DXF(2D) 도면 GeoServer 배포 자동화

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차례

- 발표자 소개
- 교육내용 개요
- In QGIS
- Automation

     Concept 1 : AnotherDXFImporter

     Concept 2 : GeoServer Rest API
- 정리

소개

- Alziotsystem - https://alziotsystem.com/

- 발표자 : 전종수
- 블로그 - https://t2ols.tistory.com/
- GitHub - https://github.com/t2ols

  강의 대상자 : 초급

2. 발표내용 소개 및 준비사항

DXF(2D) 활용사례(토목분야)

- 설계 산출물 활용을 위한 방법
- GIS 기반 설계 도면 시각화
- DigitalTwin – 3D Intergration
  (SHP 예외)

- 평면도   - 발파계획평면도
- 포장깨기평면도   - 구조물깨기평면도
- 비옥토채취계획평면도
- 토지이용계획도   - 토지이동계획도

Example

Example

개발환경

- 교육 notebook : 8G, i5 1.6
- 코드(Python)에서 사용하는 라이브러리
    QGIS Desktop(3.26), PyQGIS, GDAL(3.5.2)
- GeoServer 2.18 (+openjdk 1.8, + CSS Plugin)
- 교육진행 환경
  OSGeo4W, OSGeoLive(Virtual BOX)
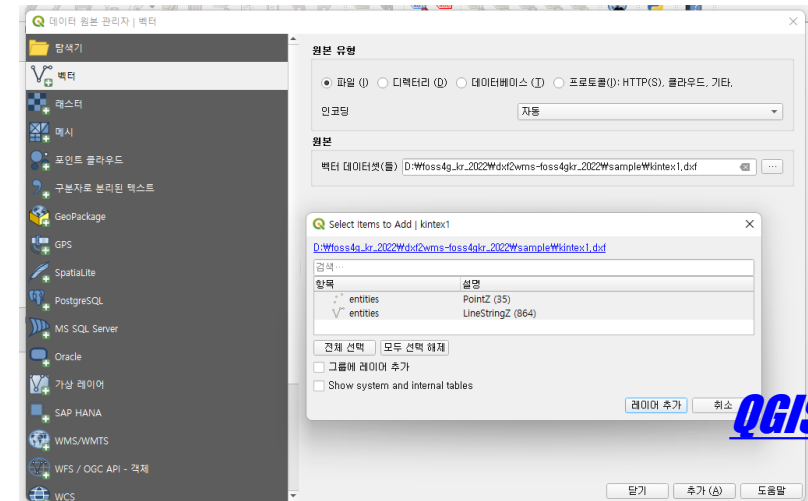 WebServer(NodeJS,http-server)
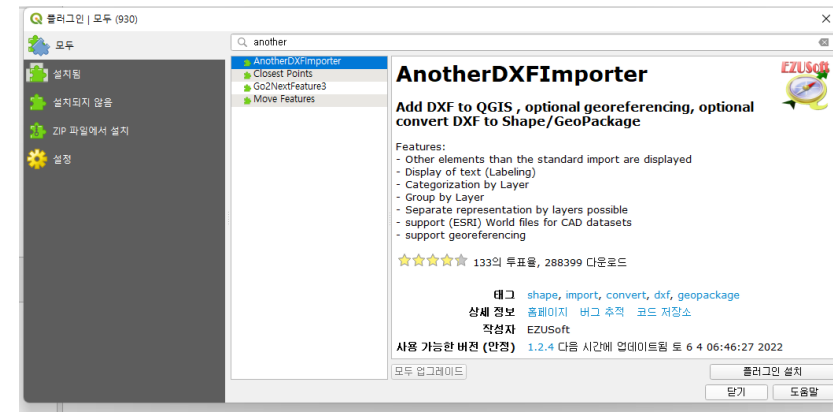- git https://github.com/t2ols/FOSS4FKR_2022.git

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운영환경

- 충분한 사양의 PC
  Tile 작업 시 필요한 디스크 용량
  Tile 이후의 디스크 용량
  Linux 환경의 멀티 프로세싱

- 실 운영 시스템
  WINDOWS + CONDA + qgis

2022.10.12 현재

3. In QGIS

DXF Import Plugin – AnotherDXFImporter

- AnotherDXFImporter PlugIn 확인
- QGIS에서 기본적으로 DXF import를 지원함
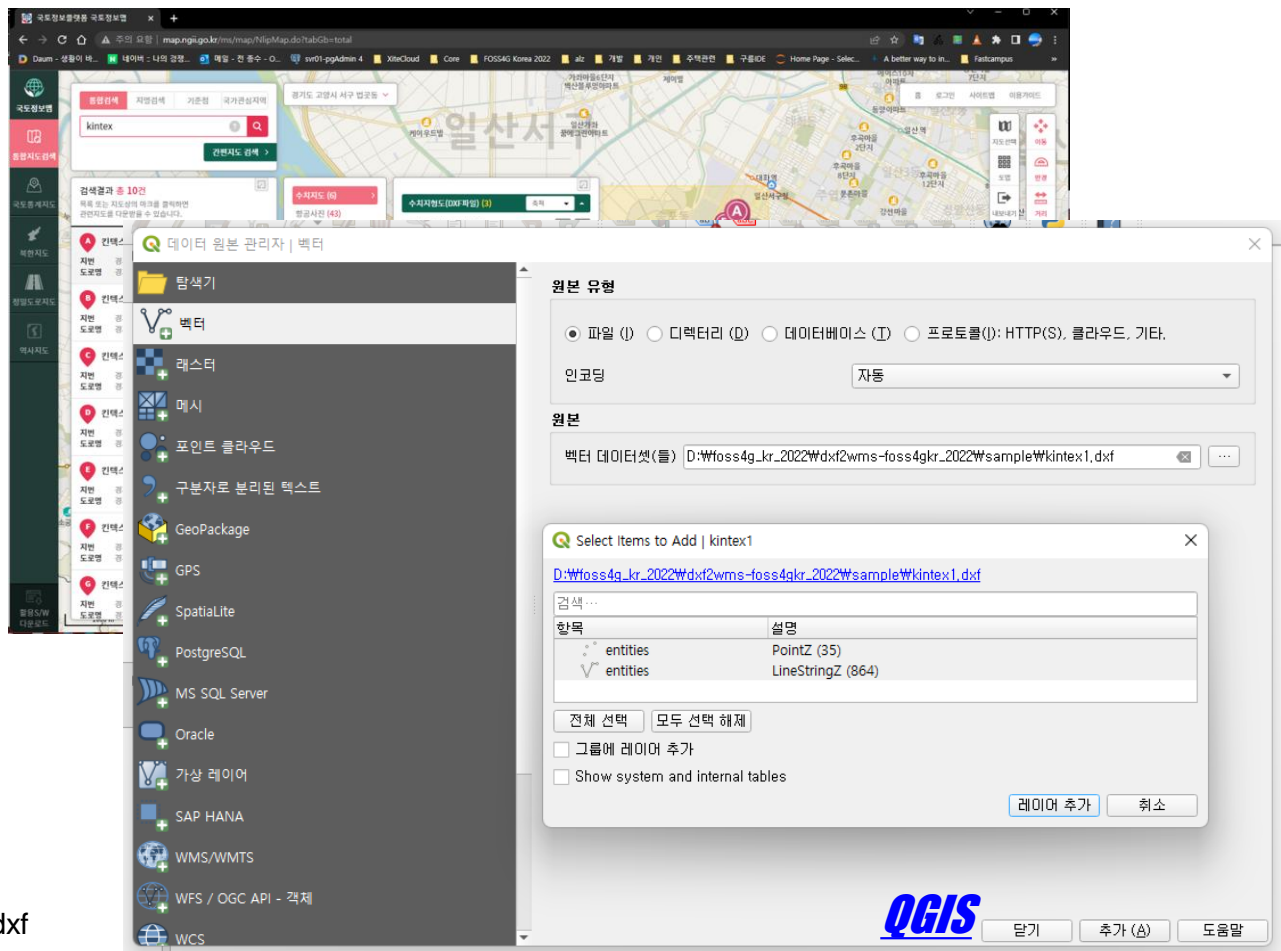

QGIS에서 DXF 파일 SHP 파일로 일괄 변환하기

https://foss4g.tistory.com/1137

Work in QGIS

- 벡터레이어 추가
  점, 선, 면
  한글 관련 Encoding
- DXF layer 갯수 오류
- 전체 도면의 범위 확인 필요
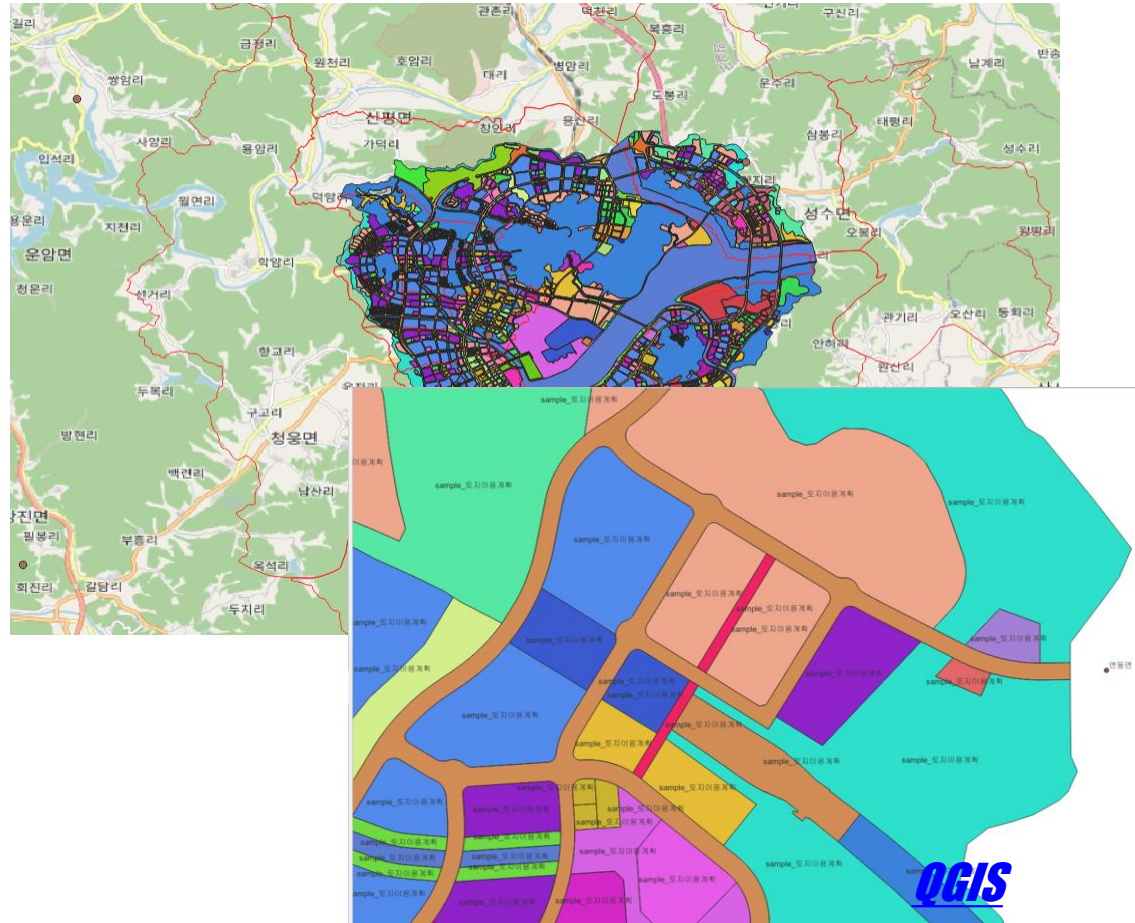- 샘플 DXF
  국토정보플랫폼
    -국토정보맵
  EPSG:5186

Script
sejong.dxf

Styling in QGIS

- 레이어 스타일링
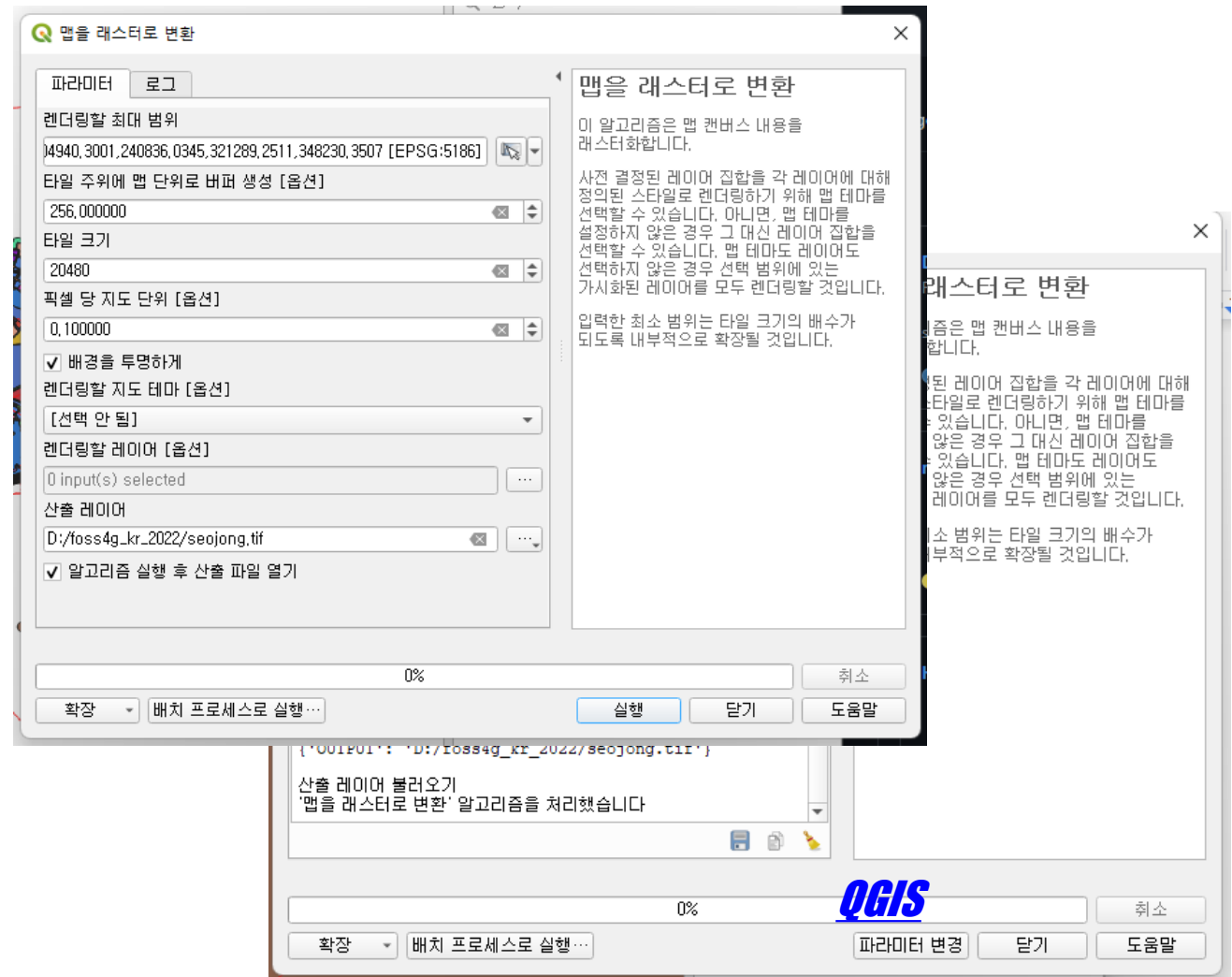 Label
  Symbols
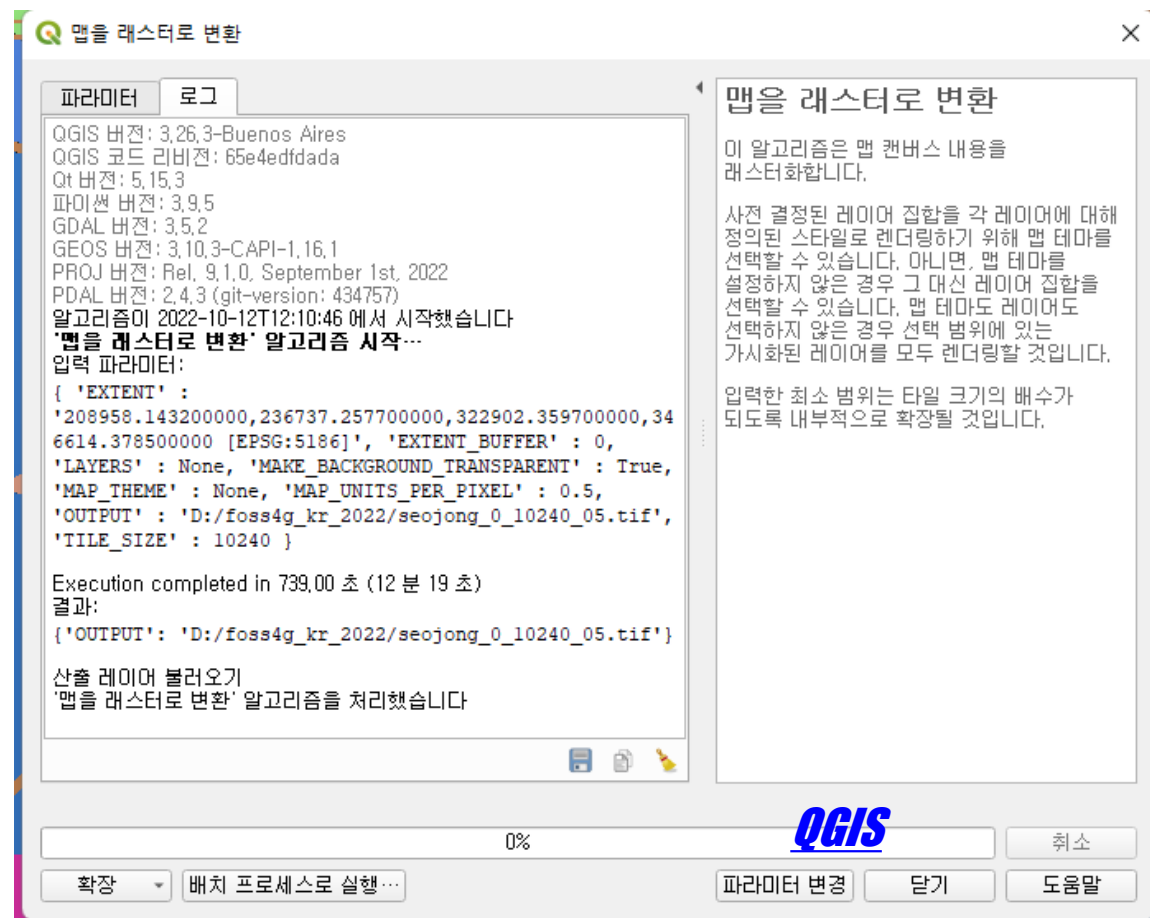 Color
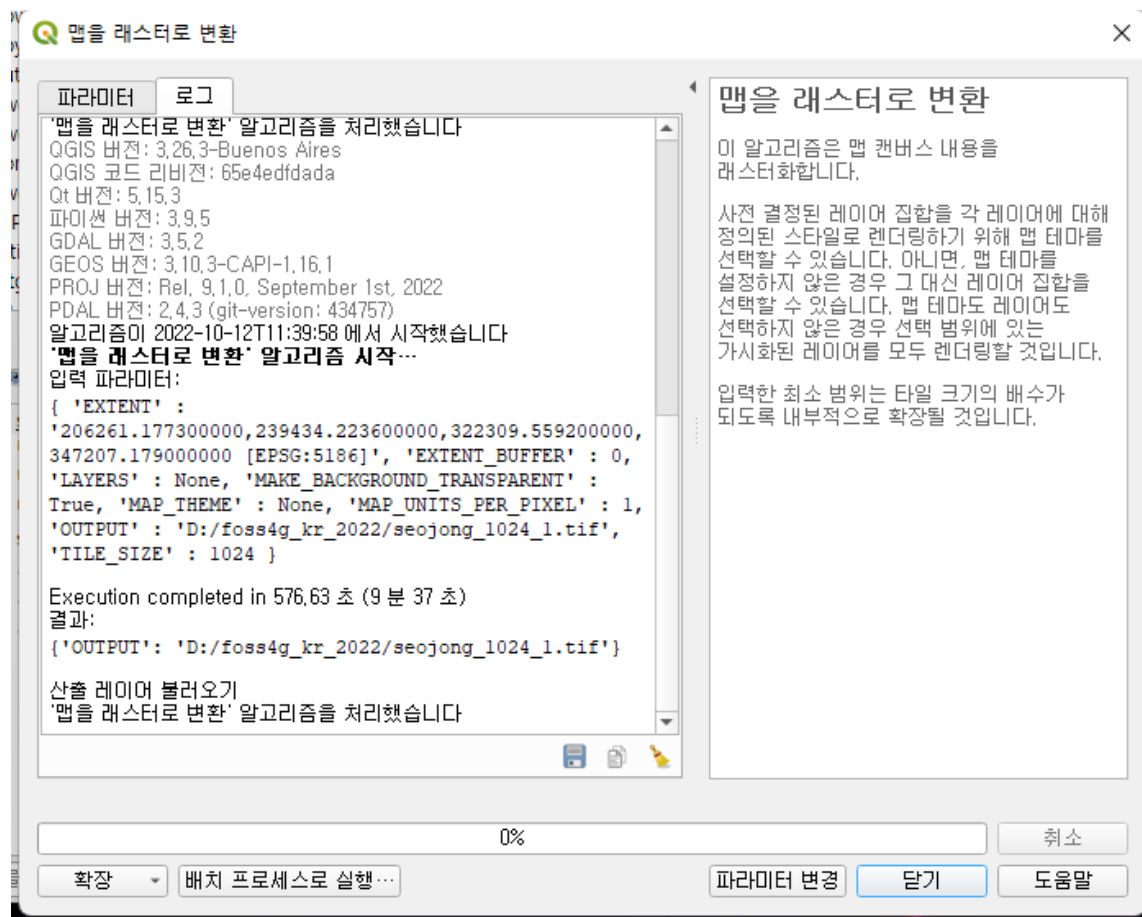- 실 설계 도면의 DXF 스타일
  이 반영 됨
- GeoServer CSS 스타일링

Rasterize - map2tiff

- 좌표계확인(프로젝트)
  랜더링 범위(용량 확인)
  버퍼 (중첩도선명도)
  타일크기
  픽셀당지도단위(Resolution)
  배경을 투명하게
  산출 레이어 : 파일 저장

* 옵션에 따른 파일용량 확인
  buffer 0 크기 10240 ppm 0.5

Rasterize - map2tiff

gdal2tiles(TMS)

- ouput 위치 설정
- zoom Level
  (Viewer level 확인)

```
gdal2tiles.bat -p mercator -w all -r average -a 0.0
D:/foss4g_kr_2022/seojong_0_10240_05.tif
D:\foss4g_kr_2022\seojong_0_10240_05
```

결과물 - Web Viewer

googlemap
leaflet
default web viewer

4. 자동화

자동화 전략

- 상용 및 솔루션 도입 검토
- 수작업 프로세스를 전환
  PyQGIS, Python Script
- DXF 입력 유지
- 현 운영 시스템 통합 고려

Like AnotherDXFImporter

GitHub

https://github.com/EZUSoft/AnotherDXF2Shape.git

PyQGIS CookBook

https://docs.qgis.org/3.22/en/docs/pyqgis_developer_cookbook/index.html

한글

https://docs.qgis.org/2.8/ko/docs/pyqgis_developer_cookbook/index.html

PyQGIS

QGIS 라이브러리 설정
  QGIS install
  Conda QGIS
  (OSGEO4W, OSGEOLive)

GUI 관련 이슈

1.4.1. Using PyQGIS in standalone scripts

To start a standalone script, initialize the QGIS resources at the beginning of the script:

```
1   from qgis.core import *
2
3   # Supply path to qgis install location
4   QgsApplication.setPrefixPath("/path/to/qgis/installation", Tru
5
6   # Create a reference to the QgsApplication.  Setting the
7   # second argument to False disables the GUI.
8   qgs = QgsApplication([], False)
9
10  # Load providers
11  qgs.initQgis()
12
13  # Write your code here to load some layers, use processing
14  # algorithms, etc.
15
16  # Finally, exitQgis() is called to remove the
17  # provider and layer registries from memory
18  qgs.exitQgis()
```

1.4.2. Using PyQGIS in custom applications

The only difference between Using PyQGIS in standalone scripts and a custom PyQGIS
QgsApplication . Pass True instead of False to indicate that we plan to use a GUI.

```
1   from qgis.core import *
2
3   # Supply the path to the qgis install location
4   QgsApplication.setPrefixPath("/path/to/qgis/installation", True)
5
6   # Create a reference to the QgsApplication.
7   # Setting the second argument to True enables the GUI.  We need
8   # this since this is a custom application.
9
10  qgs = QgsApplication([], True)
11
12  # Load providers
13  qgs.initQgis()
14
15  # Write your code here to load some layers, use processing
16  # algorithms, etc.
17
18  # Finally, exitQgis() is called to remove the
19  # provider and layer registries from memory
20  qgs.exitQgis()
```
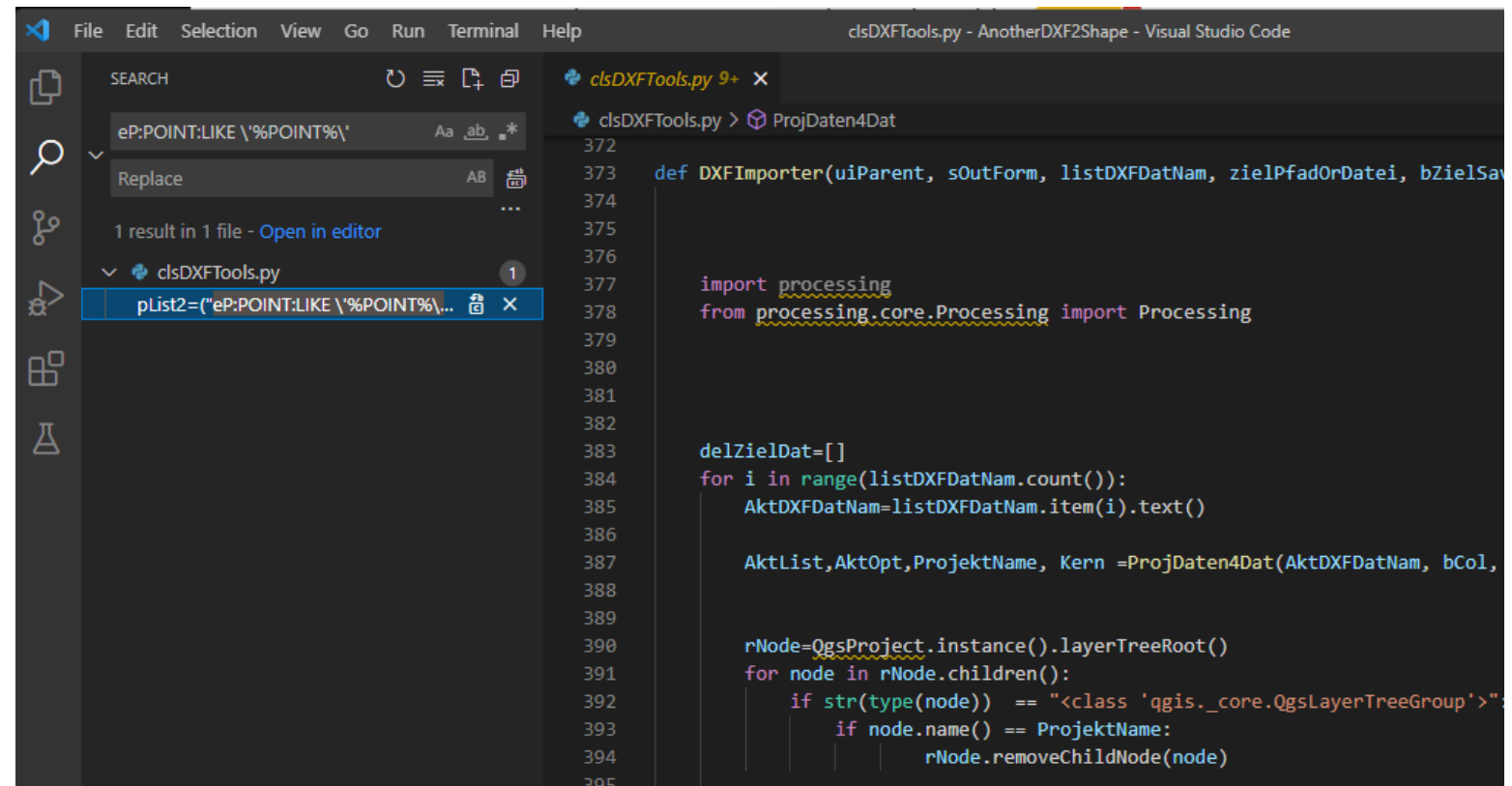
Processing
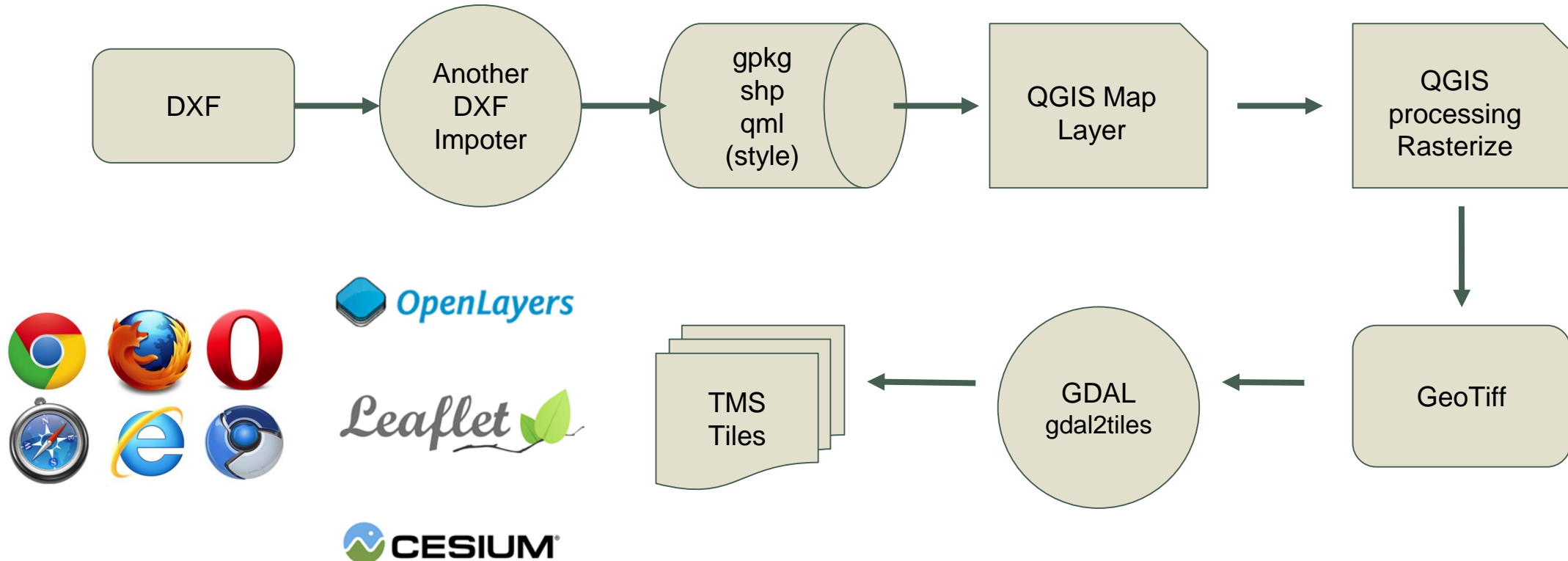
From AnotherDXFImporter

Load Geometry
& Layer(Table)

set Coordinate

Add style attribute

dxf2gpkg

AnotherDXFImporter
window command
실행환경 스크립트 : osgeorun.bat
PYTHON, QGIS, GDAL, QT


```
D:\foss4g_kr_2022\dxf2wms-foss4gkr_2022>python dxf2gpkgAll.py
Wrong char in  'ogr_style' at EntityHandle: AF61 (Check your choose charset)한국국제전시장
Wrong char in  'ogr_style' at EntityHandle: AF61 (Check your choose charset)한국국제전시장
Wrong char in  'ogr_style' at EntityHandle: AF61 (Check your choose charset)한국국제전시장
Wrong char in  'ogr_style' at EntityHandle: AF61 (Check your choose charset)한국국제전시장
```
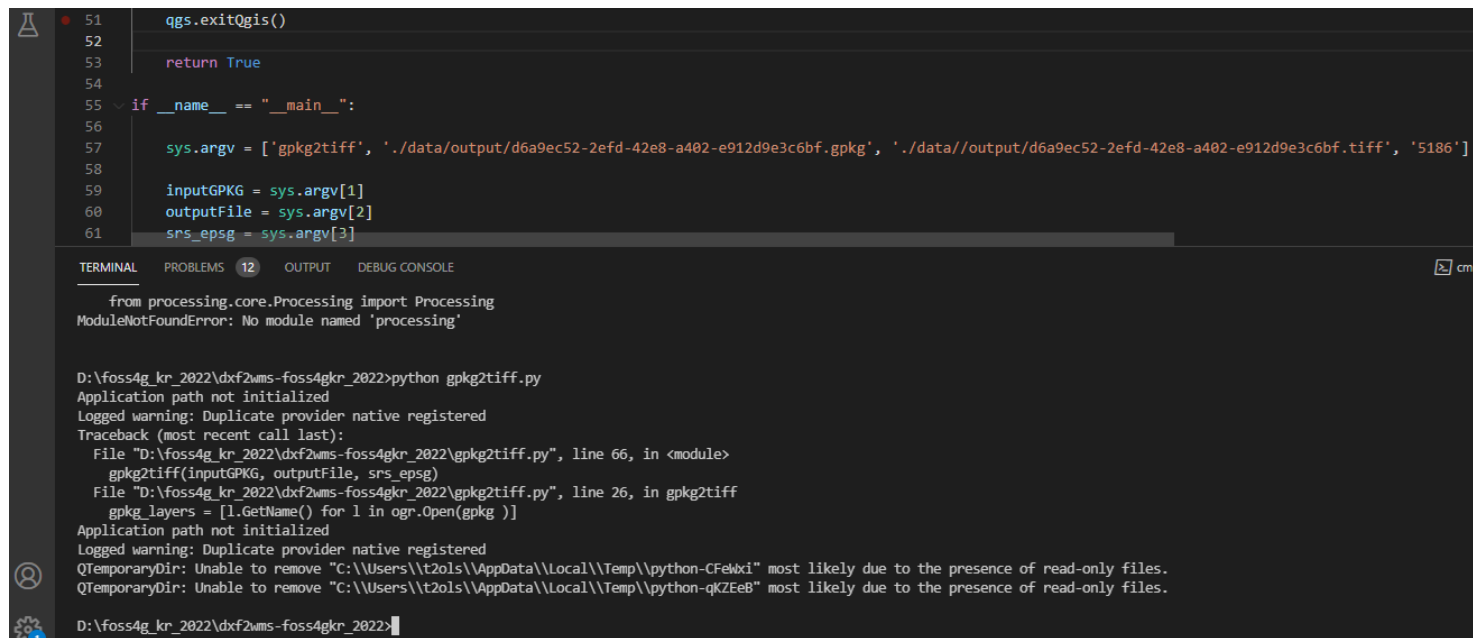


```
Wrong char in  'ogr_style' at EntityHandle: B033 (Check your choose charset)대    화    동
Warning 1: Value of field 'styleName' has 38 characters, whereas maximum allowed is 30.
Warning 1: Value of field 'styleName' has 38 characters, whereas maximum allowed is 30.
Warning 1: Value of field 'styleName' has 39 characters, whereas maximum allowed is 30.
From {projectOrgName}.dxf To {_projectTranceName}.gpkg
d6a9ec52-2efd-42e8-a402-e912d9e3c6bf

D:\foss4g_kr_2022\dxf2wms-foss4gkr_2022>
```

QGIS   Code

gpkg2tiff - rasterize

Process parameter

Extent, Buffer, Transparent, map init per pixel, tile size

QGIS   *Code*

tiff2tiles - gdal2tiles

gdal excute
qgis processing or python script

Web

Code

In CesiumJS

Script
D:\foss4g_kr_2022\dxf2wms-foss4gkr_2022>http-server
http://localhost:8081/webviewer/indexCesium.html

Web

Code

Is Best?

Process Schedule
HDD Size
low Resolution

Next…

Deep dive

OGR2OGR in AnotherDXFImporter
    DXF geometry load to gpkg

Add geometry Attribute - Style
    font, angle, size, size_u, anchor, color, underline, plaintext, ...

Web

QGIS

GeoServer

CSS Plugin Install

Geoserver Guide

https://www.oss.kr/storage/app/public/oss/c0/77/[GeoServer]%20Solution%20Guide%20V0.95.pdf

Script
Install CSS Plugin
D:\foss4g_kr_2022\util\geoserver-2.18.0-bin\bin\startup.bat

Web

GeoServer – WebUI

User [foss4g]
Workspace [foss4g]
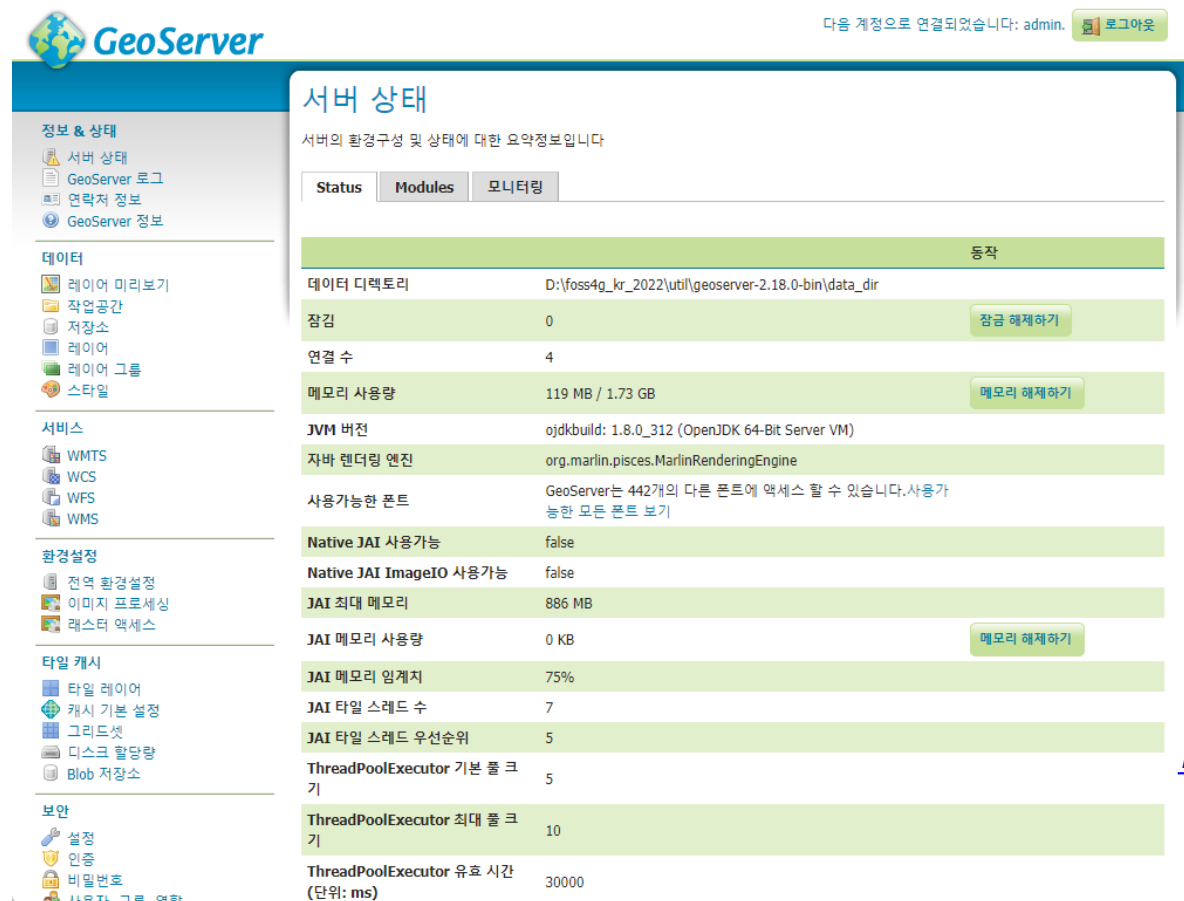
Make DataStore(From gpkg)
Publish Layer
Create Style(CSS)
  레이어 속성을 이용한 스타일
Apply Layer Style
Layer Group
Web Viewer

Web

GeoServer - Authentication(CORS)

```
vi /usr/geoserver-2.14.1/webapps/geoserver/WEB-INF/web.xml
```

내용 중 CORS에 해당되는 2곳에 대한 주석을 아래 그림처럼 해제합니다.

작업공간 편집
기존 작업공간을 편집합니다

Basic Info | Security

이름
foss4g_pre

네임스페이스 URI
foss4g_pre
이 작업공간과 연결된 네임스페이스 URI 입니다

☑ 기본 작업공간으로 설정하기
☐ 분리된 작업공간

| Basic Info | Security |

설정   ☐ Grant access to any role

활성화
☐

Available Roles	Read	Write	Admin
ADMIN	☑	☑	☑
ROLE_AUTHENTICATED	☑	☐	☐
ROLE_ANONYMOUS	☑	☐	☐
GROUP_ADMIN	☑	☑	☑

저장 Apply 취소

Script

Web

http://localhost:8081/webviewer/indexCesiumGeoserver.html   *Code*

Result - CesiumJS

```
<script>
  const viewer = new Cesium.Viewer("cesiumContainer");
</script>
<script type="text/javascript">

    // const viewer = window.cesiumViewer;
    let layers = viewer.imageryLayers;
    var wmsPath = '/data/output/d6a9ec52-2efd-42e8-a402-e912d9e3c6bf'
    var wmsObj = new Cesium.TileMapServiceImageryProvider({
        url: wmsPath
    });
    var rtnObj = layers.addImageryProvider(wmsObj);
    viewer.flyTo(rtnObj);

</script>
```


Script

http://localhost:8081/webviewer/indexCesiumGeoserver.html

Web
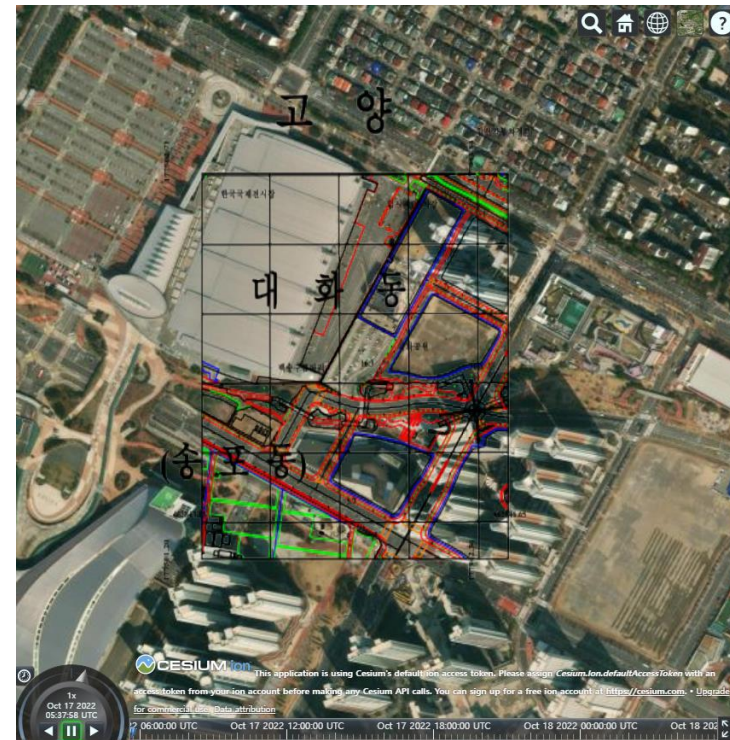
Code

GeoServer - RestAPI

Homepage RestAPI
　　https://docs.geoserver.org/stable/en/user/rest/
　　pip install geoserver-rest

Python raw request RestAPI sample : Today
　　https://gist.github.com/jgomo3/73f38cc5a91d85146ccf

Web

Code

GeoServer – RestAPI

- Authorize

  Create RestAPI user
  Workspace 권한 부여 필요
- (Create Workspace 사용자 권한 등 처리 필요)
- Create DataStore(Tiff,GPKG)
  (등록 후 재부팅 후에 상세 페이지 접근 가능 Bug?)
- Publish Layer(Vector, Raster) - FeatureType
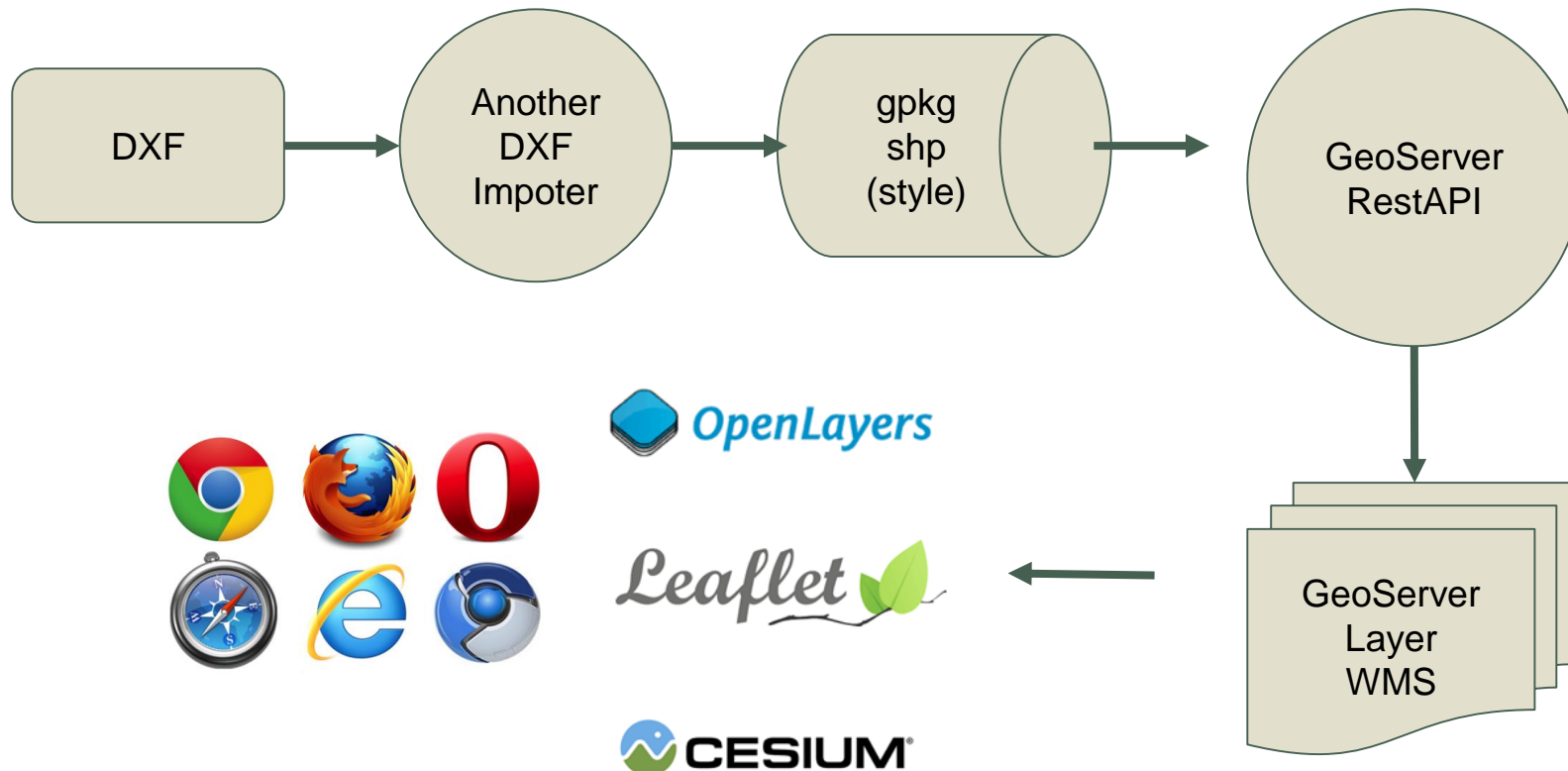- Apply Style (CSS) - Update Layer
- Create LayerGroup
- WebViewer

Web

Code

정리

- Processing Flow
- 한계점
  gpkg 생성에 따른 QGIS 의존성(GUI 개발환경, server os)
- 개선방향
  DXF Geometry 추출 프로세스 개선 (OGR2OGR)
  Authentication 개선 (Proxy, Authorize Header 등)

Processing

No QGIS - GDAL

도형 추출

```
opt = '-append -update --config DXF_ENCODING "' + ogrCharSet + '" '

opt = opt + '--config DXF_INCLUDE_RAW_CODE_VALUES TRUE '
opt = opt + ('%s -nlt %s %s -sql "select *, ogr_style from entities where OGR_GEOMETRY %s" -nln "%s"') % (cmdOpt,v[1],optGCP,v[2], gpkgTable)
if bGen3D:
    opt = opt + ' -dim 3 '

pList={'INPUT':korrDXFDatNam,'OPTIONS':opt,'OUTPUT': korrGPKGDatNam}

"""
ogr2ogr -append -update ^
    ".\\output\\sample.gpkg" ".\\data\\sample.dxf" ^
    --config DXF_ENCODING "UTF-8" ^
    --config DXF_INCLUDE_RAW_CODE_VALUES TRUE ^
    --config DXF_TRANSLATE_ESCAPE_SEQUENCES FALSE ^
    --config DXF_MERGE_BLOCK_GEOMETRIES TRUE ^
    --config DXF_INLINE_BLOCKS TRUE -dim 2 ^
    -nlt POINT ^
    -sql "select *, ogr_style from entities where OGR_GEOMETRY LIKE '%POINT%' " ^
    -nln "e986663f-065e-4f25-aaed-d3238a8ca41eeP"

"""

pAntw=processing.run('gdal:convertformat',pList)
```

gpkg processing

```
Layer = QgsVectorLayer(sLayer, layerName+'('+v[0]+')',"ogr")
Layer.setCrs(mLay_crs)

Layer.setSubsetString( "Layer = '" + layerName + "'" )

if Layer.featureCount() < 0: Layer=None

Layer = QgsProject.instance().addMapLayer(Layer, False)
```

Authentication

Q&A

강의 소스
https://github.com/t2ols/FOSS4GKR_2022

QGIS Desktop 실행환경
   QGIS https://qgis.org/ko/site/forusers/download.html
   OSGEO4W : https://trac.osgeo.org/osgeo4w/

GeoServer : https://geoserver.org/release/stable/
   CSS Extensions : https://sourceforge.net/projects/geoserver/files/GeoServer/2.21.2/extensions/geoserver-2.21.2-css-plugin.zip/download
주의) GeoServer 버젼과 CSS Extention 버젼 일치

GeoServer 지원 JDK
jdk 1.8 : https://github.com/ojdkbuild/ojdkbuild

감사합니다