    MFNode  choice      []
   exposedField    SFInt32 whichChoice -1    # [-1,)
 }
```

Text

```
Text {
   exposedField  MFString string    []
   exposedField  SFNode   fontStyle NULL
   exposedField  MFFloat  length    []      # [0,)
   exposedField  SFFloat  maxExtent 0.0     # [0,)
 }
```

TextureCoordinate

```
TextureCoordinate {
   exposedField MFVec2f point  []      # (-,)
 }
```

TimeSensor

```
TimeSensor {
   exposedField SFTime   cycleInterval 1       # (0,)
   exposedField SFBool   enabled       TRUE
   exposedField SFBool   loop          FALSE
   exposedField SFTime   startTime     0       # (-,)
   exposedField SFTime   stopTime      0       # (-,)
   eventOut     SFTime   cycleTime
   eventOut     SFFloat  fraction_changed
   eventOut     SFBool   isActive
   eventOut     SFTime   time
 }
```

TouchSensor

```
TouchSensor {
   exposedField SFBool  enabled TRUE
   eventOut     SFVec3f hitNormal_changed
   eventOut     SFVec3f hitPoint_changed
   eventOut     SFVec2f hitTexCoord_changed
   eventOut     SFBool  isActive
   eventOut     SFBool  isOver
   eventOut     SFTime  touchTime
 }
```

Transform

```
Transform {
  eventIn      MFNode      addChildren
  eventIn      MFNode      removeChildren
  exposedField SFVec3f     center           0 0 0    # (-,)
  exposedField MFNode      children         []
  exposedField SFRotation  rotation         0 0 1 0  # [-1,1],(-,)
  exposedField SFVec3f     scale            1 1 1    # (0,)
  exposedField SFRotation  scaleOrientation 0 0 1 0  # [-1,1],(-,)
  exposedField SFVec3f     translation      0 0 0    # (-,)
  field        SFVec3f     bboxCenter       0 0 0    # (-,)
  field        SFVec3f     bboxSize         -1 -1 -1 # (0,) or -1,-1,-1
 }
```

Viewpoint

```
Viewpoint {
  eventIn      SFBool     set_bind
  exposedField SFFloat    fieldOfView    0.785398  # (0,)
  exposedField SFBool     jump           TRUE
  exposedField SFRotation orientation    0 0 1 0   # [-1,1],(-,)
  exposedField SFVec3f    position       0 0 10    # (-,)
  field        SFString   description    ""
  eventOut     SFTime     bindTime
  eventOut     SFBool     isBound
 }
```

VisibilitySensor

```
VisibilitySensor {
  exposedField SFVec3f center   0 0 0      # (-,)
  exposedField SFBool  enabled  TRUE
  exposedField SFVec3f size     0 0 0      # [0,)
  eventOut     SFTime  enterTime
  eventOut     SFTime  exitTime
  eventOut     SFBool  isActive
 }
```

WorldInfo

```
WorldInfo {
  field MFString info  []
  field SFString title ""
 }
```