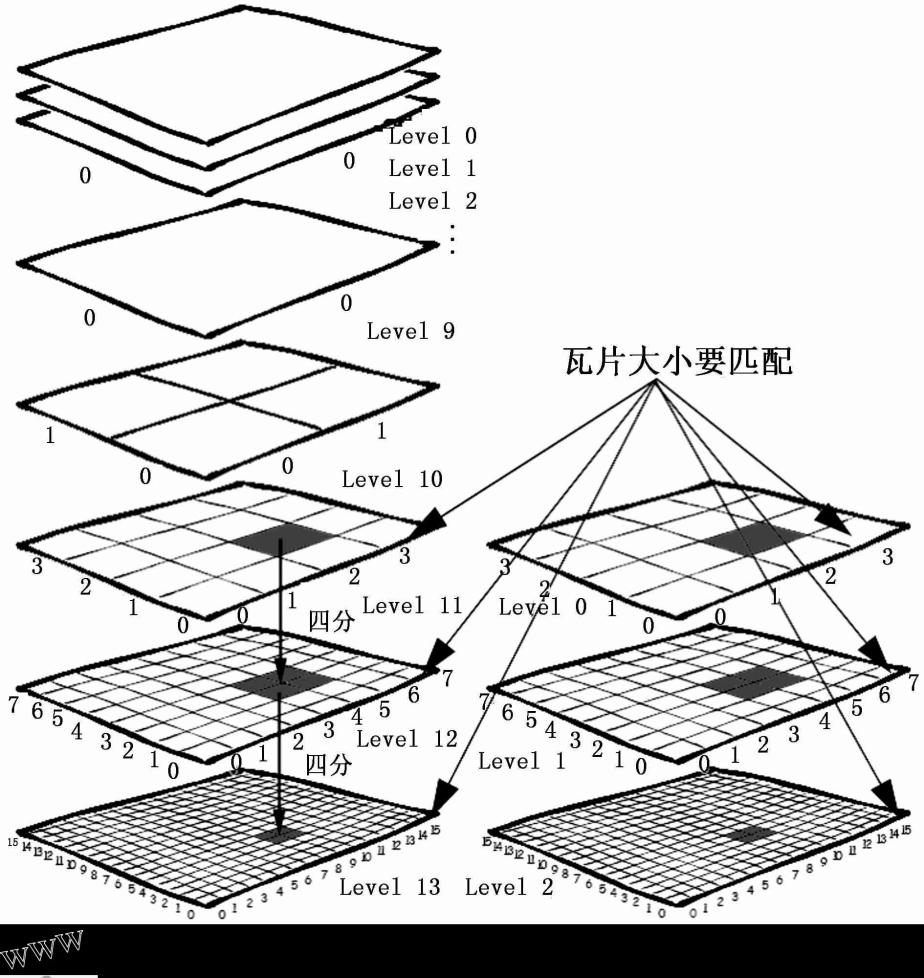
# Openlayers 4加载地图

## Openlayers 4 加载瓦片地图

### 瓦片地图解析

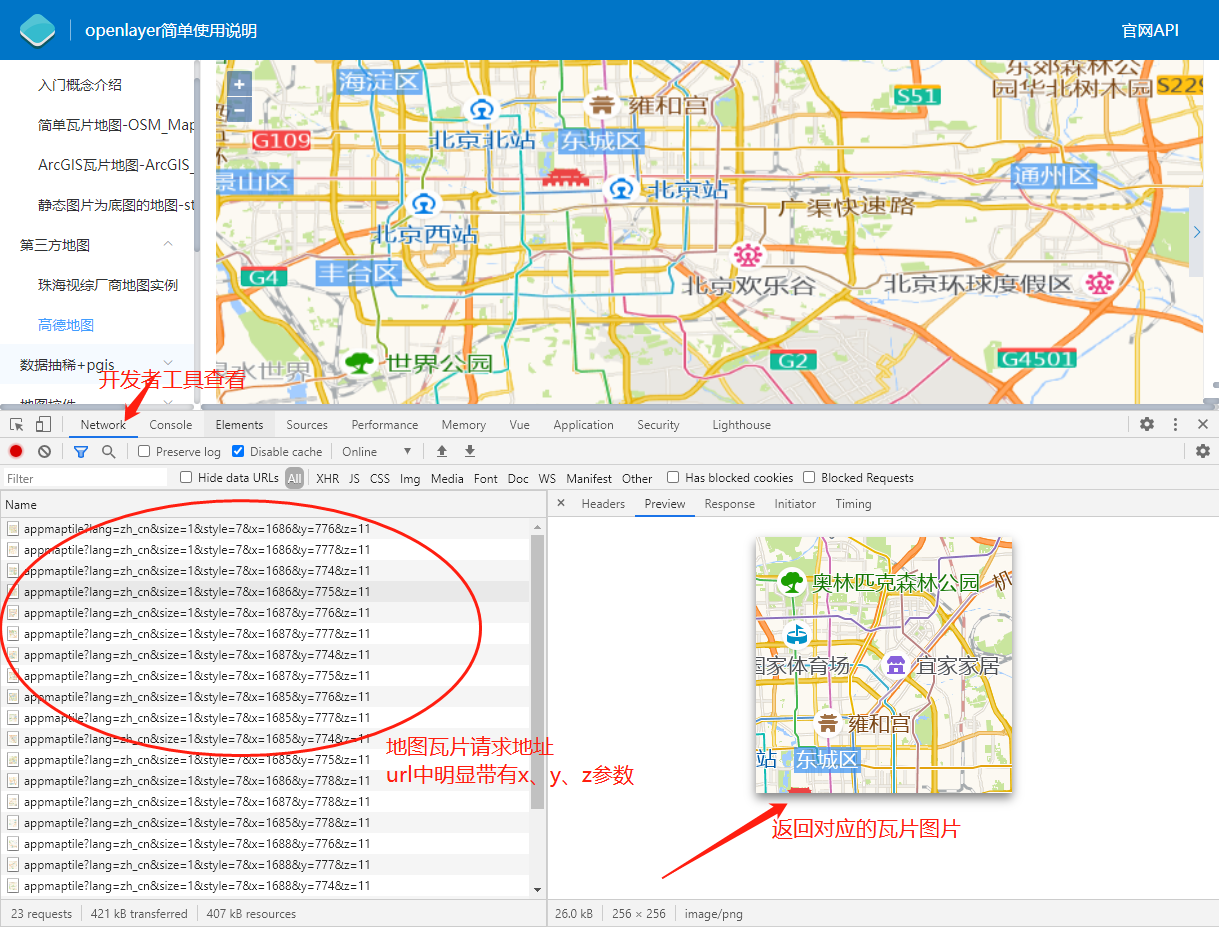
常用的瓦片地图是一个三维的概念，我们通常使用xyz这样的坐标来精确定位一张瓦片。通常z用于表示地图层级，而xy表示某个层级内的瓦片平面，x为横纵坐标，y为纵轴坐标。



### 瓦片地图辨别

在浏览器中打开任意一个在线的网页地图，然后打开浏览器的开发者工具，再随意拖动，放大缩小地图。之后在开发者工具里查看新发起的请求，是否有一些图片请求，查看请求返回的图片，是否为正在浏览的地图的一部分，如果是，则基本为瓦片地图。

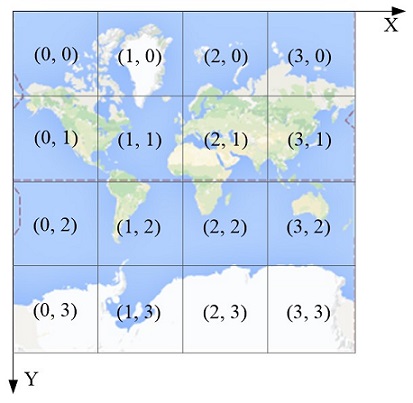
下面以高德地图为例，说明一下在线瓦片地图请求信息：



### 瓦片地图加载

OpenLayers提供了ol.source.XYZ这种通用的Source来适应广大的在线瓦片地图数据源，具备很好的适用性。通常情况下，开发者想要加载不同的在线瓦片地图源，则只需要更改ol.source.XYZ的构造参数中url就可以了。

在OpenLayers 中，默认使用的瓦片地图的坐标系的原点在左上角，向上为y轴正方向，向右为x轴正方向。



#### 高德地图加载

其中GaodeMapLayer 是表示高德地图瓦片图层

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| <template>    <div id="map" **class**="map" style="height:100%;width:100%;"></div>  </template>  <script>  **import** "ol/ol.css";  **import** Map from "ol/Map";  **import** XYZ from "ol/source/XYZ";  **import** TileLayer from "ol/layer/Tile";  **import** View from "ol/View";  **export** **default** {    name: "GaodeMap",    mounted() {  **const** mapLayer = **new** TileLayer({        source: **new** XYZ({          url: "http://wprd0{1-4}.is.autonavi.com/appmaptile?lang=zh\_cn&size=1&style=7&x={x}&y={y}&z={z}",        }),      })  **new** Map({        target: "map",        layers: [mapLayer],        view: **new** View({          center: [106.51, 29.55],          zoom: 12,          projection: "EPSG:4326",        }),      });    },  };  </script> |

#### Open Street Map地图加载

Open street map地图，可以直接使用new ol.layer.Tile({source: new ol.source.OSM()})作为Layers图层值进行地图初始化。但是同样，经过对open street map进行分析，它也是瓦片地图，因此同样可以使用ol.source.XYZ来加载Open Street Map地图，初始化结果的一样的。

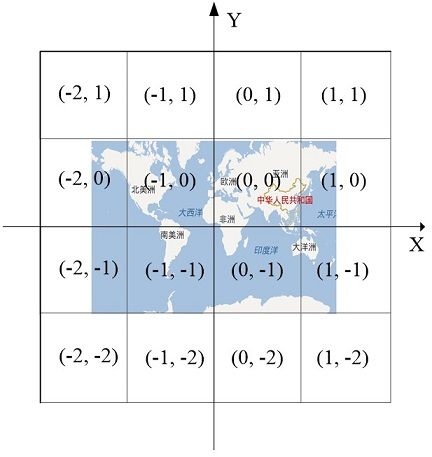
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| **const** mapLayer = **new** TileLayer({    source: **new** XYZ({      url: "http://{a-c}.tile.openstreetmap.org/{z}/{x}/{y}.png",    }),  }) |

#### Yahoo地图加载

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| **const** mapLayer = **new** TileLayer({    source: **new** XYZ({      url: "https://{0-3}.base.maps.api.here.com/maptile/2.1/maptile/newest/normal.day/{z}/{x}/{y}/512/png8?lg=ENG&ppi=250&token=TrLJuXVK62IQk0vuXFzaig%3D%3D&requestid=yahoo.prod&app\_id=eAdkWGYRoc4RfxVo0Z4B",    }),  }) |

### 瓦片地图加载之百度地图

直接使用ol.source.XYZ中的url值进行初始化地图，这种方法并不使用于所以的在线瓦片地图，例如百度地图。针对原点不在左上角的瓦片地图，那么就需要对瓦片重新定义瓦片坐标系，使用ol.tilegrid.TileGrid类做出一些调整。



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| <template>    <div id="map" **class**="map" style="height:100%;width:100%;"></div>  </template>  <script>  **import** "ol/ol.css";  **import** Map from "ol/Map";  **import** TileLayer from "ol/layer/Tile";  **import** View from "ol/View";  **import** TileImage from "ol/source/TileImage"  **import** TileGrid from "ol/tilegrid/TileGrid"  **export** **default** {    name: "baiduXYZMap",    mounted() {      // 百度平面坐标系的坐标原点与百度瓦片坐标原点相同，以瓦片等级18级为基准，规定18级时百度平面坐标的一个单位等于屏幕上的一个像素      // 自定义分辨率和瓦片坐标系      let resolutions = [];      let maxZoom = 18;      // 计算百度使用的分辨率  **for**(let i=0; i<=maxZoom; i++){        resolutions[i] = Math.pow(2, maxZoom-i);      }      // 创建百度地图的数据源      let baiduSource = **new** TileImage({        projection: 'EPSG:3857',        tileGrid:  **new** TileGrid({          origin: [0,0],    // 设置原点坐标          resolutions: resolutions  // 设置分辨率        }),        tileUrlFunction: **function**(tileCoord, pixelRatio, proj){          let z = tileCoord[0];          let x = tileCoord[1];          let y = tileCoord[2];          // 百度瓦片服务url将负数使用M前缀来标识  **if**(x<0){              x = 'M' + (-x);  }  **if**(y<0){              y = 'M' + (-y);  }  **return** "http://online0.map.bdimg.com/onlinelabel/?qt=tile&x="+x+"&y="+y+"&z="+z+"&styles=pl&udt=20160426&scaler=1&p=0";        }      });      // 百度地图层      let mapLayer = **new** TileLayer({          source: baiduSource      });  **new** Map({        target: "map",        layers: [mapLayer],        view: **new** View({          center: [106.51, 29.55],          zoom: 12,          projection: "EPSG:4326",        }),      });    },  };  </script> |

### 瓦片地图加载之xml文件（珠海视频网）

以下是在实际生产中，对接的第三方瓦片地图的一个地图信息。已知地图url的情况下，初始化该地图。

通过xml文件内容，我们可以得出以下信息：

* 地图原点Origin：[-180, 90]
* 地图投影Spatial Reference：4490
* 地图范围extend：[111.76777278415705,20.9352931197987,115.71767805383536,22.986388506824426]
* 地图层级Level ：0~20
* 地图分辨率Resolution(对应0-20层)：[

0.9410711005830282, 0.7031250000000002, 0.3515625000000001, 0.17578125000000006, 0.08789062500000003, 0.043945312500000014, 0.021972656250000007, 0.010986328125000003, 0.005493164062500002, 0.002746582031250001, 0.0013732910156250004, 6.866455078125002E-4, 3.433227539062501E-4, 1.7166137695312505E-4, 8.583068847656253E-5, 4.2915344238281264E-5, 2.1457672119140632E-5, 1.0728836059570316E-5, 5.364418029785158E-6, 2.682209014892579E-6, 1.34110450744629E-6]

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| JSON | SOAP | WMTS  BasemapWhite (MapServer)  View In: GeoScene JavaScript GeoScene Online Map Viewer GeoScene Earth GeoScene Desktop GeoScene Pro    View Footprint In: GeoScene Online Map Viewer    Service Description:    Map Name: Layers    Legend    All Layers and Tables    Dynamic Legend    Dynamic All Layers    Layers:  New\_Shapefile (0)  Description:    Copyright Text:    Spatial Reference: 4490 (4490)      Single Fused Map Cache: true    Tile Info:  Height: 256  Width: 256  DPI: 96  Levels of Detail: 21  Level ID: 0 [ Start Tile, End Tile ]  Resolution: 0.9410711005830282  Scale: 3.9549759305875003E8  Level ID: 1 [ Start Tile, End Tile ]  Resolution: 0.7031250000000002  Scale: 2.9549759305875003E8  Level ID: 2 [ Start Tile, End Tile ]  Resolution: 0.3515625000000001  Scale: 1.4774879652937502E8  Level ID: 3 [ Start Tile, End Tile ]  Resolution: 0.17578125000000006  Scale: 7.387439826468751E7  Level ID: 4 [ Start Tile, End Tile ]  Resolution: 0.08789062500000003  Scale: 3.6937199132343754E7  Level ID: 5 [ Start Tile, End Tile ]  Resolution: 0.043945312500000014  Scale: 1.8468599566171877E7  Level ID: 6 [ Start Tile, End Tile ]  Resolution: 0.021972656250000007  Scale: 9234299.783085939  Level ID: 7 [ Start Tile, End Tile ]  Resolution: 0.010986328125000003  Scale: 4617149.891542969  Level ID: 8 [ Start Tile, End Tile ]  Resolution: 0.005493164062500002  Scale: 2308574.9457714846  Level ID: 9 [ Start Tile, End Tile ]  Resolution: 0.002746582031250001  Scale: 1154287.4728857423  Level ID: 10 [ Start Tile, End Tile ]  Resolution: 0.0013732910156250004  Scale: 577143.7364428712  Level ID: 11 [ Start Tile, End Tile ]  Resolution: 6.866455078125002E-4  Scale: 288571.8682214356  Level ID: 12 [ Start Tile, End Tile ]  Resolution: 3.433227539062501E-4  Scale: 144285.9341107178  Level ID: 13 [ Start Tile, End Tile ]  Resolution: 1.7166137695312505E-4  Scale: 72142.9670553589  Level ID: 14 [ Start Tile, End Tile ]  Resolution: 8.583068847656253E-5  Scale: 36071.48352767945  Level ID: 15 [ Start Tile, End Tile ]  Resolution: 4.2915344238281264E-5  Scale: 18035.741763839724  Level ID: 16 [ Start Tile, End Tile ]  Resolution: 2.1457672119140632E-5  Scale: 9017.870881919862  Level ID: 17 [ Start Tile, End Tile ]  Resolution: 1.0728836059570316E-5  Scale: 4508.935440959931  Level ID: 18 [ Start Tile, End Tile ]  Resolution: 5.364418029785158E-6  Scale: 2254.4677204799655  Level ID: 19 [ Start Tile, End Tile ]  Resolution: 2.682209014892579E-6  Scale: 1127.2338602399827  Level ID: 20 [ Start Tile, End Tile ]  Resolution: 1.34110450744629E-6  Scale: 563.616930119991  Format: PNG8  Compression Quality: 0.0  Origin: X: -180.0  Y: 90.0  Spatial Reference: 4490 (4490)  Initial Extent:  XMin: 111.75111655711625  YMin: 21.65151088255361  XMax: 115.73195481987032  YMax: 22.99590635084772  Spatial Reference: 4490 (4490)    Full Extent:  XMin: 111.76777278415705  YMin: 20.9352931197987  XMax: 115.71767805383536  YMax: 22.986388506824426  Spatial Reference: 4490 (4490)    Units: esriDecimalDegrees    Supported Image Format Types: PNG32,PNG24,PNG,JPG,DIB,TIFF,EMF,PS,PDF,GIF,SVG,SVGZ,BMP    Document Info:  Title:  Author:  Comments:  Subject:  Category:  Keywords:  AntialiasingMode: None  TextAntialiasingMode: Force  Supports Dynamic Layers: true    MaxRecordCount: 1000    MaxImageHeight: 4096    MaxImageWidth: 4096    Supported Query Formats: JSON, geoJSON    Supports Query Data Elements:    Min Scale: 577143.7364428712    Max Scale: 2254.4677204799655    Supports Datum Transformation: true      Child Resources: Info Dynamic Layer    Supported Operations: Export Map Identify QueryDomains QueryLegends Find Return Updates Generate KML |

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| <template>    <div id="map" **class**="map" style="height:100%;width:100%;"></div>  </template>  <script>  **import** "ol/ol.css";  **import** Map from "ol/Map";  **import** XYZ from "ol/source/XYZ";  **import** TileLayer from "ol/layer/Tile";  **import** View from "ol/View";  **import** TileGrid from "ol/tilegrid/TileGrid"  **export** **default** {    name: "otherMap",    mounted() {      let mapLayer = **new** TileLayer({          source: **new** XYZ({            tileGrid: **new** TileGrid({              resolutions: [0.9410711005830282,  0.7031250000000002, 0.3515625000000001, 0.17578125000000006, 0.08789062500000003, 0.043945312500000014, 0.021972656250000007,0.010986328125000003, 0.005493164062500002, 0.002746582031250001, 0.0013732910156250004, 6.866455078125002E-4, 3.433227539062501E-4, 1.7166137695312505E-4, 8.583068847656253E-5,4.2915344238281264E-5, 2.1457672119140632E-5, 1.0728836059570316E-5, 5.364418029785158E-6, 2.682209014892579E-6, 1.34110450744629E-6],              origin: [-180, 90],              extent: [111.76777278415705,20.9352931197987,115.71767805383536,22.986388506824426],            }),            maxZoom: 20, // 图层最大缩放层级            projection: "EPSG:4490", // 图层对应坐标系对象            tileSize: [256, 256], // 图层对应切片尺寸对象            url: ['地图url地址'] // 图层对应地图服务url          })        })  **new** Map({        target: "map",        layers: [mapLayer],        view: **new** View({          center: ['地图初始化中心点位'],          zoom: 12,          projection: "EPSG:4326",        }),      });    },  };  </script> |

### 瓦片地图加载之PGIS矢量地图

加载PGIS瓦片地图，也是和上面相似的渲染方法



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| let pgisSource = **new** TileImage({    projection: 'EPSG:3857',    tileGrid:  **new** TileGrid({      origin: [0,0],    // 设置原点坐标      resolutions: [1,0.5,0.25,0.125,0.0625,0.03125,0.015625,0.0078125,0.00390625,0.001953125,9.765625E-4,4.8828125E-4,2.441406124E-4,1.220703125E-4,6.103515625E-5,3.0517578125E-5,1.52587890625E-5,7.62939453125E-6,3.814697265625E-6,1.9073486328125E-6],  // 设置分辨率      extent: [-180,-90,180,90]    }),  });  let mapLayer = **new** TileLayer({      source: pgisSource  }); |

### 分辨率和比例尺转换