

中興工程

指導教授:孔令傑 教授

團隊成員:黃奕滔、趙允祥、許芸嘉、何睿、鄭允頤

Agenda

- REVIT
- ACIS SAT
- FBX
- IFC
- NEC

- DXF
- DGN
- DWF
- DWG

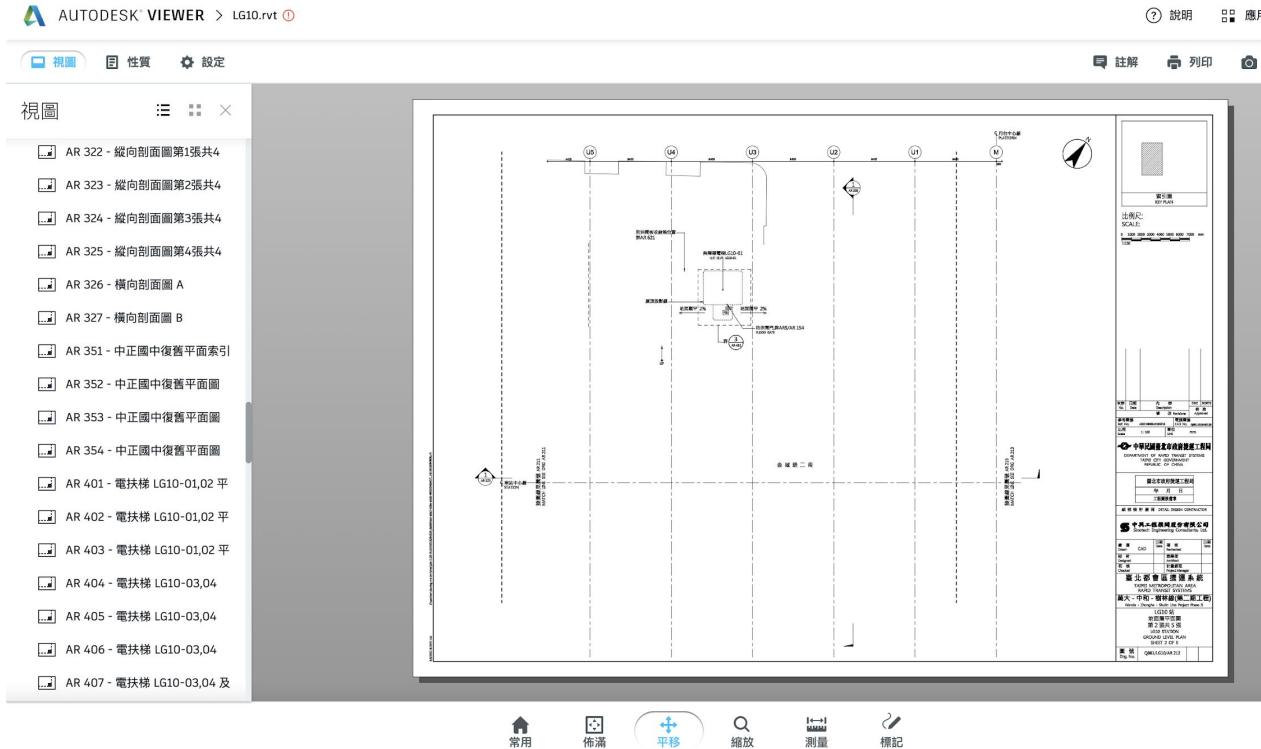
CAD
Family

REVIT

REVIT

REVIT

- 無損存檔
- Binary File
- 2D圖層式結構
- C#



ACIS SAT

ACIS SAT

```
lump $-1 -1 $-1 $-1 $230 $67 #
lump $-1 -1 $-1 $231 $232 $68 #
lump $-1 -1 $-1 $-1 $233 $69 #
lump $-1 -1 $-1 $234 $235 $70 #
lump $-1 -1 $-1 $-1 $236 $71 #
lump $-1 -1 $-1 $-1 $237 $72 #
lump $-1 -1 $-1 $-1 $238 $73 #
transform $-1 -1 1 0 0 0 1 0 0 0 1 0 -0.3820829684246746516 0 1 no_rotate no_reflect no_shear #
lump $-1 -1 $-1 $-1 $239 $74 #
transform $-1 -1 1 0 0 0 1 0 0 0 1 0 -0.3820829684246746516 0 1 no_rotate no_reflect no_shear #
lump $-1 -1 $-1 $240 $241 $75 #
transform $-1 -1 1 0 0 0 1 0 0 0 1 0 -0.3820829684246746516 0 1 no_rotate no_reflect no_shear #
shell $-1 -1 $-1 $-1 $-1 $242 $-1 $76 #
shell $-1 -1 $-1 $-1 $-1 $243 $-1 $77 #
shell $-1 -1 $-1 $-1 $-1 $244 $-1 $78 #
shell $-1 -1 $-1 $-1 $-1 $245 $-1 $79 #
shell $-1 -1 $-1 $-1 $-1 $246 $-1 $80 #
shell $-1 -1 $-1 $-1 $-1 $247 $-1 $81 #
shell $-1 -1 $-1 $-1 $-1 $248 $-1 $82 #
shell $-1 -1 $-1 $-1 $-1 $249 $-1 $83 #
shell $-1 -1 $-1 $-1 $-1 $250 $-1 $84 #
shell $-1 -1 $-1 $-1 $-1 $251 $-1 $85 #
shell $-1 -1 $-1 $-1 $-1 $252 $-1 $86 #
```

ACIS SAT

- 2D
- 可解析編碼
- 目前無廣泛套件

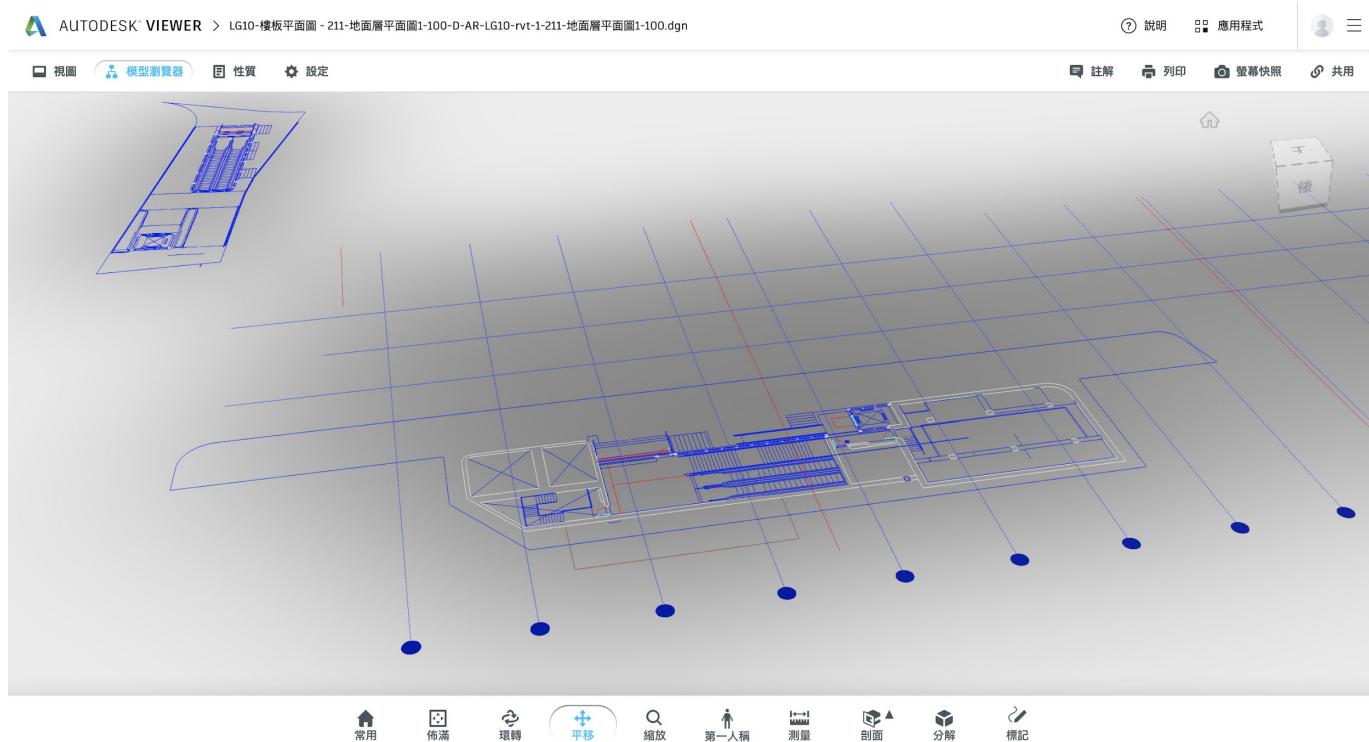


DGN

DGN

DGN

- 無損存檔
- Binary File
- 2D物件疊加
- Python/C# SDK



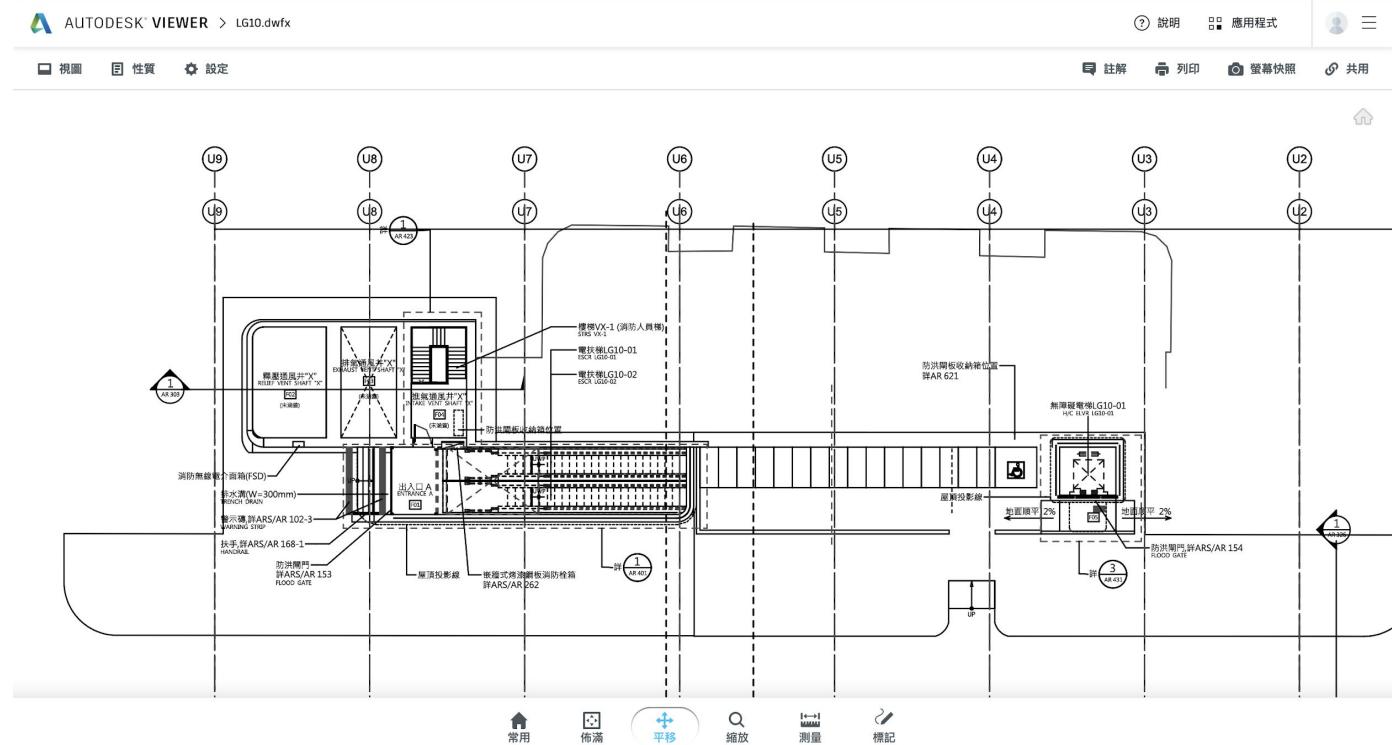
DWF

DWF

```
PK??x?RR???.rels/.rels??n?0?_y??
????6R??e??6????[g5?F?I??l????c??=????????R?8?H?Kg?iK????$????{????M??
?d????1??
?c(o?p)?????n?.z??cg???oPK????x?RR??][?????Content_Types].xml?[o?0??
?5.?\\\e?`?y?[????AY.?n????VU?f?3|?????n?=????Vn?????n?rwv
????\_]~?q????3+????N????Aw?f.mi?q??CY? H?????,?Y?,,????m?#'\>????Fs??P:????r?MUZ??
????Y??.?^~?????h????;F?5o?x?N??s_c????d?L?E?~????c?9?s
?'????flj?_?/?QY(;?F?g?_?BNBg,????m?Ga!rN`L@?L??%i??@?Pr??j? f?;??????
?LI?"#??B?x,V?ry?>?E??o??S&x??<????q
\&1D? !??Bu?0??f?P??P??W?PK??x?RR?C(s????????CoreProperties.xml=?I?0????:p@5??
?1' ?6V?MG?+T?Q????|a????XL????8?????2?0 ?g?uu*yL?e4
M??_?q?*4%?T?r? ?]????_PK????x?RR????H ??_?E????dwf/documents/31DBCA26-99F0-438B-9E32-FE47640
????8????#????dwf/documents/31DBCA26-99F0-438B-9E32-FE47640B21EA/sections/com.autodesk.dwf.ePlot_47DF323E
?C?????07?a,@???\?~?=????`(??.?j?#z?FwW?;?*3????v?_~????_R?????0_=?????
?o)(????We?B?W?z????BWo????z????_?\?%+``',0??F? ??7鍼?J> ?s|????_q??\?1?Z??\?M?Eo??
F?????qL7????Z$kc?Q???
????????G??7?W????y????Q????W????<^?#????go??????
????W????@B??
?gr?Y?5;?^=?%??u?{$@?}?????kmo?v` ]m ?]??p3\?yk1R?%? ?j?bH?`?
(j?%R?dr??dp?s????\??
v]??P??&?1gt??@?r?????_:ua{? ?5`~M`b?g?M?MF'?A tKF0PT'??*@nR?????:?;0E?M'<&1F?D.Z??
?????+C?>?I?y`?2?2nW??,]??7?0?<(??.?W????pe????V!????U?*X????}????? ????_P5????oHA??
h
?*o0L?D?>h!xC'??X p::?R????Y&?&?e_?9????=[}]?/?vU? ?????u?2?0????,?udQ????#(2
????uce????!??1?????Ar??BWJi)%
```

DWF

- 無損存檔
- Binary File
- 2D構造圖

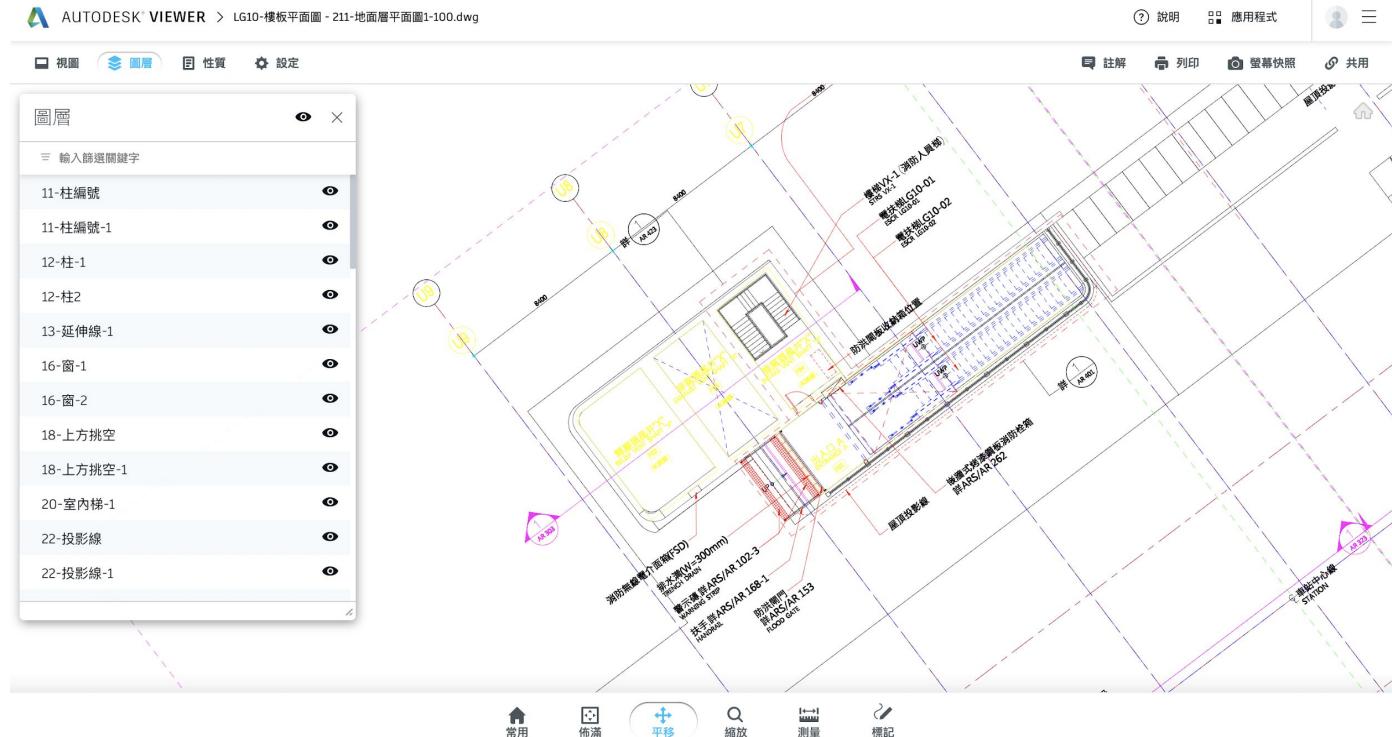


DWG

DWG

DWG

- 無損存檔
 - Binary File
 - 2D分解圖



DXF

DXF

```
$DIMALT  
40  
25.4  
9  
$DIMLFAC  
40  
1.0  
9  
$DIMTOFL  
70  
0  
9  
$DIMTVP  
40  
0.0  
9  
$DIMTIIX  
70  
0  
9  
$DIMSOXD  
70  
0  
9
```

```
$CLAYER  
8  
0  
9  
$CELTTYPE  
6  
ByLayer  
9  
$CECOLOR  
62  
256  
9  
$CELTSCALE  
40  
1.0  
9  
$DISPSILH  
70  
0  
9  
$DIMSCALE  
40  
1.0  
9
```

DXF

- 無損存檔
- 可解析檔
- 2D分解圖



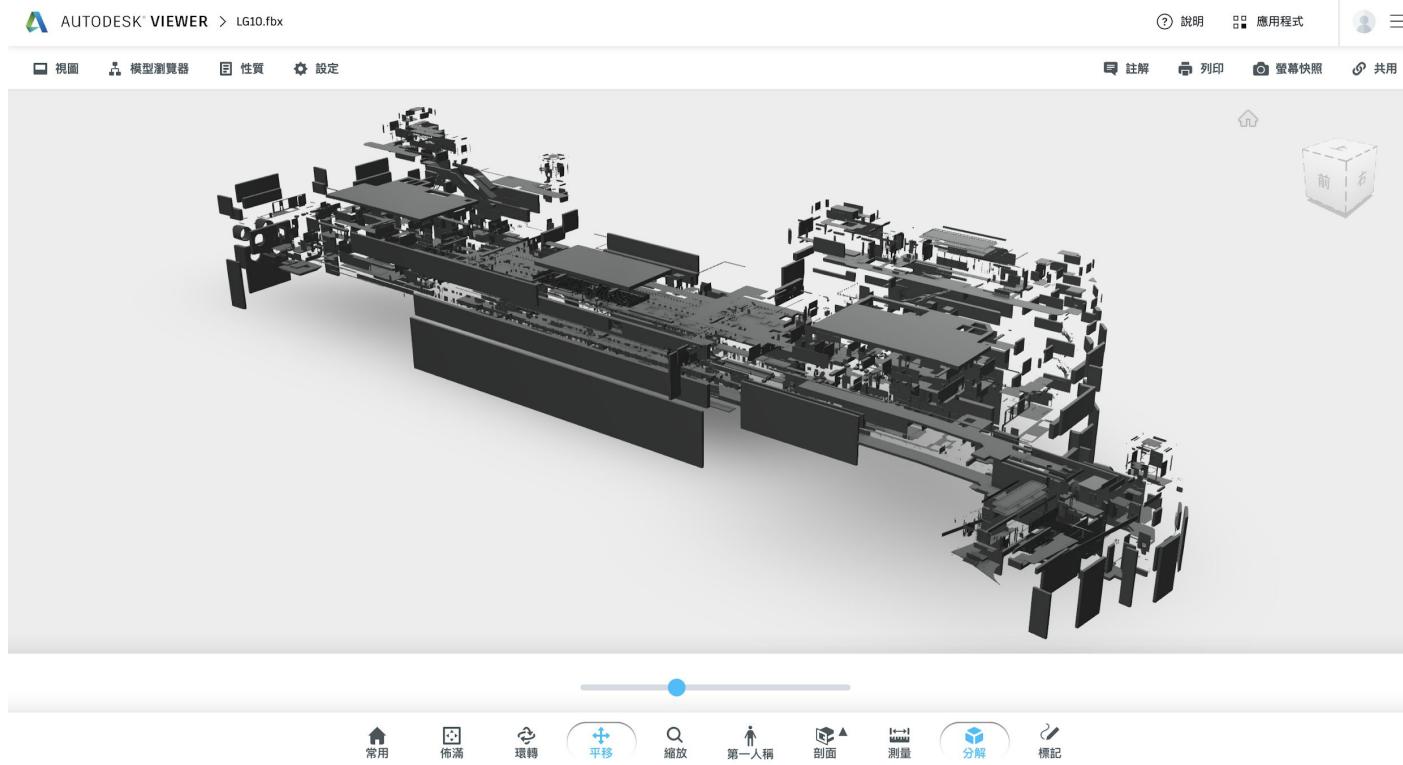
FBX

FBX

```
Kaydara FBX Binary  FBXHeaderExtension\????? FBXHeaderVersionI?????x???? ??????
FBXVersionI????? EncryptionTypeI????? ??????CreationTimeStamp????? VersionI??????
?????TypeS????UserData0?? VersionId????z?????????????MetaData^?? VersionId??????
?????GlobalSettings`?? VersionI?????
?????Properties70@?????)??? PS????UpAxisS????intS????IntegerS????I????????-???? PS
????UpAxisSignS????ints????IntegerS????I ????% ?????,??? PS  ???FrontAxisS????intS????IntegerS????I ????c
????FrontAxisSignS????intS????IntegerS????I????? ?????,??? PS  ???CoordAxisS????intS????IntegerS????I?????
????CoordAxisSignS????intS????IntegerS????I ???
?????1???? PS????OriginalUpAxisS????intS????IntegerS????I?????]
?????5???? PS????OriginalUpAxisSignS????ints????IntegerS????I ?????
?????8???? PS????UnitScaleFactorS????doubleS????NumberS????D{?G@z>@?
????@???? PS????OriginalUnitScaleFactorS????doubleS????Numbers????D?????????G?????H???? PS????AmbientColorS??
????DefaultCameraS????KStringS????S????S????Producer Perspective????????%???? PS????TimeModeS????enumS????S????I?
????TimeSpanStartS????KTimeS????TimeS????L????????????????2???? PS????TimeSpanStopS????KTimeS????TimeS????L?????
?????
?????8???? PS????CustomFrameRateS????doubleS????NumberS????D????????5
?????&???? PS
????TimeMarkerS????CompoundS????S????w
?????4???? PS????CurrentTimeMarkerS????intS????IntegerS????I?????????????????????????????????????????????????
?? ?????CountI ????????????? DocumentL ?????S????REVIT_3DS????Scene????????Properties70@?????&??
ReferencesV?? ???
????FilePathUrls????LG10.fbx#?? ???
?????
ObjectTypeS????SceneI?? ???
????DocumentPathS????REVIT_3D???????????????????????????????? ReferenceS????Reference_1S????Internal????$????Object
????DocumentPathS????REVIT_3D???????????????????????????????????? ReferenceS????Reference_2S????Internal]????$????ObjectL
????DocumentPathS????REVIT_3D???????????????????????????? ReferenceS????Reference_3S????Internal????*????ObjectL
```

FBX

- 無損存檔
- 加密檔
- 3D分解構造圖



IFC

```
#11= IFC DIRECTION((1.,0.,0.));
#13= IFC DIRECTION((-1.,0.,0.));
#15= IFC DIRECTION((0.,1.,0.));
#17= IFC DIRECTION((0.,-1.,0.));
#19= IFC DIRECTION((0.,0.,1.));
#21= IFC DIRECTION((0.,0.,-1.));
#23= IFC DIRECTION((1.,0.));
#25= IFC DIRECTION((-1.,0.));
#27= IFC DIRECTION((0.,1.));
#29= IFC DIRECTION((0.,-1.));
#31= IFC AXIS2PLACEMENT3D(#6,$,$);
#32= IFC LOCAL PLACEMENT(#1821,#31);
#35= IFC PERSON($,'','donaldlu@oitc.com.tw',$,$,$,$,$,$);
#37= IFC ORGANIZATION($,'','','$,$);
#38= IFC PERSON AND ORGANIZATION(#35,#37,$);
#41= IFC OWNER HISTORY(#38,#5,$,.NOCHANGE.,$,,$,$,1612234963);
#42= IFC SI UNIT(*,.LENGTHUNIT.,$,METRE.);
#43= IFC SI UNIT(*,.AREAUNIT.,$,SQUARE_METRE.);
#44= IFC SI UNIT(*,.VOLUMEUNIT.,$,CUBIC_METRE.);
#45= IFC SI UNIT(*,.PLANEANGLEUNIT.,$,RADIAN.);
#46= IFC DIMENSIONAL EXPONENTS(0,0,0,0,0,0,0,0);
#47= IFC MEASURE WITH UNIT(IFCRATIO MEASURE(0.0174532925199433),#45);
#48= IFC CONVERSION BASED UNIT(#46,.PLANEANGLEUNIT.,'DEGREE',#47);
```

IFC

- 資料遺失？
- 可解析檔
- 3D線圖
- IfcOpenShell



● IfcOpenShell

```
>>> import ifcopenshell
>>> f = ifcopenshell.open("./LG10.ifc")
>>> products = f.by_type('IfcProduct')
>>> products
[#114=IfcBuilding('0knnLJwjT5H8D6qRgfHp$Y',#41,'$',,$,#32,$,'',.ELEMENT.,$,,$,$), #1824=IfcSite(
'0knnLJwjT5H8D6qRgfHp$X',#41,'Default',$,,$,#1821,$,$,.ELEMENT.,(42,24,53,508911),(-71,-15,-29,-
58837),0.,$,,$), #129=IfcBuildingStorey('0knnLJwjT5H8D6qRfM1mZ9',#41,'軌道層',$,,'樓層:樓層標高兩
行',#128,$,'軌道層',.ELEMENT.,98.415), #135=IfcBuildingStorey('0knnLJwjT5H8D6qRfM1WXk',#41,'月
台層',$,,'樓層:樓層標高兩行',#134,$,'月台層',.ELEMENT.,99.45), #141=IfcBuildingStorey('0knnLJwjT
5H8D6qRfM16e',#41,'穿堂層',$,,'樓層:樓層標高兩行',#140,$,'穿堂層',.ELEMENT.,104.9), #159=IfcBui
ldingStorey('0knnLJwjT5H8D6qRfMg2$k',#41,'出入口C',$,,'樓層:樓層標高兩行',#158,$,'出入口C',.ELEM
ENT.,115.), #601=IfcSpace('0rR5GV0ez5ufB1JgfQR9Ug',#41,'1',$,,$,#440,#597,'區域',.ELEMENT..INT
ERNAL.,$), #628=IfcSpace('0rR5GV0ez5ufB1JgfQR9Hw',#41,'2',$,,$,#617,#626,'區域',.ELEMENT..INT
ERNAL.,$), #650=IfcSpace('0rR5GV0ez5ufB1JgfQR9H$',#41,'3',$,,$,#639,#648,'區域',.ELEMENT..INTERNAL
.,$), #672=IfcSpace('0rR5GV0ez5ufB1JgfQR9Hy',#41,'4',$,,$,#661,#670,'區域',.ELEMENT..INTERNAL.,
$), #751=IfcBuildingElementProxy('11NVyd70DCrRylTI98chpa',#41,'逃生通過線:逃生通過線:4084637',$
,'逃生通過線:逃生通過線',#750,#745,'4084637',$), #805=IfcBuildingElementProxy('11NVyd70DCrRylTI
98chlz',#41,'逃生通過線:逃生通過線:4084868',$,,'逃生通過線:逃生通過線',#804,#799,'4084868',$),
#835=IfcBuildingElementProxy('11NVyd70DCrRylTI98cheZ',#41,'逃生通過線:逃生通過線:4085082',$,,'逃
生通過線:逃生通過線',#834,#829,'4085082',$), #875=IfcBuildingElementProxy('2hsoWEn1fASxd9M6XVCu
Za',#41,'逃生通過線:逃生通過線:4086161',$,,'逃生通過線:逃生通過線',#874,#869,'4086161',$), #905=
IfcBuildingElementProxy('2hsoWEn1fASxd9M6XVCul0',#41,'逃生通過線:逃生通過線:4086445',$,,'逃生通
過線:逃生通過線',#904,#899,'4086445',$), #928=IfcBuildingElementProxy('2hsoWEn1fASxd9M6XVCueH',
#41,'逃生通過線:逃生通過線:4086628',$,,'逃生通過線:逃生通過線',#927,#922,'4086628',$), #968=IfcB
uildingElementProxy('2hsoWEn1fASxd9M6XVCutU',#41,'逃生通過線:逃生通過線:4086955',$,,'逃生通過線:
逃生通過線',#967,#962,'4086955',$), #998=IfcBuildingElementProxy('2hsoWEn1fASxd9M6XVCuyq',#41,'
```

NWC



NWC

- 資料遺失？
- Binary File
- 3D線圖

