GIS.FCU 逢甲大學地理資訊系統研究中心

http://www.gis.tw

資源共享資訊平台之發展趨勢

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2008.05

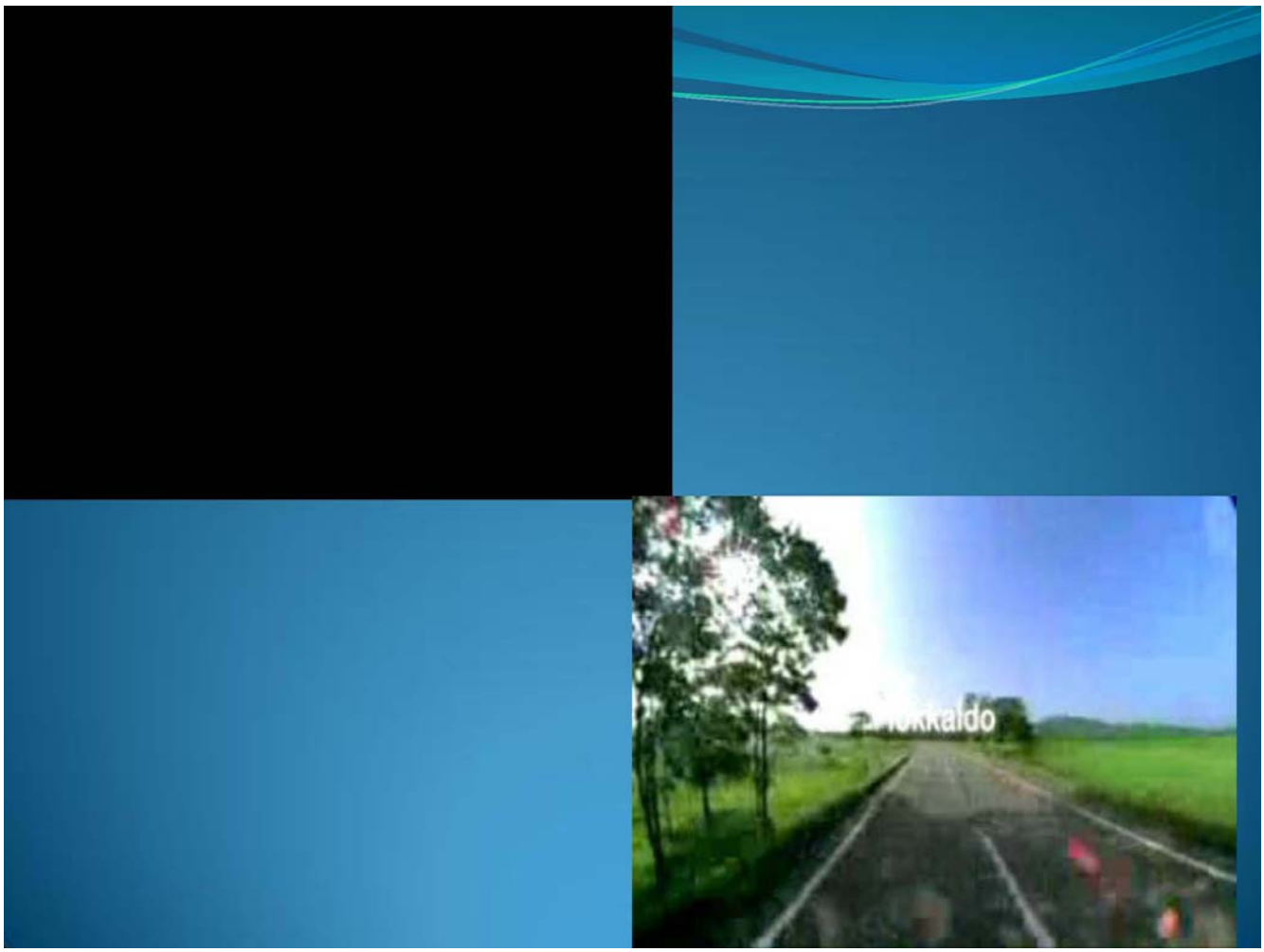
OGC Associate Member　OASIS

GIS.FCU

前言

- 如果一個大社區可以共用發電廠、圖書館與儲水池，爲什麼每個家庭或企業都得自備電腦系統？(Ian Foster)
- 未來你永遠只需要 640 KB (Bill Gates)


Geo-spatial Data Warehouse
資料倉儲
•成為資料交換平台
•建立資料更新機制
•使用共同資料來源
•強化客戶關係管理
•確認資料供需關係
•作為資料探勘基礎
地理資料倉儲
GIS
文數字屬性
決策者
統計圖表
資料倉儲中心
平台
地理資料庫
土地基本資料庫
公文資料庫
環境教育資料庫
知識管理資料庫
工程管理資料庫
單一入口
資料倉儲中心
水土保持局地理資料倉儲中心


Hokkaido

Web services

- Web services-
  - W3C(World Wide Web Consortium) defines as "a software system designed to support interoperable Machine to Machine interaction over a network."
  - Web services are frequently just Web APIs that can be accessed over a network, such as the Internet, and executed on a remote system hosting the requested services.

SOA (Service Oriented Architecture)

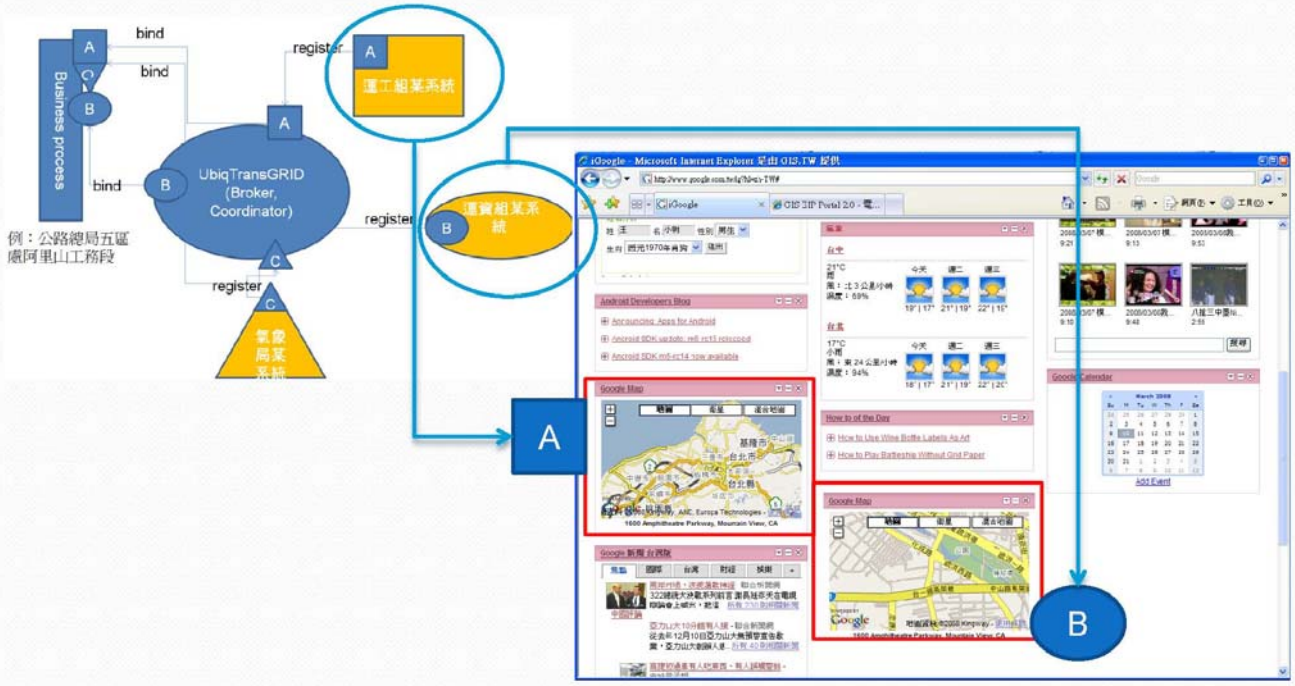
- OASIS (the Organization for the Advancement of Structured Information Standards) 定義：
  - 一種能夠組織和應用分散在不同區位的能量的營運型態，而該組織和應用的機制均能夠受到控制。在這樣的機制下，不論提供、查找或兩兩交互運用便可以產生事先預期或規劃的成果
  - 如
    - 仲介業提供房屋租售物件
    - 電視購物提供各種家用品
    - 網路購物提供各種3C家電
    - 研考會e政府服務平台提供各種網路服務

SOA, Web 2.0, and mashup

- In technology, a **mashup** is a web application that combines data from more than one source into a single integrated tool; an example is the use of cartographic data from Google Maps to add location information to real-estate data from Craigslist, thereby creating a new and distinct web service that was not originally provided by either source
  - Ex: iGoogle

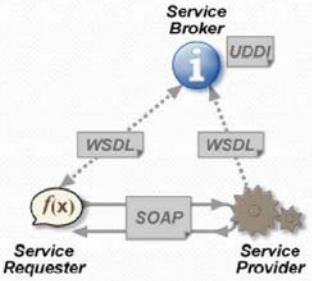
Mashups範例-iGoogle

Machine to human



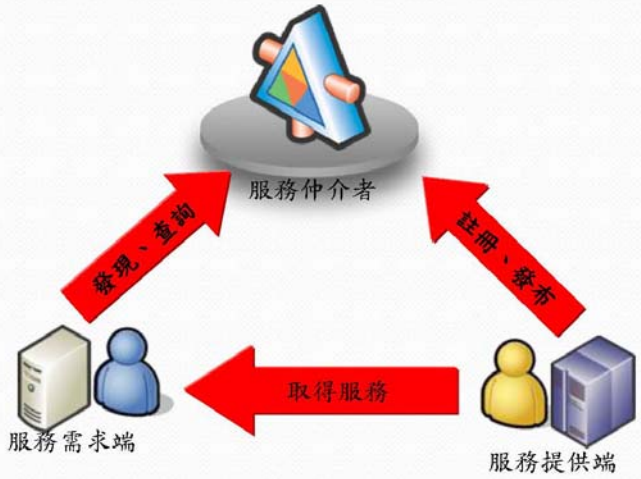
Why SOA

- 政府的施政作爲需要跨單位的協調整合
- 經過數十年的施政電子化，政府已擁有非常多的電子資料及資訊系統
- 上述電子資料及資訊系統在過去並沒有成熟的標準或協定可以整合
- SOA在軟體業界的發展已可做爲我國政府單位進行業務/資訊系統整合的架構

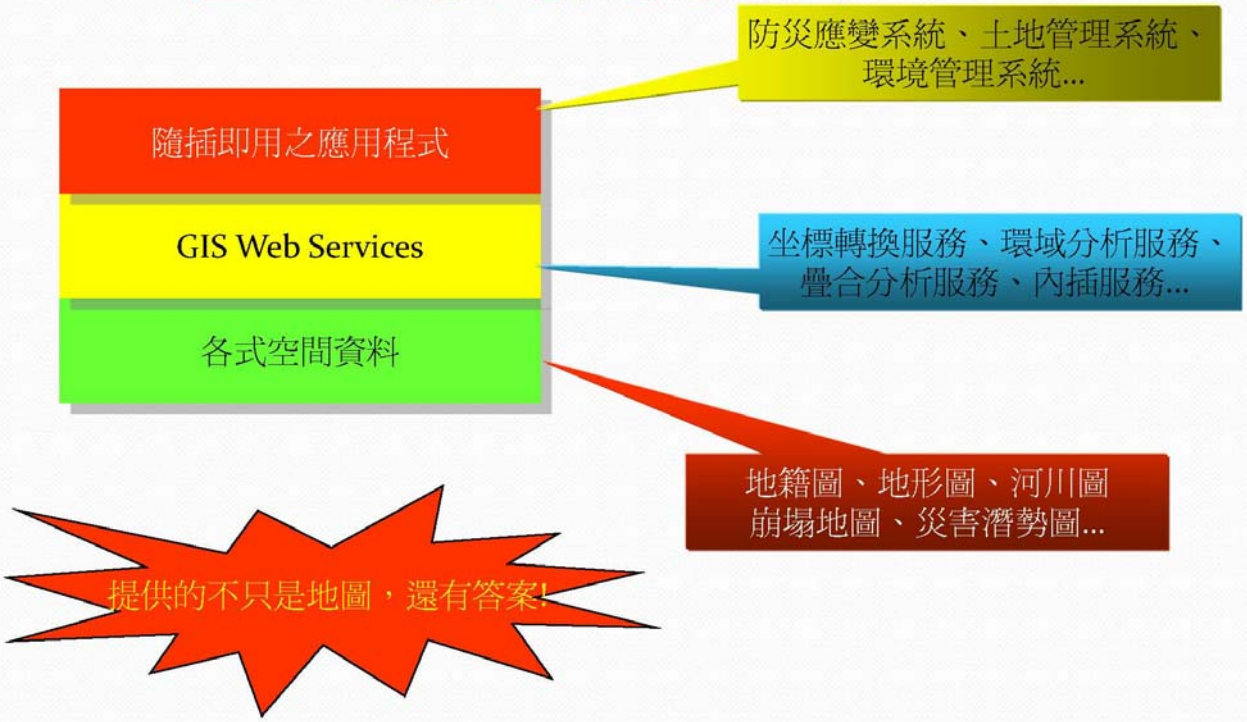


服務導向架構SOA

- 目前國際上異質性平台交換流通及整合服務的架構
- 目前研考會e政府服務平台的架構
- 以「應用系統」作爲「使用者」考慮
  - 同W3C的定義，Machine to Machine



SOA在GIS應用的想法

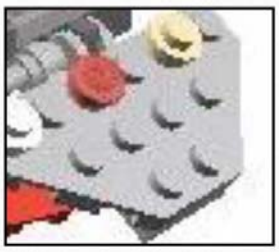


SOA最大特徵

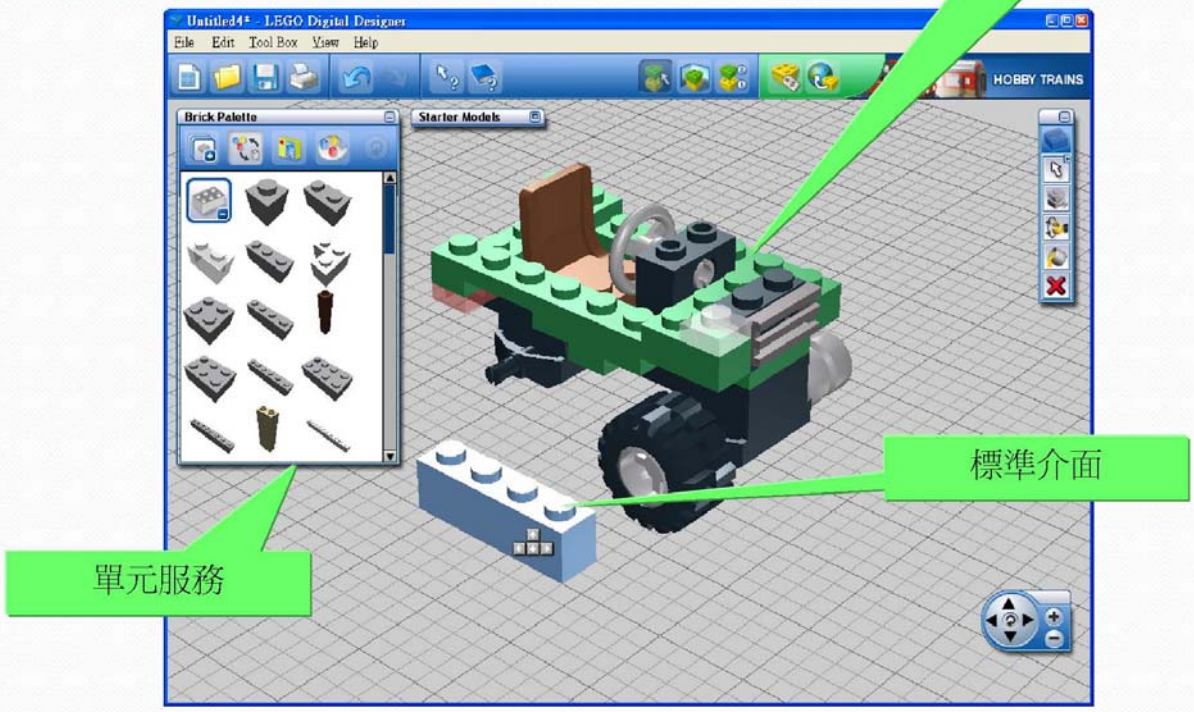
- 將許多常用的功能「服務」變成網路元件
- 使用者除了可以提供服務出去，也可以使用別人提供的服務
- 可以將別人提供的服務進行「串接」、「加值」，又變成一個新的服務供其他人使用
- 貢獻、分享、互動
  - 企業級的Web 2.0

SOA價值

- 每一個單元服務就像一個積木，Web Services的標準就像積木上的突起
- 透過積木的組裝，可以建構出一個嶄新的應用，稱之爲創新服務。



樂高虛擬遊戲



http://ldd.lego.com/download/

服務流程

開發者減少了開發的時間與成本

物資需求資訊
台中市政府提供

67-97轉換服務
土地測量局提供

最短路徑服務
逢甲大學提供

物資分配服務
台中市政府提供

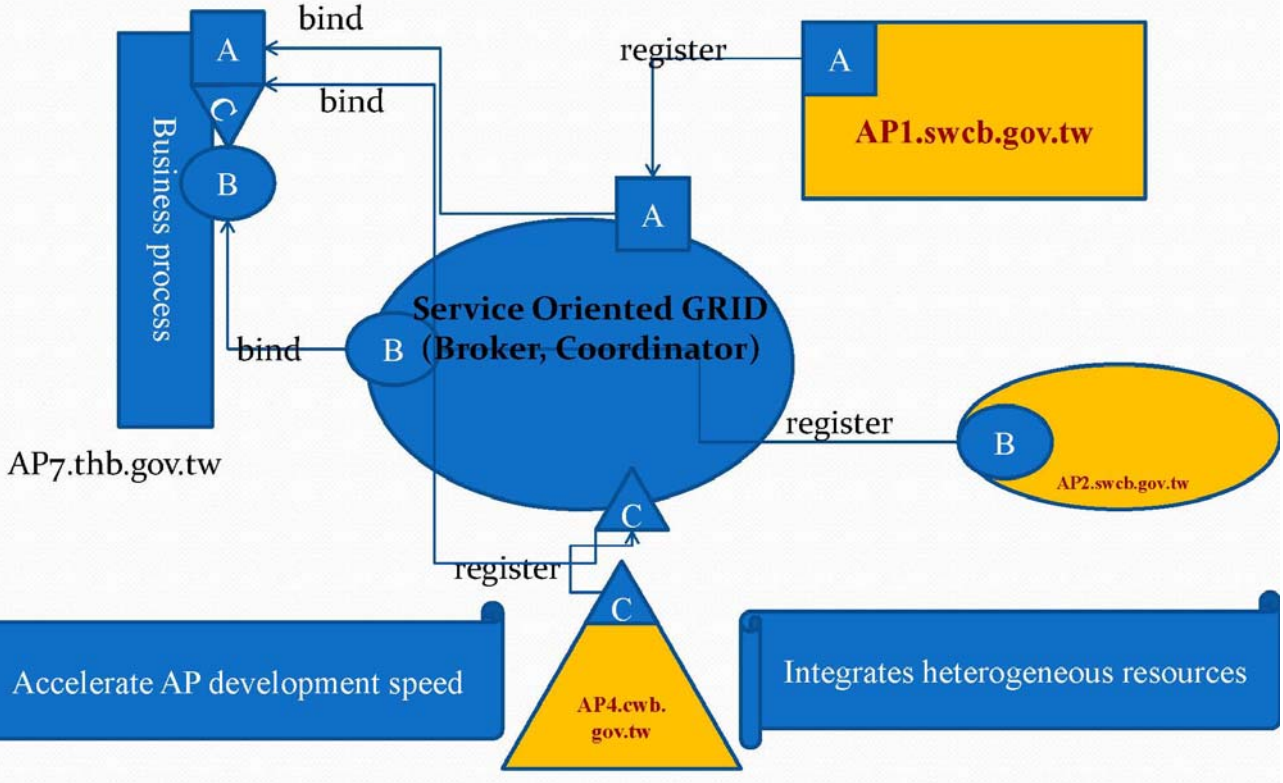
1/1000路網圖
台中市政府提供

救災倉庫物資資訊
水利署提供

道路通阻
運研所提供

從網路上找尋既有的功能，
像玩樂高般將它組合成應用程式

Mashup-SOA
Machine to Machine



應用實例-異質資訊整合展示

AVI

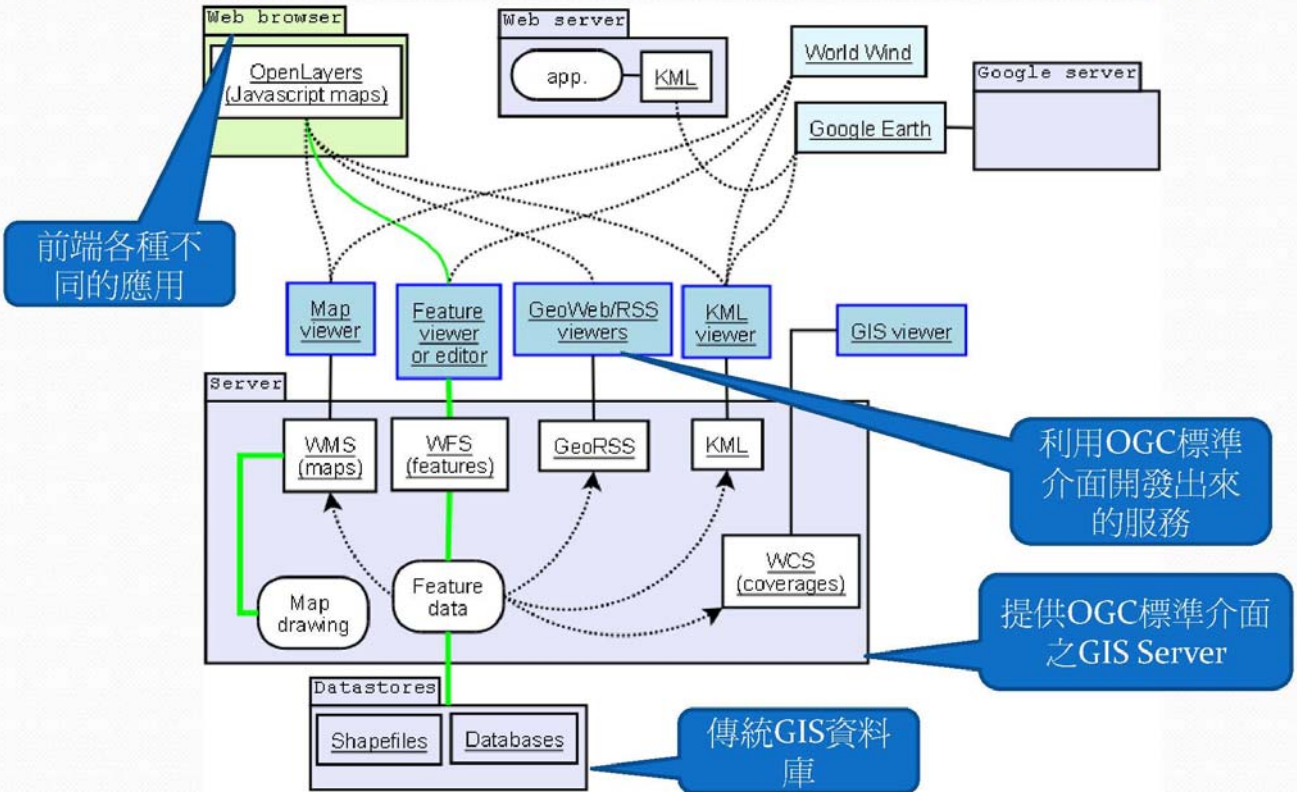
OGC (Open Geospatial Consortium)
在跨平台整合的作為

OWS(OGC Web Services)

Open Geospatial Consortium

- The Open Geospatial Consortium, Inc (OGC) is an international industry consortium of **348** companies, government agencies and universities participating in a consensus process to develop publicly available interface specifications. **OpenGIS® Specifications** support **interoperable** solutions that "geo-enable" the Web, wireless and location-based services, and mainstream IT. The specifications empower technology developers to make complex spatial information and services accessible and useful with all kinds of applications.

OGC: Geo-services server with apps

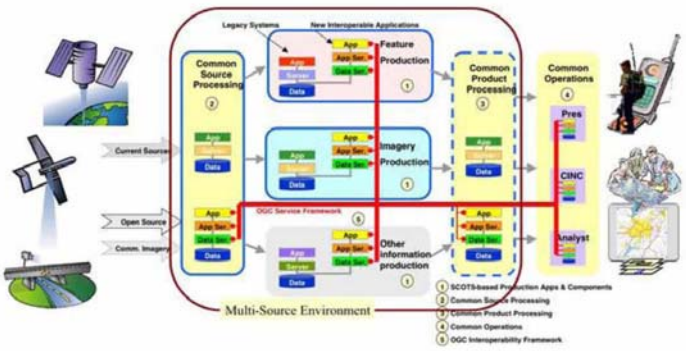


OWS-1

- After the events of September 11, the OWS 1.1 sponsors agreed to align OWS 1.1 to address interoperability challenges defined by officials in New York City.
- The OWS 1.1 demonstration scenario developed by the sponsors challenged participating technology developers and integrators to implement interoperability capabilities that address specific critical disaster management needs involving New York City data.
- Focus on:
  - OGC Common Architecture
  - Web Mapping
  - Imagery Exploitation and Sensor Web

OWS-1 achievement

- Stefan Falke , "The OWS-1 Initiative work," says Falke "means that analysts can not only get at sensor data, but can seamlessly integrate it with other data, including imagery, base maps and other resources."



OWS-2

- Common Architecture:
  - using the W3C's WSDL and SOAP standards for "publishing, finding and binding" geoprocessing services.
- Technical Baseline Maturation:
  - Developing compliance tests for and improving the OpenGIS Specifications for WMS,WFS,WCS,WOS,CS-W and GML 3.x. A Reference Implementation for Web Coverage Server and for an Integrated Client will be created under this initiative.
- Image Handling and Decision Support Tools:
  - Finding, binding, and chaining" individual Web accessible image archival and processing
    functions sequentially into complete workflows Information Interoperability:

OWS-3

- Common Architecture
- Sensor Web Enablement (SWE)
- Geo-Decision Support Services (GeoDSS)
- Geo-Digital Rights Management (GeoDRM)
- Open Location Services (OpenLS)

OWS-4

- Sensor Web Enablement (SWE)
- Geo Processing Workflow (GPW)
- Geo-Decision Support (GeoDSS)
- Geo-Digital Rights Management (GeoDRM)
- CAD / GIS / BIM (CGB)
- OGC Location Services (OpenLS)
- Compliance Testing (CITE)

OWS-5

- 1. Sensor Web Enablement (SWE)
- 2. Geo Processing Workflow (GPW)
- 3. Agile Geography
- 4. Compliance Testing (CITE)
- - CAD / GIS / BIM

OWS-6

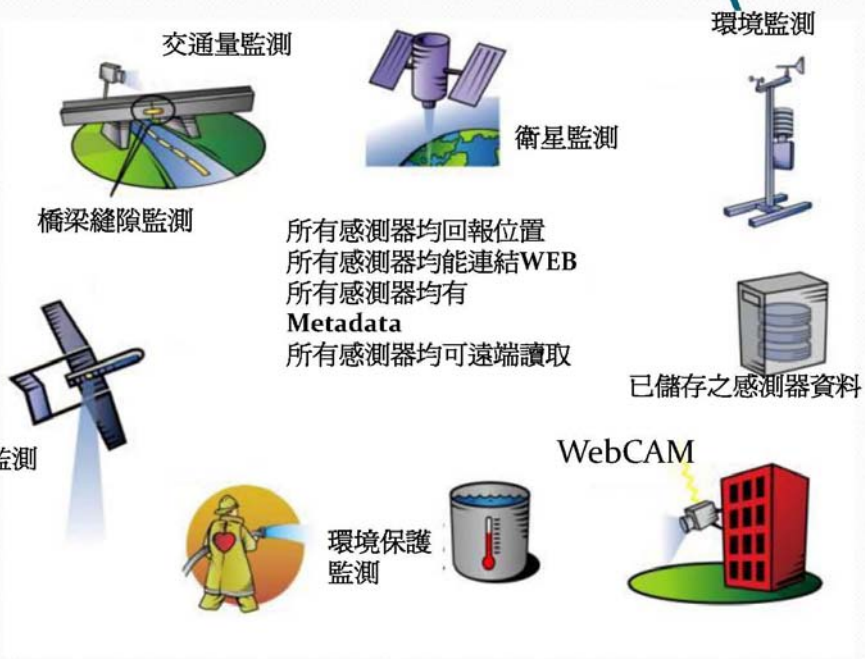
- 1. Sensor Web Enablement (SWE)
- 2....
- 3....

Will be announced on June,2008.

歷次OWS的共同議題

- 共通架構(common architecture)
- 決策支援(decision support)
- 感測器網絡(sensor web)
- 流程整合(geo-processing)

Sensor Web Enablement(SWE)



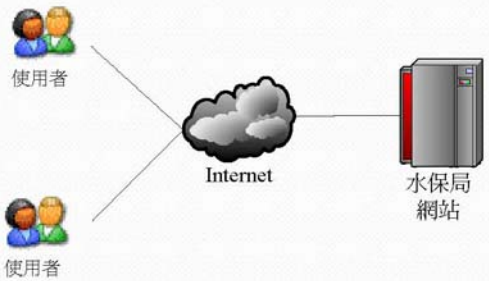
- SWE offers integrators:
  - 感測器WEB應用的開放標準
  - 可連結IEEE 1451, TML, CAP, WS-N, ASAP
  - 支援影像設備界面
  - Opportunity to participate in an open process to shape standards
  - 與OGC既有之各種標準(WMS, WFS)整合
  - 將感測器資料與其他空間資料融合(fusion)
  - 與其他如IEEE等國際標準組織之標準結合

格網運算

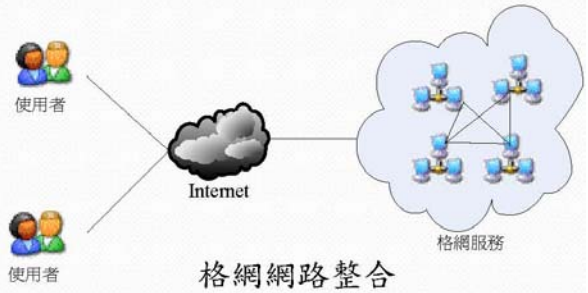
SOA化的格網運算

格網的概念

- 傳統Internet資訊服務
  - 單一網站資訊
- 格網服務架構
  - 分散式整合
  - 資源共享
  - 服務導向架構(SOA)



傳統Internet資訊服務



格網網路整合

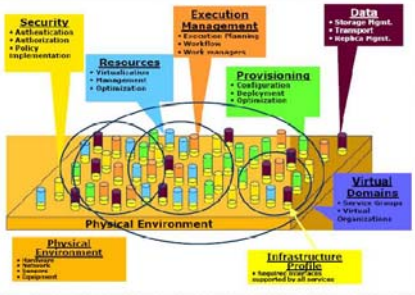
格網的定義

- 格網的研究者與web services的研究者原本是兩批人
- 但近年因web services及SOA的成功使得這兩批人使用的技術與觀念逐漸收斂
- OGSA(Open Grid Services Architecture)近年將其底層OGSI(Open Grid Services Infrastructure)抽換掉，改爲WSRF(Web services Resources Framework)，更證明GRID與SOA(web services)的密切關係。
- 已經不是傳統對於擁有超級計算能力的狹隘定義

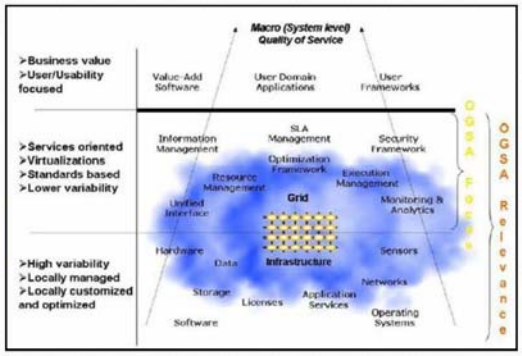
OGSA

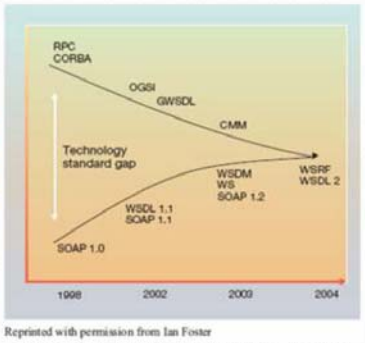
Open Grid Services Architecture 開放式格網服務架構

- OGSA 是由 Global Grid Forum（GGF）的 Open Grid Services Infrastructure（OGSI在2002 年 6 月制定），其一開始是針對合併服務導向架構與格網架構為主。
- 支援跨分散式異質平台管理資源、強化服務質量（Quality of Service，QoS）、最佳化、定義開放的、已公佈的界面，以及應用產業標準整合技術、工作執行、資料服務、安全、降低行政成本、可獲得性、穩定度以及容易使用與延伸



OGSA框架圖





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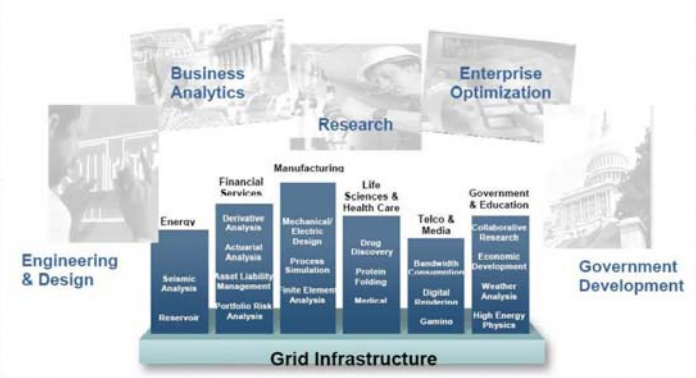
格網技術與服務導向架構之技術收斂趨勢

- **Defining the Grid: A Roadmap for OGSA® Standards Version 1.1 2008.2.12**
  - "Grid" is concerned with the integration, virtualization, and management of services and resources in a distributed, heterogeneous environment. It is "service-oriented" because it delivers functionality as loosely coupled, interacting services aligned with industry-accepted Web services standards.



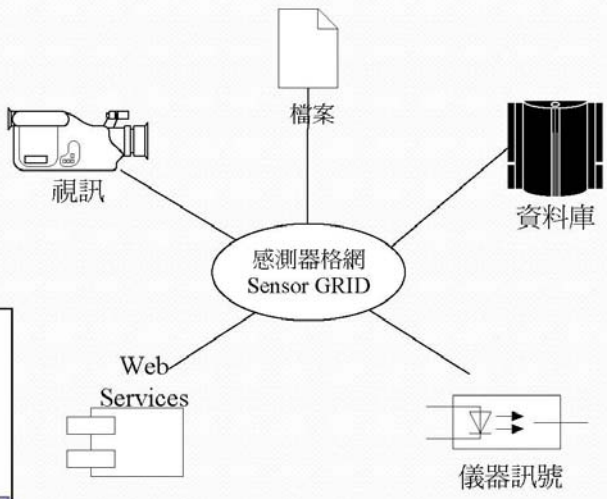
GRID-not only compute-intensive

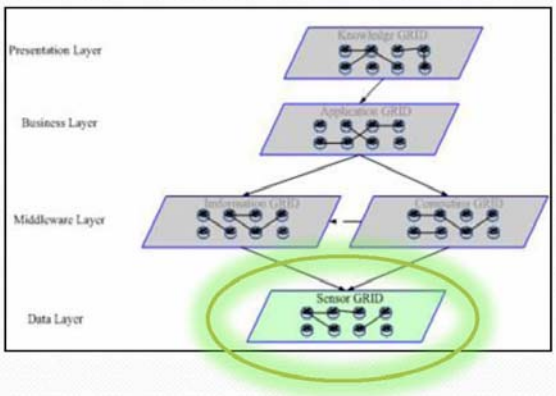
- Early on, much of the available literature focused on the compute-intensive problems made tractable by grid, often associating it with cycle-scavenging or job scheduling technologies.
- The real "innovation" in grid comes from the combination of technology domains that include workload virtualization, information virtualization, system virtualization, storage virtualization, provisioning, and orchestration.
- From this statement, one may already conclude that *no single technology constitutes a grid, but, instead, the method with which broad sets of resources are* accessed and combined.
- Grid computing is not about a specific hardware platform, a database or a particular piece of job management software, but the way in which IT resources dynamically interact to address changing business requirements.

- IBM views grid computing as critical to the ongoing development of a dynamic and flexible infrastructure that enables SOA:
  - Traditional SOA
    - allows customers to separate applications from services
  - Grid
    - allow customers to separate both applications and services from the infrastructure and systems resources
- Grids provide an underlying foundation to support the dynamic nature of SOA

感測格網(Sensor GRID)

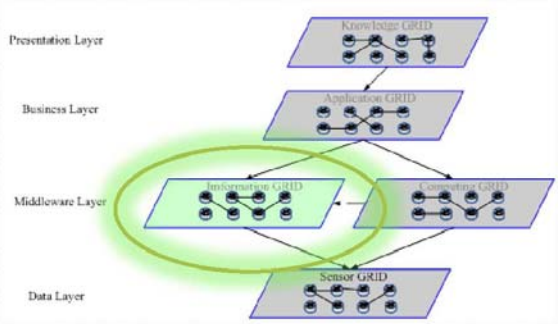
- 表示原始資料
  - 儀器訊息
  - 網路元件
  - 實體檔案
  - …

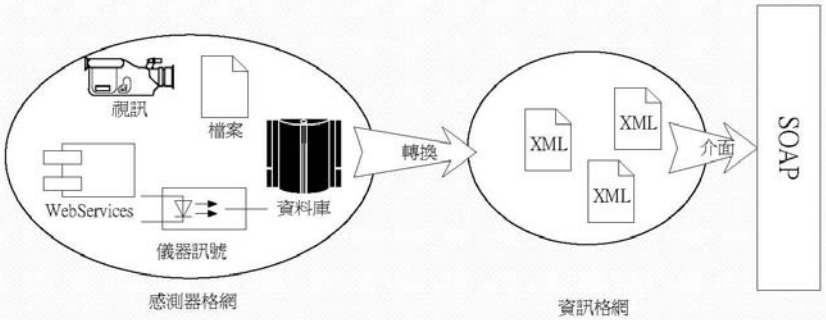




資訊格網(Information GRID)

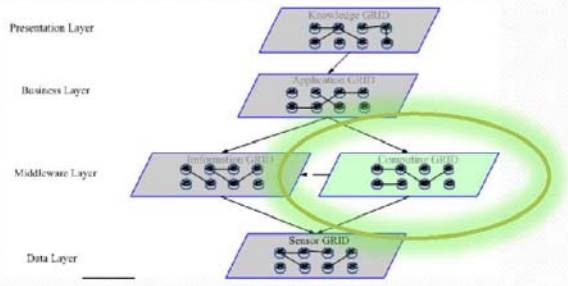
- 將資料轉換為有意義的資訊
- 採用標準XML描述資訊
- 採用SOAP標準

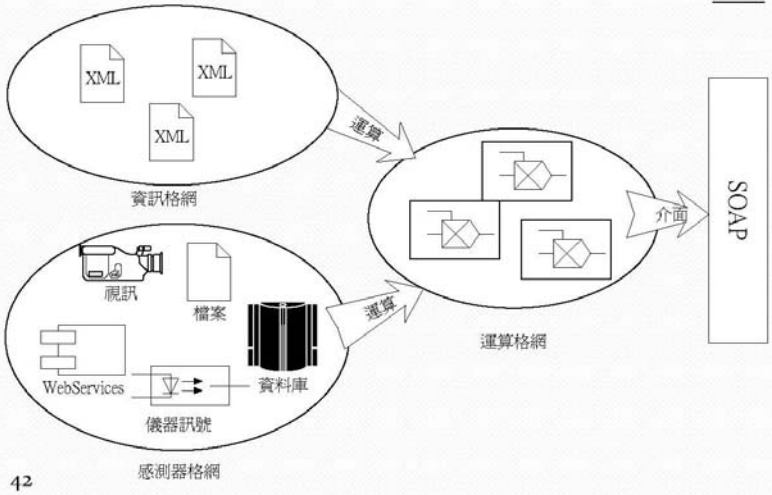




運算格網(Computing GRID)

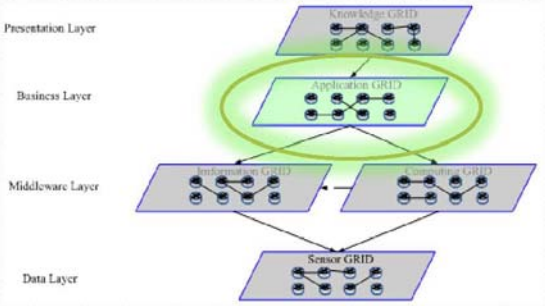
- 提供資料運算處理功能
  - 接收資訊與感測格網資料
  - 對資料進行基礎運算與處理

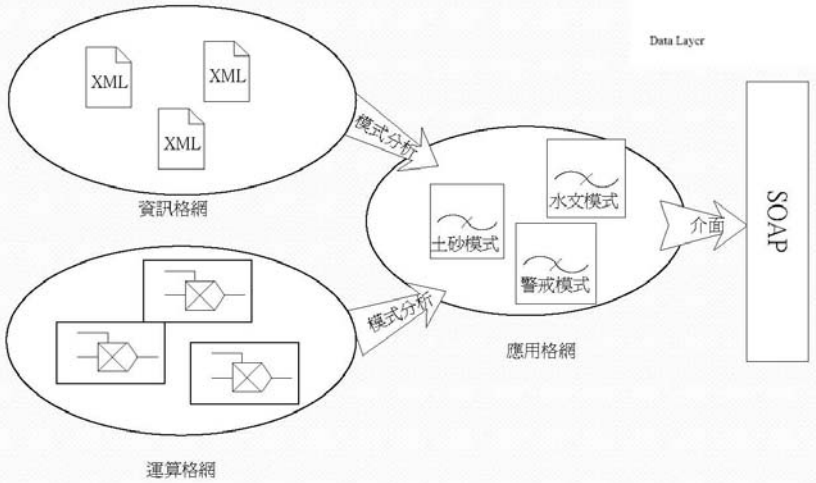




應用格網(Application GRID)

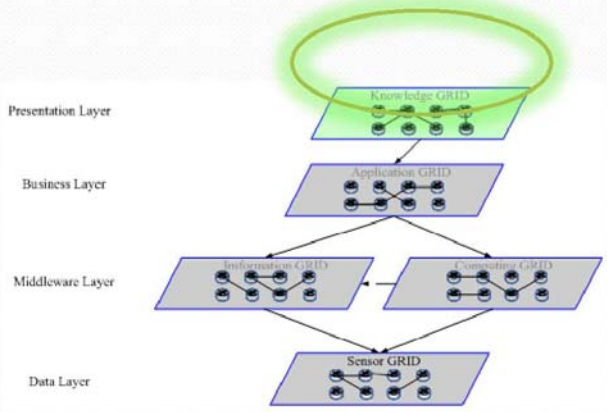
- 解決特定問題
- 模式導向服務



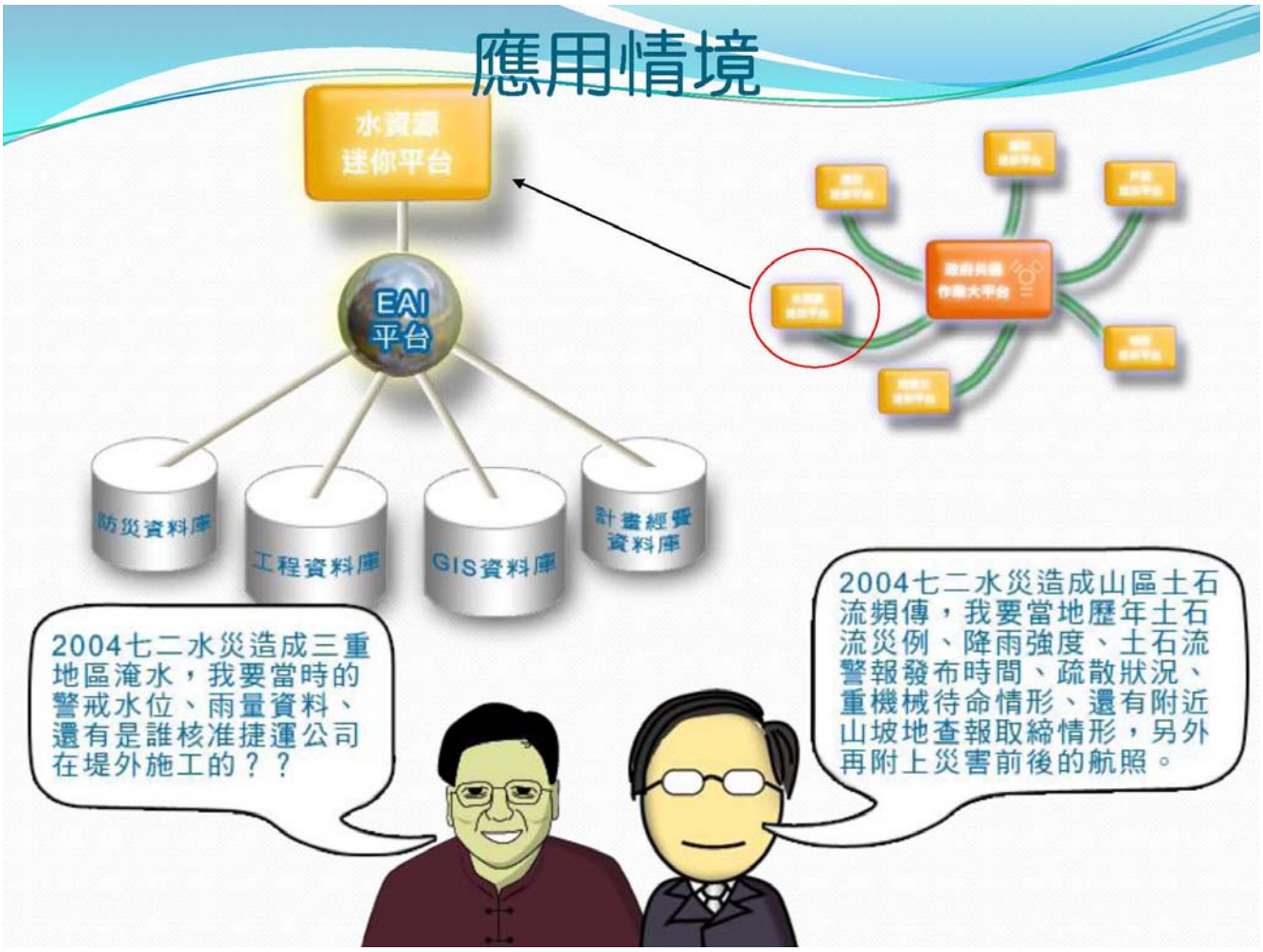


知識格網(Knowledge GRID)

- 需要豐富領域知識與應用格網支援
- 透過格網交互作用產生連結，產生特定知識
- 知識產生
  - 人工回饋
  - 機器學習



應用情境



透過平台撈取異質資料產製綜合性報表

AVI

上安村

南投縣水里鄉
平均高度550m
平均坡度 25%

土石流觀測資料

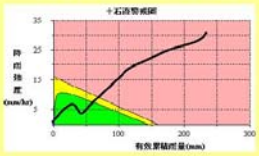
2004/07/02 12:01:56 1st 鋼索斷裂

2004/07/02 12:02:02 2nd鋼索斷裂

雨量資料(單位:公厘)			
時雨量	3小時雨量	6小時雨量	單日累積雨量
100	236	610	829

警戒發佈情形

2004/07/02 10:00達警戒基準發布警報

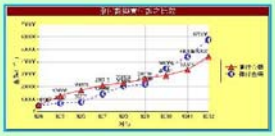


疏散避難情形

2004/07/02 12:00疏散至郡坑國小及5鄰、7鄰活動中心，共計疏散1200人

治山防災工程概況

自桃芝風災後進行相關防砂壩工程，共計經費125,634,000元。

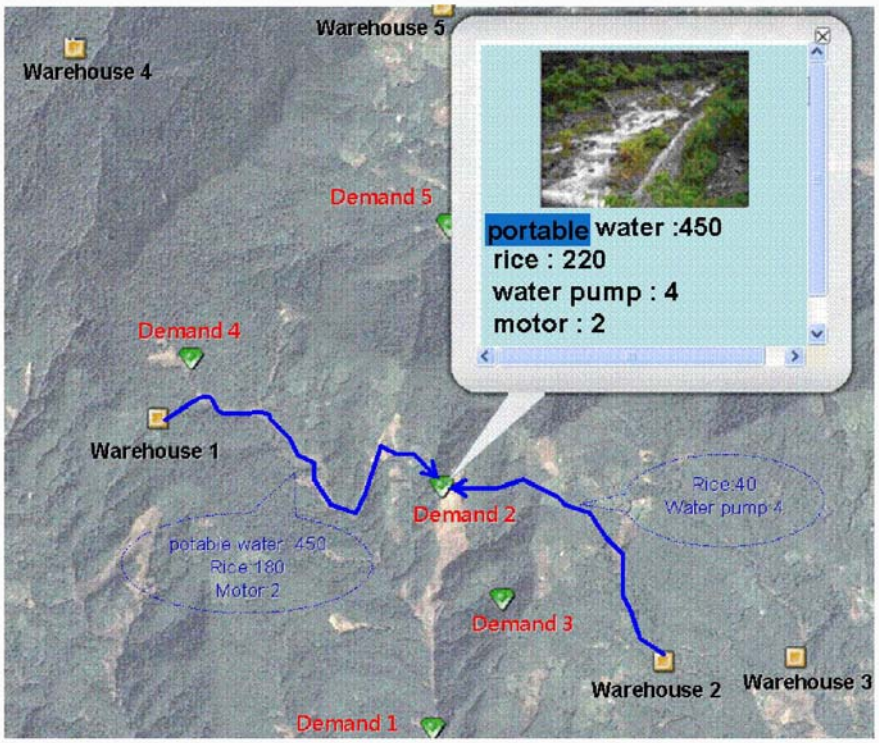


相關山坡地查報取締情形

2003/05/06 南投縣政府...

2004/06/12 南投縣政府...

Stockpiles distribution decision support



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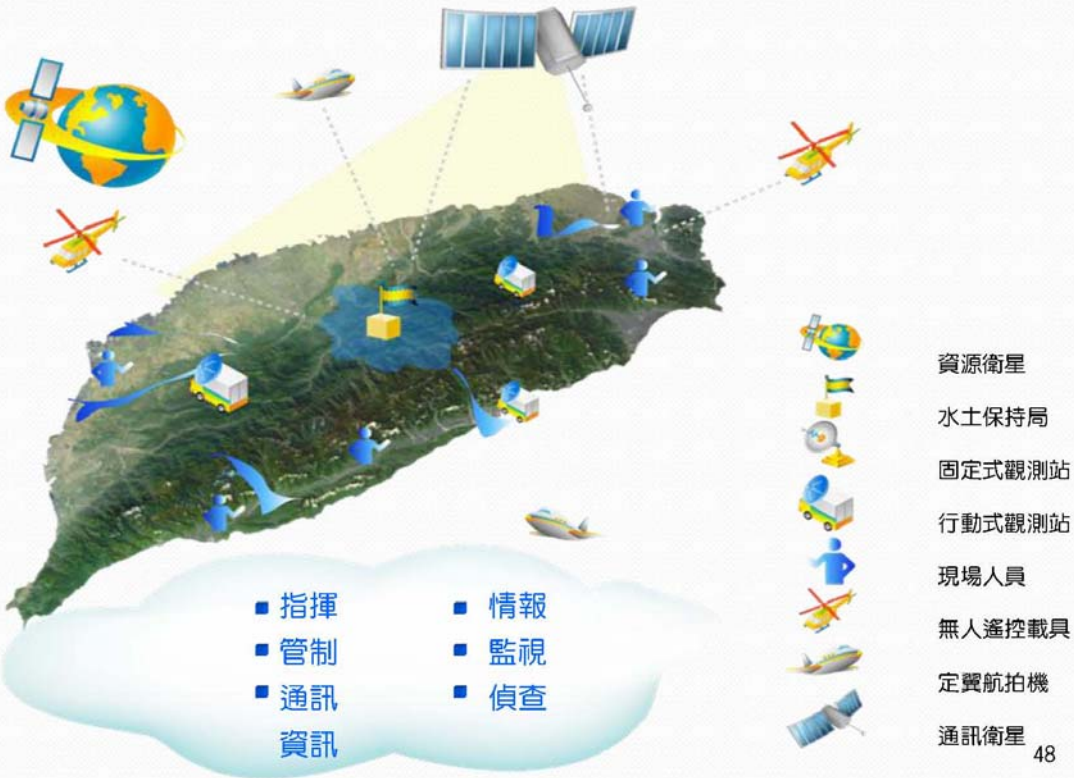
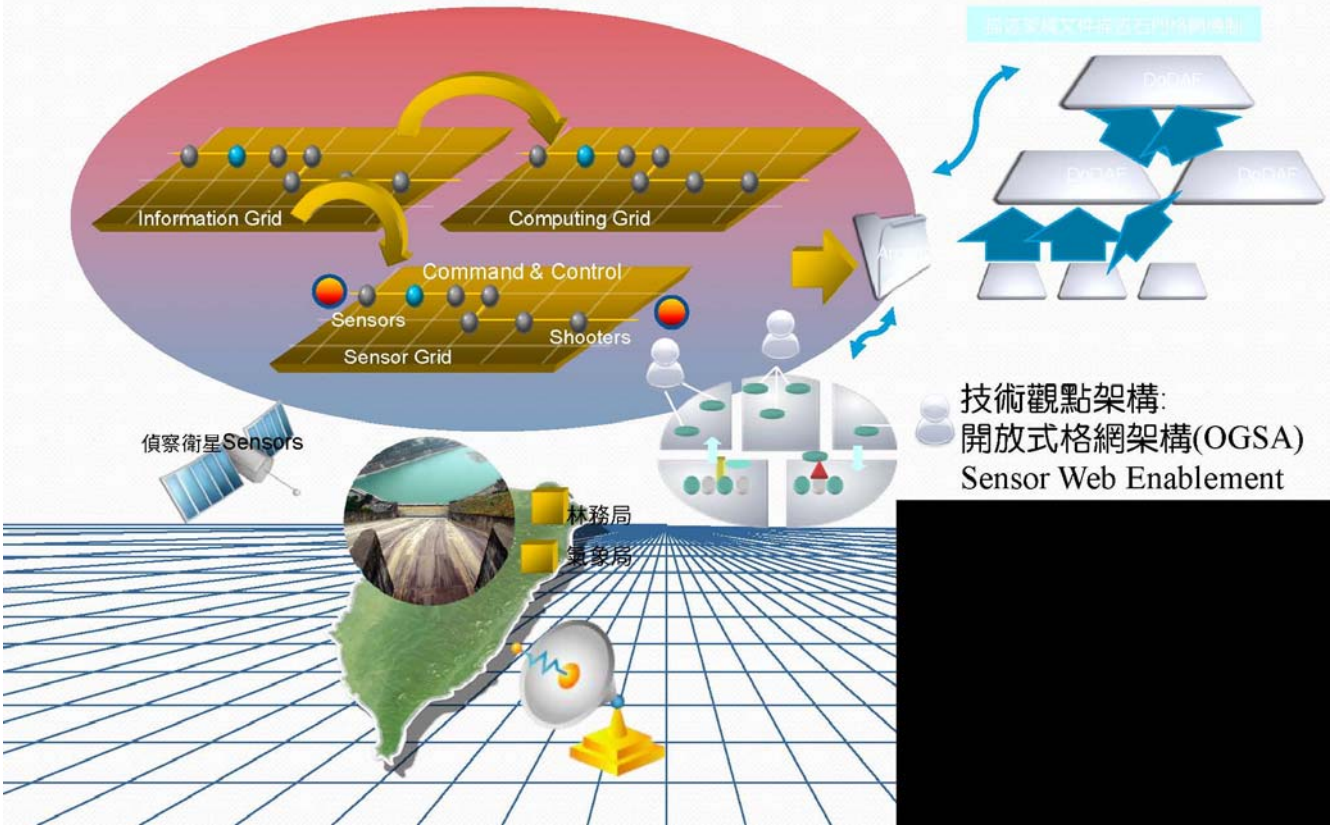
格網構想圖

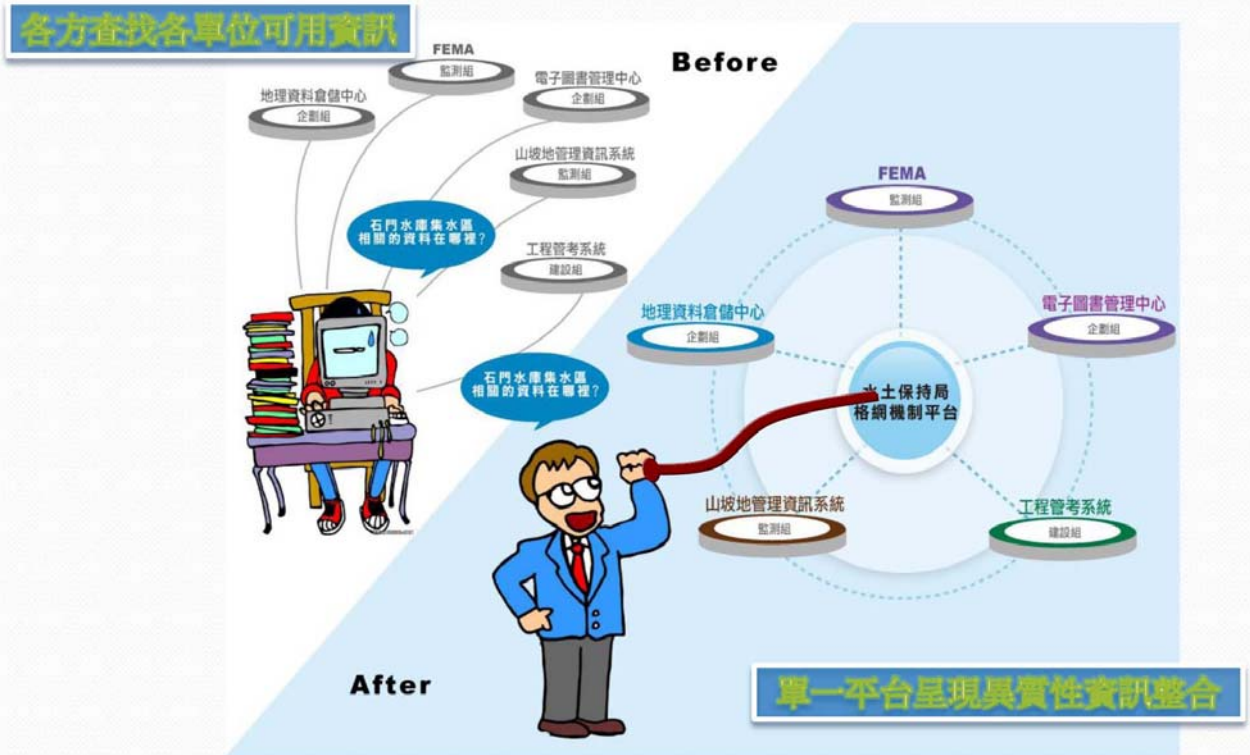


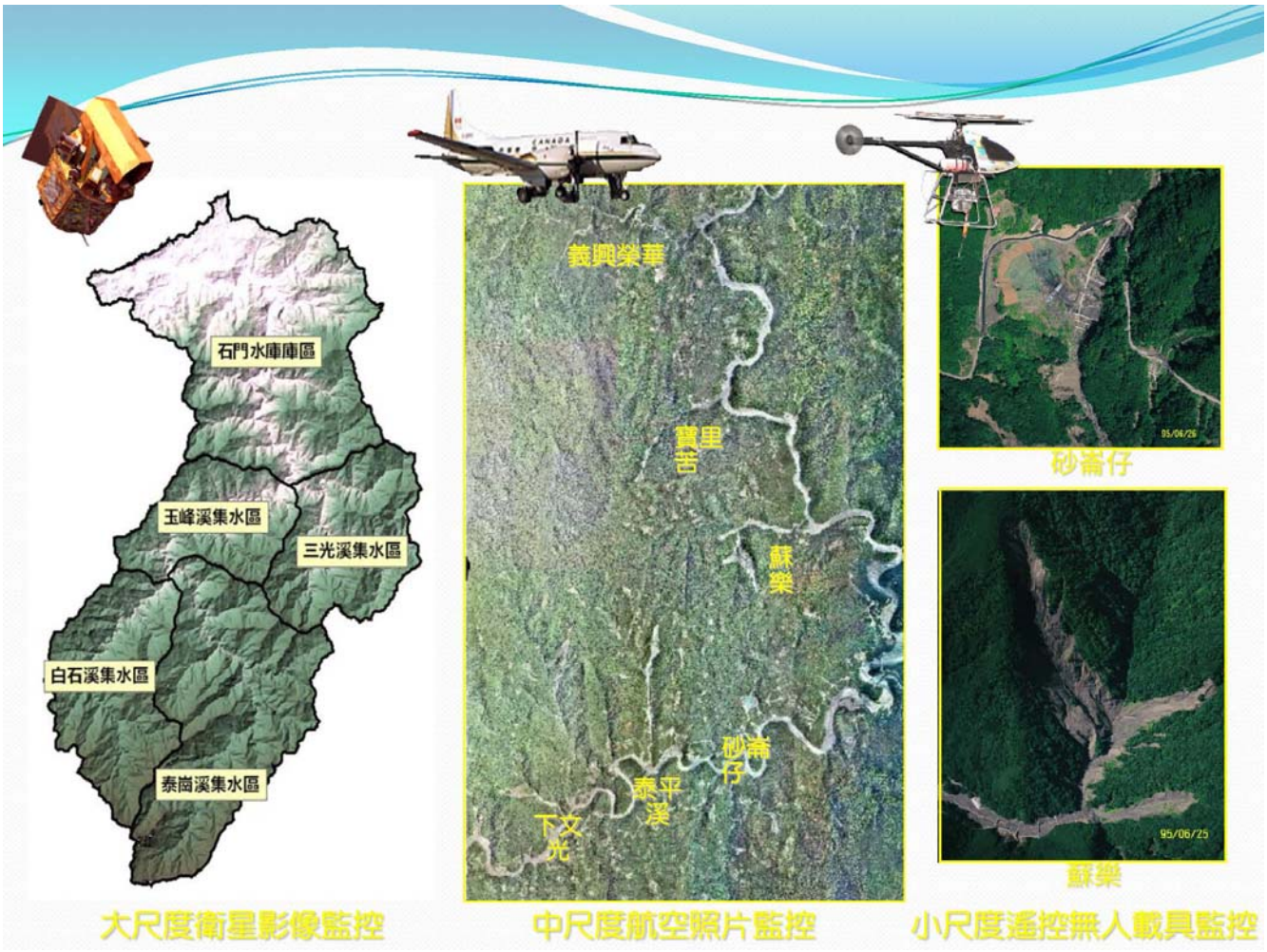
採用DoD AF描述架構文件描述格網



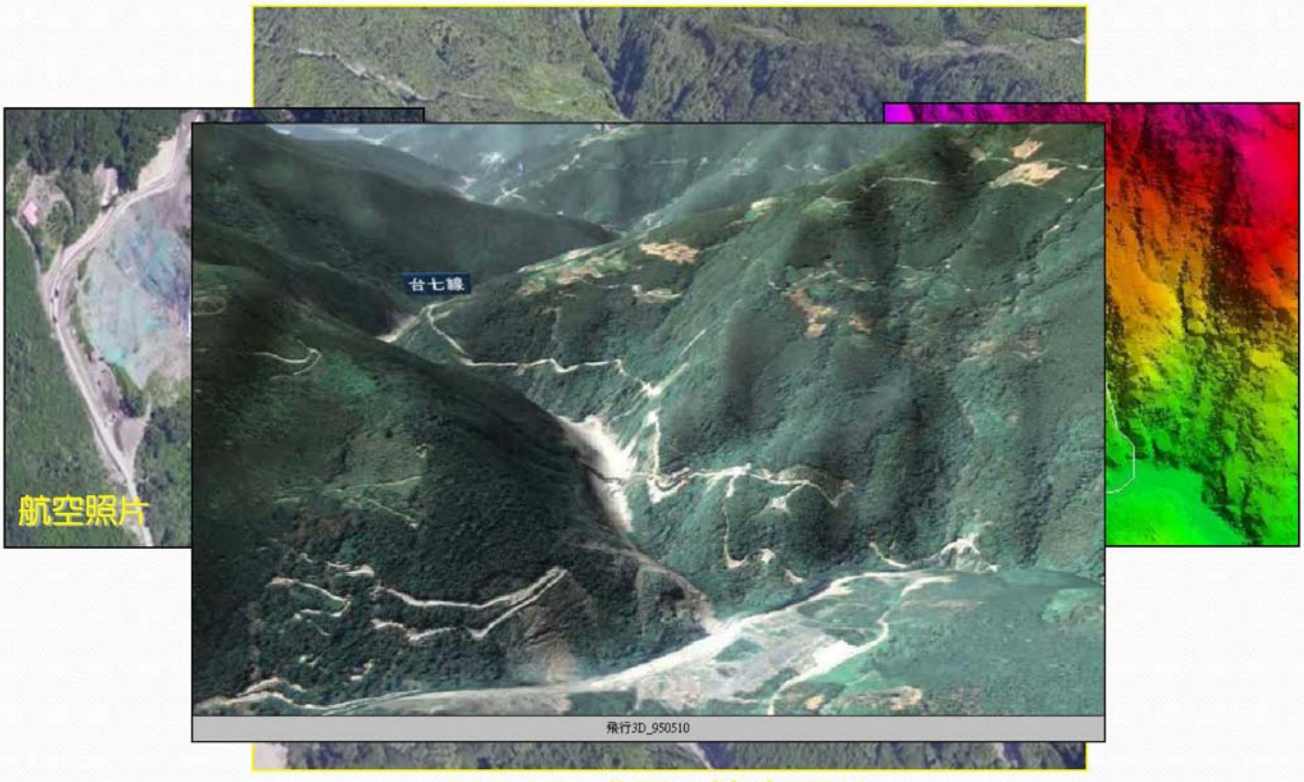
技術觀點架構:
開放式格網架構(OGSA)
Sensor Web Enablement

建置格網機制平台效益



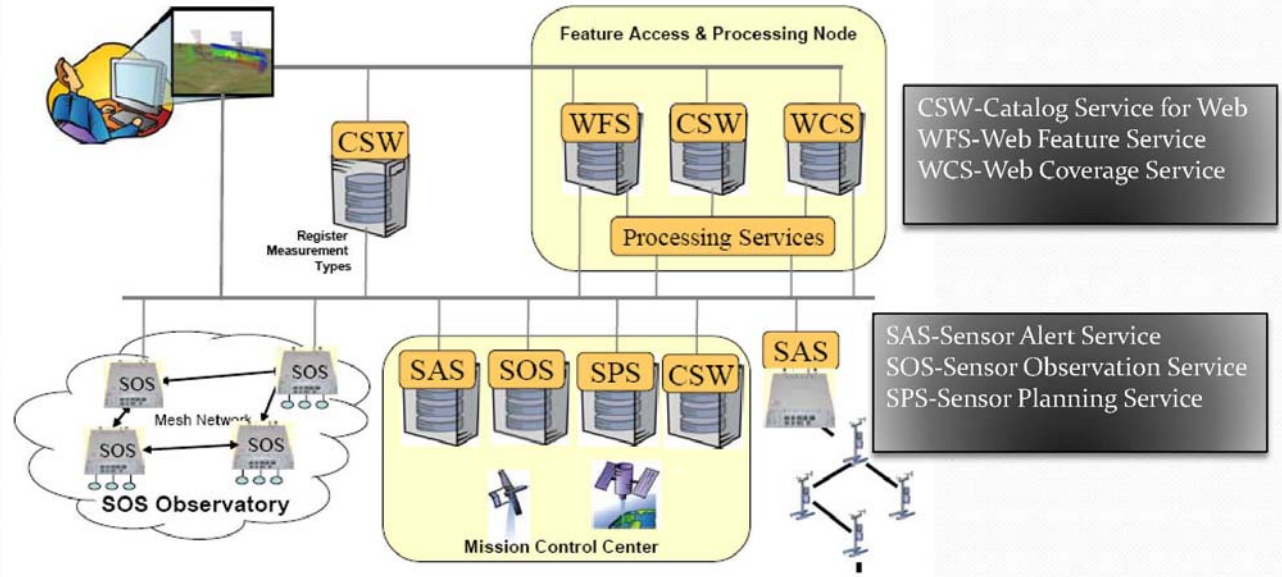


3維虛擬空間建置



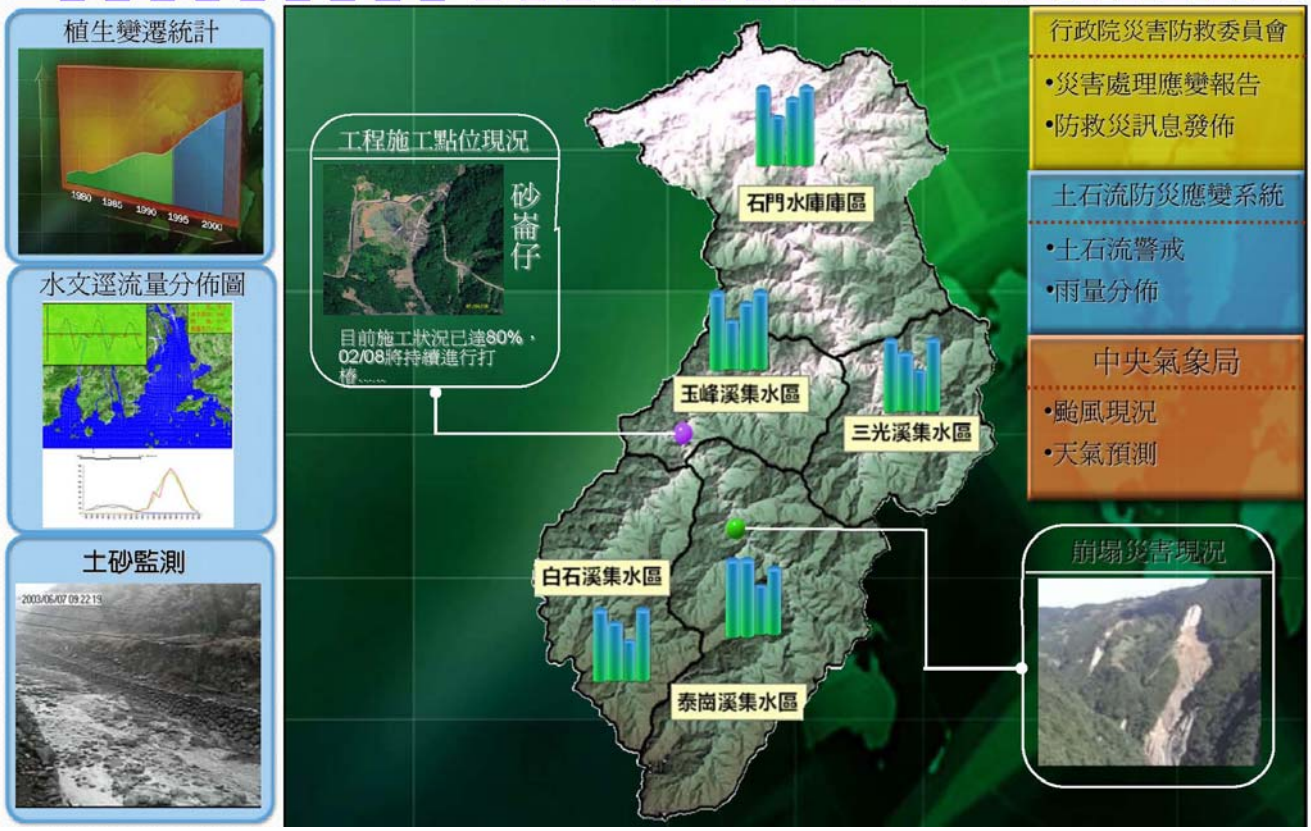
LIDAR 成果+航空照片

An Geo-Spatial GRID Architecture



格網監控資訊融合展示平台

多尺度遙測監控 | 坡地監測 | 水文分析 | 模組分析



空間資訊流通新趨勢

SOA+GRID=SOGA

複合式電子地圖流通

- 複合式可從幾個面向來看
  - 技術面向
    - Web-based 及stand alone
      - Google earth, MS Virtual Earth, ESRI AE.
    - 2D/3D顯示
    - 可整合傳統HTTP
  - 應用面向
    - 透過國際標準整合遠端異質資料
      - WMS, Web Services
      - GIS與MIS整合
      - Web 2.0

傳統式電子地圖流通
-測繪資料流通供應系統

複合式電子地圖流通I(web 2.0)-Web Services

國土利用現況查詢成果

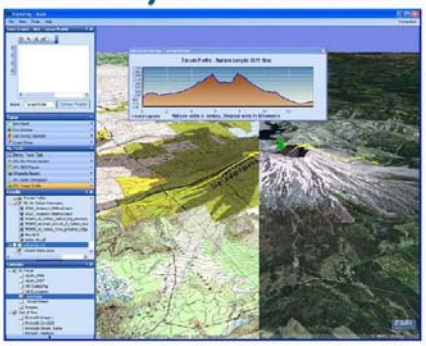
- 鄉鎮地區的查詢結果不易識別土地利用現況，建議僅提供圖幅索引查詢即可

行政區查詢

圖幅索引查詢

只列出圖面上有的圖例

複合式電子地圖流通II(web 2.0)-3D



- 目前市面上常見的軟體
  - Google Earth
  - Microsoft Virtual Earth
  - ESRI ArcGIS Explorer

複合式電子地圖流通-ESRI ArcGIS Explorer

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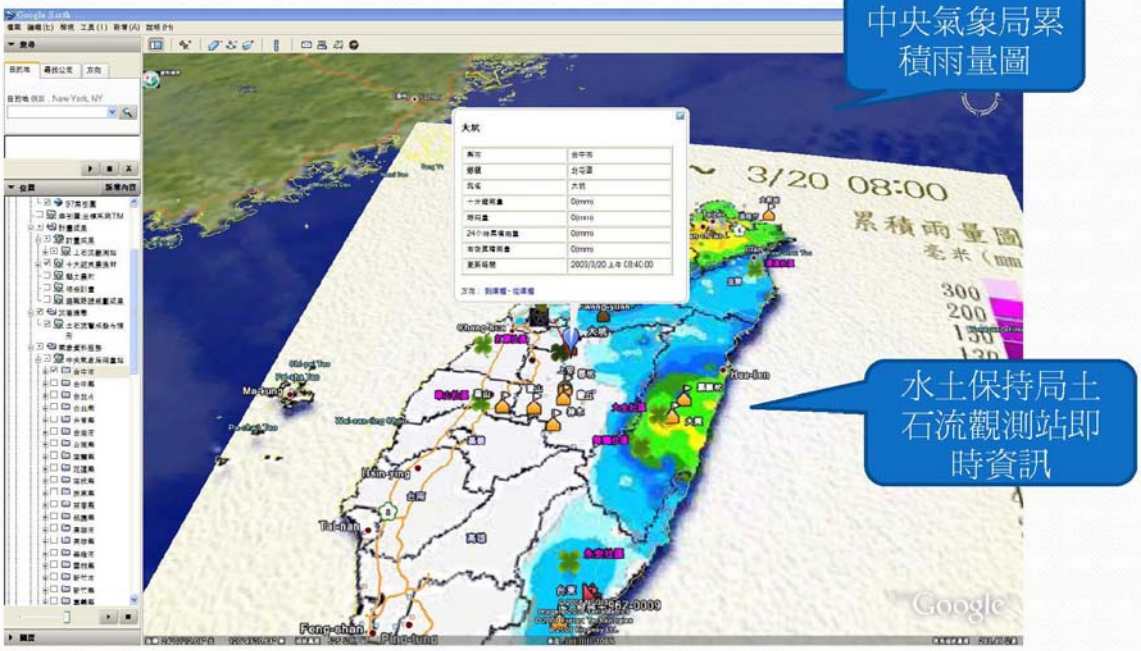
- 可接受市面上大部分之格式(如KMZ/KML)
- 目前仍屬於市場探索期
- 可支援既有之ESRI系列資料倉儲

Google Mashup應用

AVI

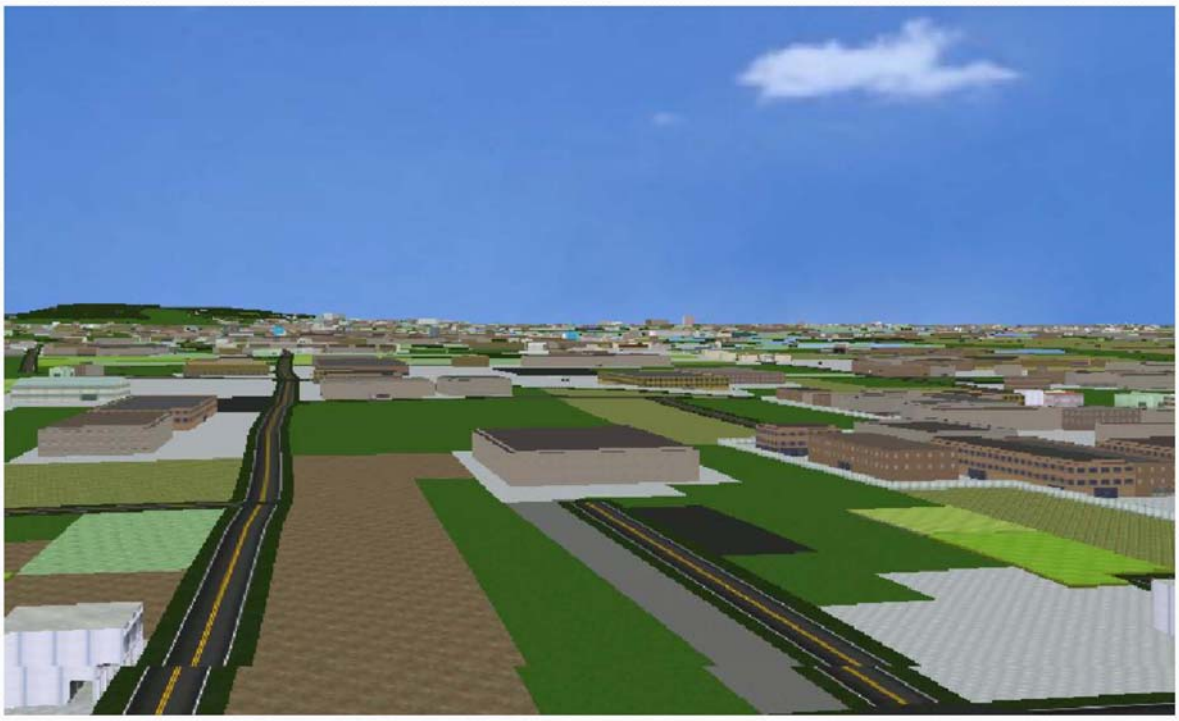


立體化的趨勢

- Google Earth帶給世人的震撼
  - 全球DTM
  - 全球衛星照片
  - 城市立體模型
  - 免費、高效能瀏覽軟體
  - Web 2.0

視效模擬

3D視效模擬—大園地區

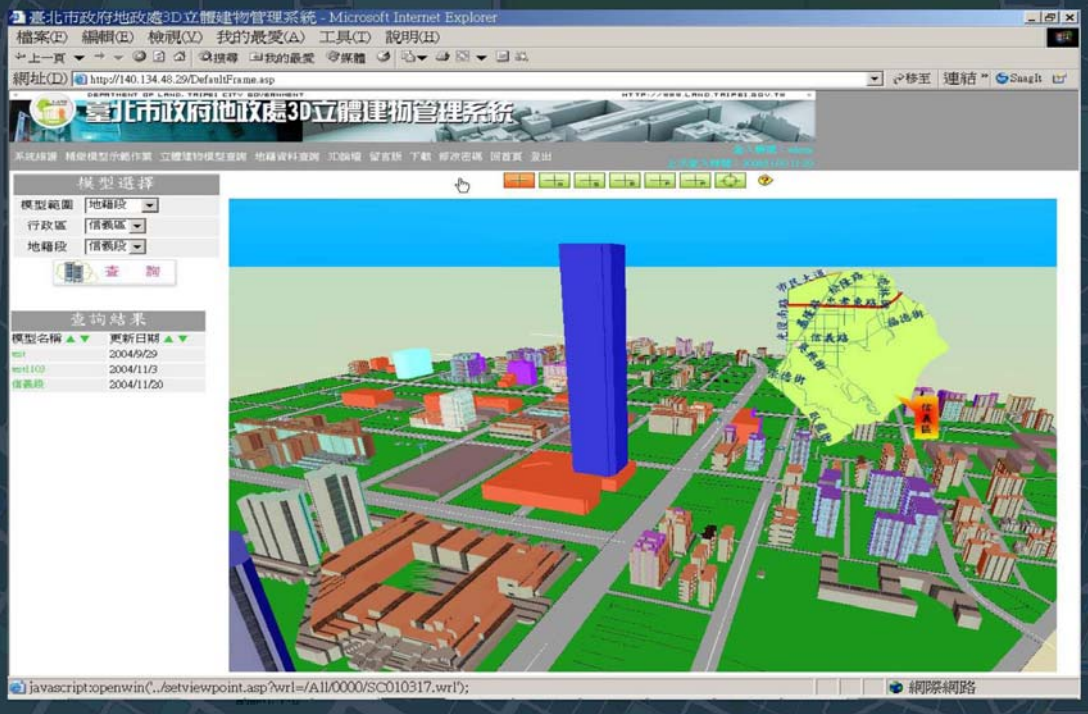


3DGIS Solution

3DGIS

整合後端地政資料庫成爲
網路3D GIS應用系統

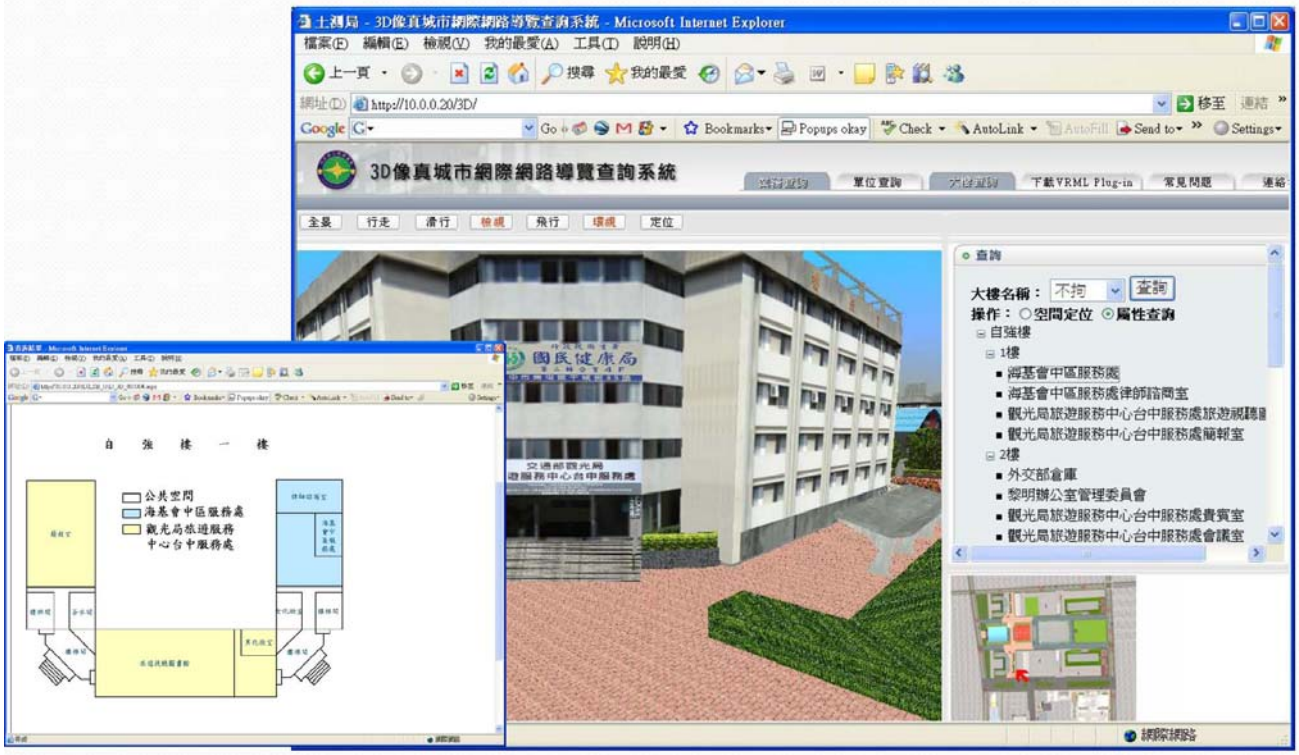
3D立體建物管理系統



提供3D/2D同步顯示

整合各大樓樓層平面圖

AVI

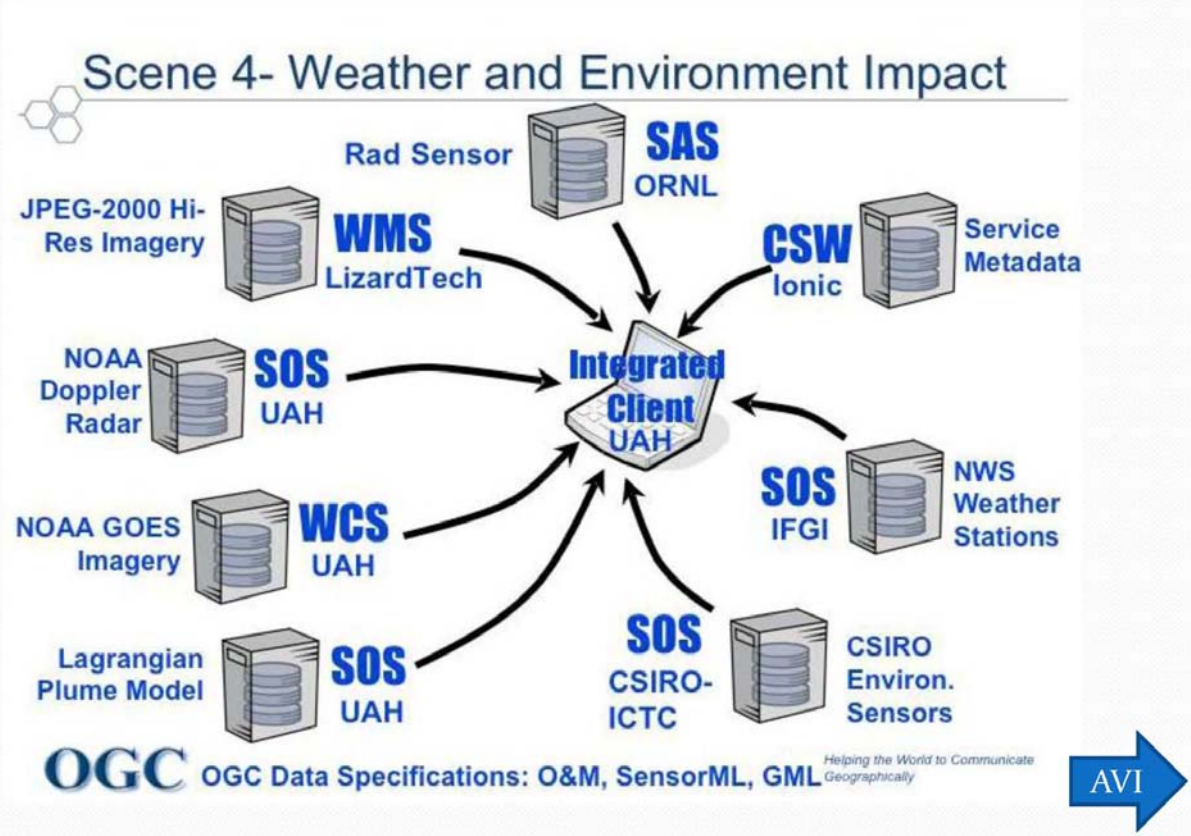


Google Earth亦想成為OGC 標準

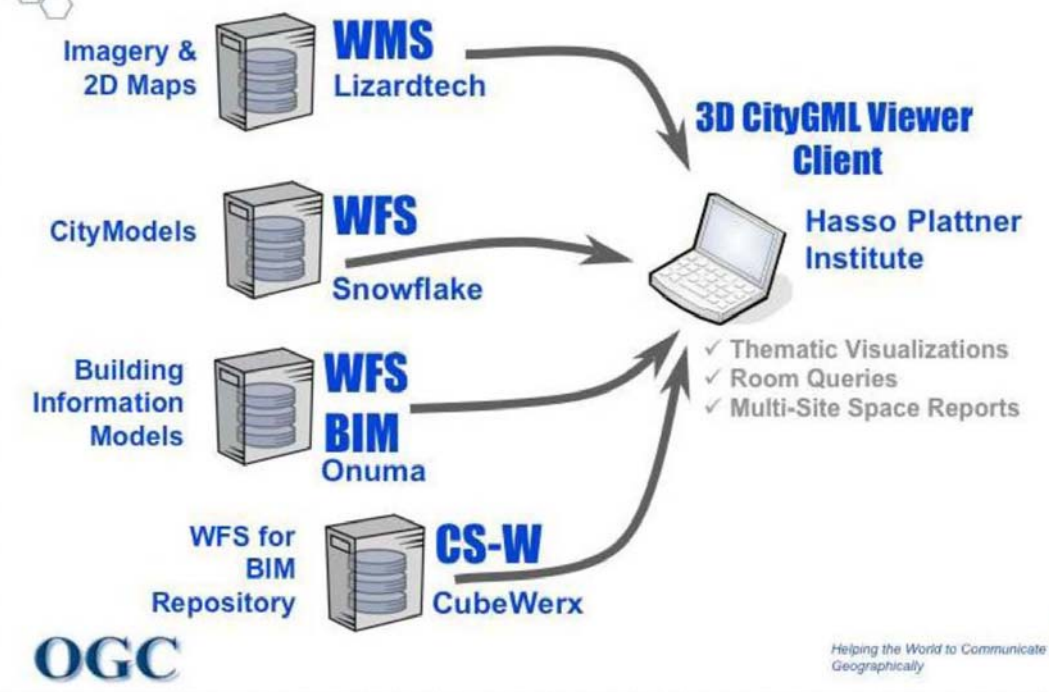
Preamble to "KML 2.1 - An OGC Best Practice"

Google submitted KML (formerly Keyhole Markup Language) to the Open Geospatial Consortium (OGC) to be evolved within the OGC consensus process with the following goal: KML Version 3.0 will be an adopted OpenGIS implementation specification that will have been harmonized with relevant OpenGIS specifications that comprise the OGC standards baseline. There are four objectives for this standards work:

本文件於2007/5送進OGC成爲Discussion standard，2008年初被OGC否決成爲Deprecated standard，3D的GIS標準仍需努力



Scene 8 - Building Selection

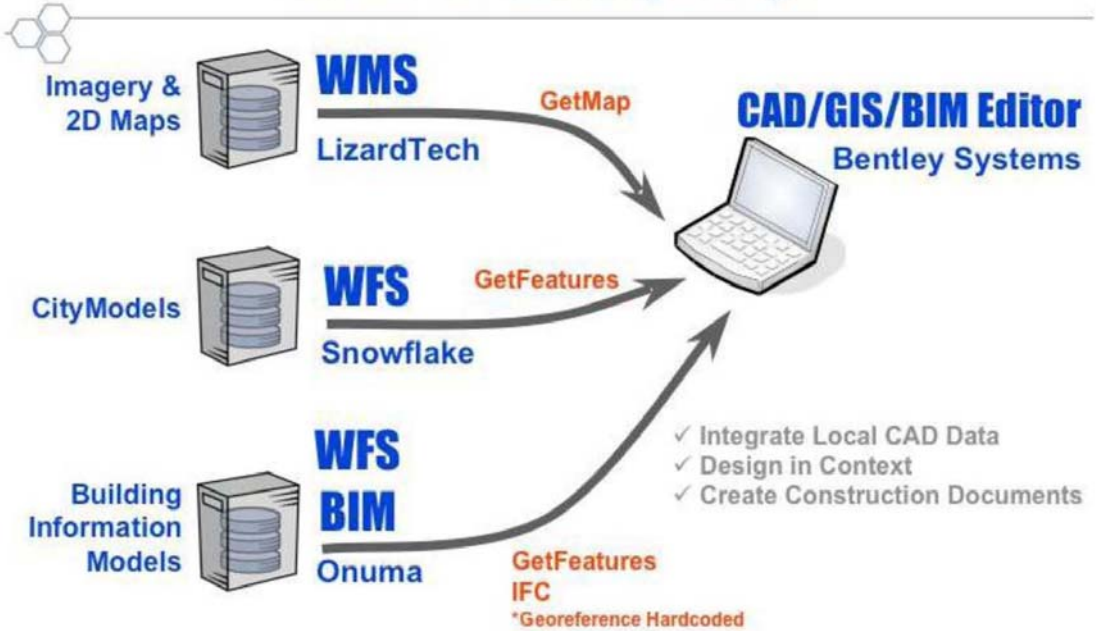


OGC

Helping the World to Communicate Geographically

AVI

Scene 10 - Building Design



OGC

Helping the World to Communicate Geographically

AVI

結論

- 空間資料的流通，應逐漸從檔案式的流通，提升爲標準協定的流通。
- 空間資料的流通，應逐漸從對「自然人」的流通，提升爲對「應用系統」的流通。
- 空間資訊不能沒有其後的屬性資訊。
- 未來的空間資料流通平台亦應考量與e政府服務平台介接的可能。
- 朝向標準化是組織資訊整合必付出的代價
- 標準化的代價是效率。

禮記禮運大同篇

；『…貨惡其棄於地也，不必藏於己
。力惡其不出於身也，不必為己…』

爲 SOGA 願景下了最好的註解

簡報結束 敬請指教

http://www.gis.tw

OGC Associate Member

OASIS

GIS.FCU