crc for spatial information

National Data Grid Demonstrator Project - a CRC for Spatial Information initiative

The National Data Grid: a development model for grid cell data infrastructure

Tai Chan, Spatial Information Infrastructure DSE

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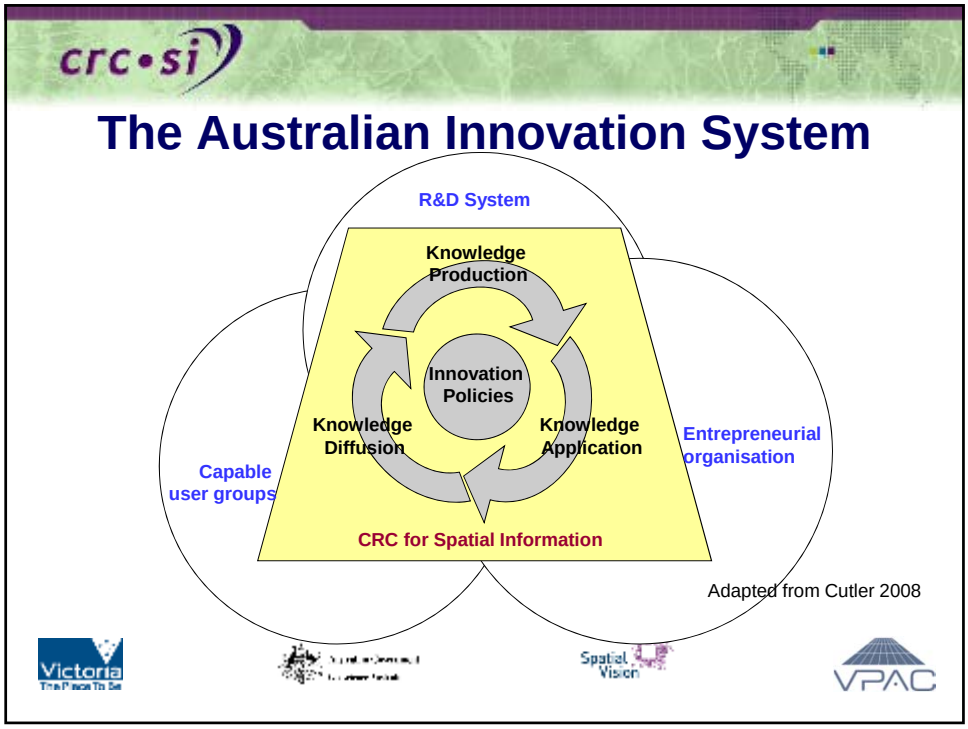
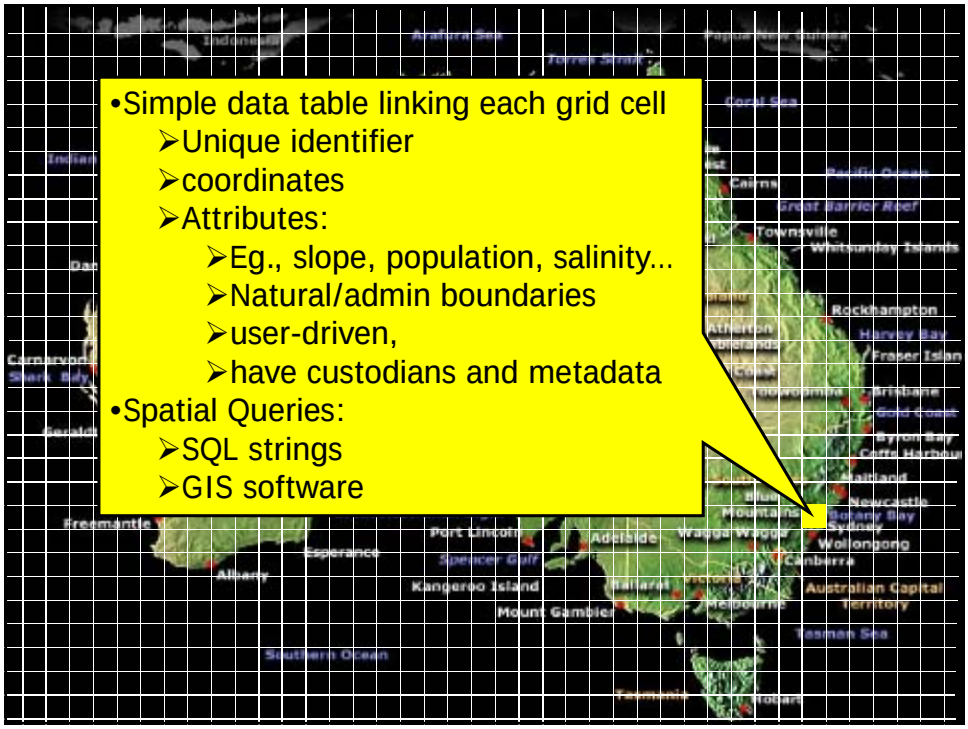
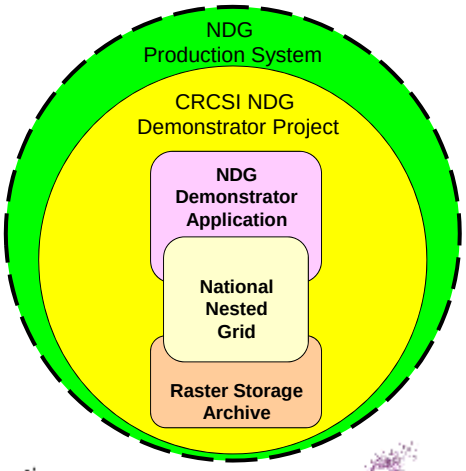
Overview

- **The Australian Innovation System**
- **The NDG**
  1. Publication data store
  2. Raster Storage Archive
  3. National nested grid
- **Diffusion of NDG**
  - Organisational Innovation Process
- **The way forward**


crc•si
The Australian Innovation System
R&D System
Knowledge Production
Innovation Policies
Knowledge Diffusion
Knowledge Application
Capable user groups
Entrepreneurial organisation
CRC for Spatial Information
Adapted from Cutler 2008
Victoria
Spatial Vision
VPAC


•Simple data table linking each grid cell
➢Unique identifier
➢coordinates
➢Attributes:
➢Eg., slope, population, salinity...
➢Natural/admin boundaries
➢user-driven,
➢have custodians and metadata
•Spatial Queries:
➢SQL strings
➢GIS software

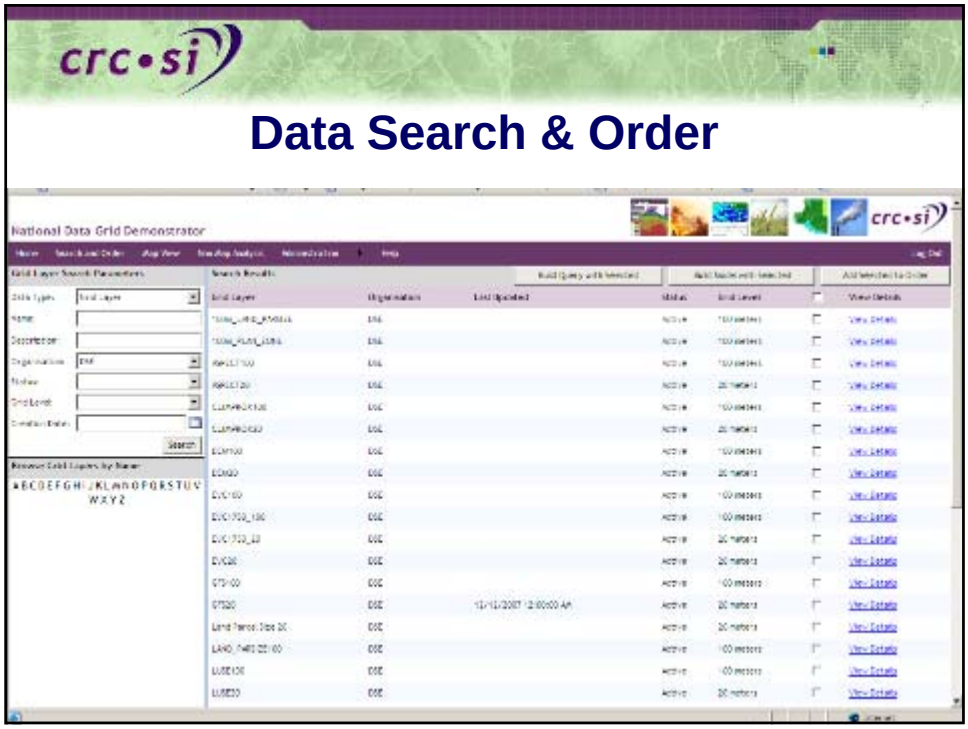
The National Data Grid



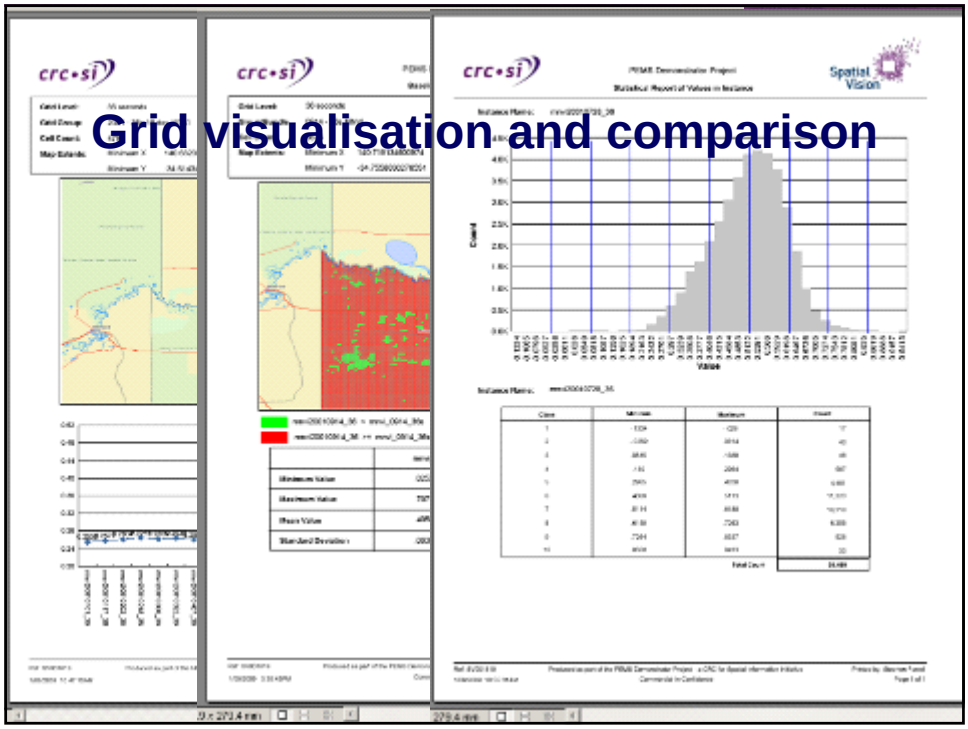
1. NDG Demo Application – Functions

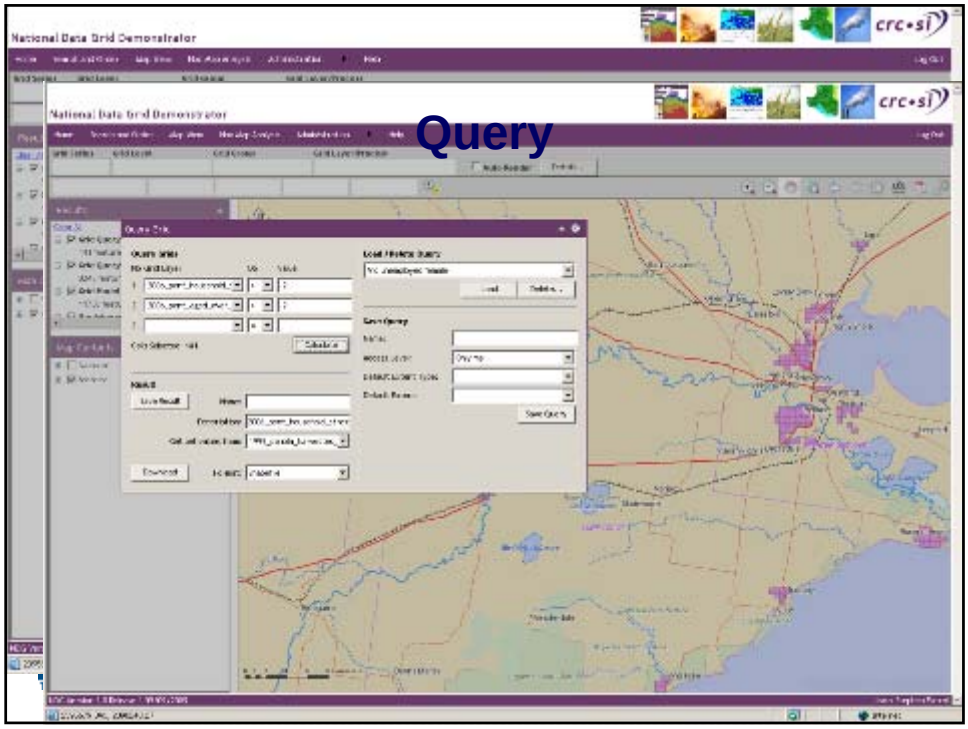
- **PEMS**
- **Spatial system with core data in aspatial tables (RDBMS) optimised for:**
  - Data search/order/delivery
  - Map-based visualisation
    - **Customised graphs/tables**
    - **Colour ram to customise map**
  - Query – sieve mapping
  - Simple modelling, ie., weighting
- **Proprietary technology**
  - ESRI
  - Microsoft
- **Data management**
  - National and jurisdictional grids & ad hoc nested grids

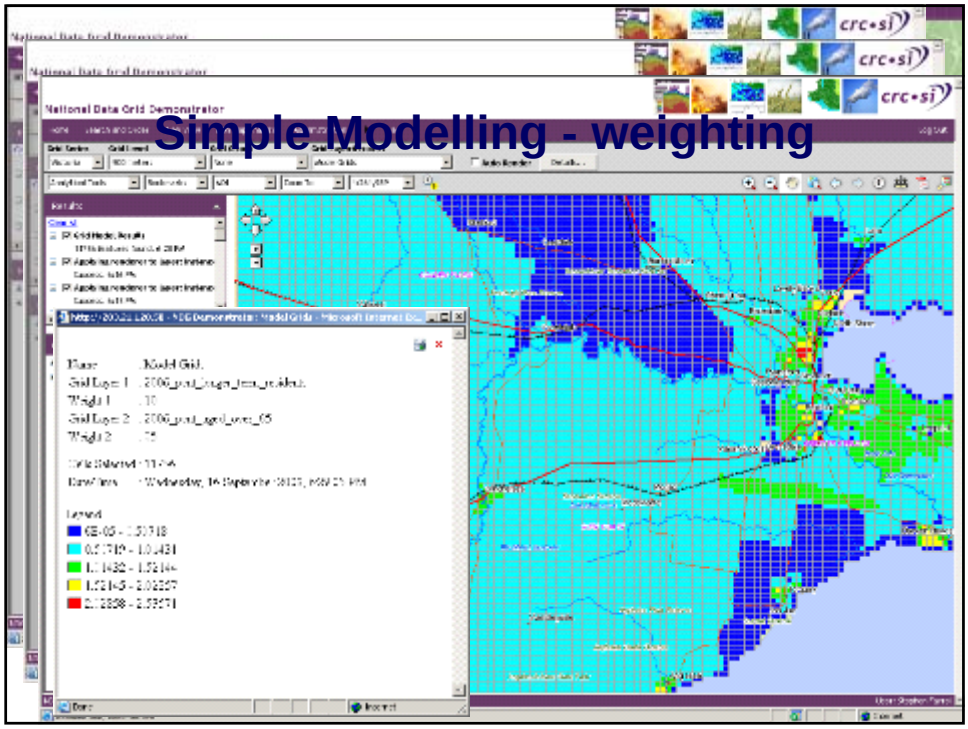
Data Search & Order



Grid visualisation and comparison



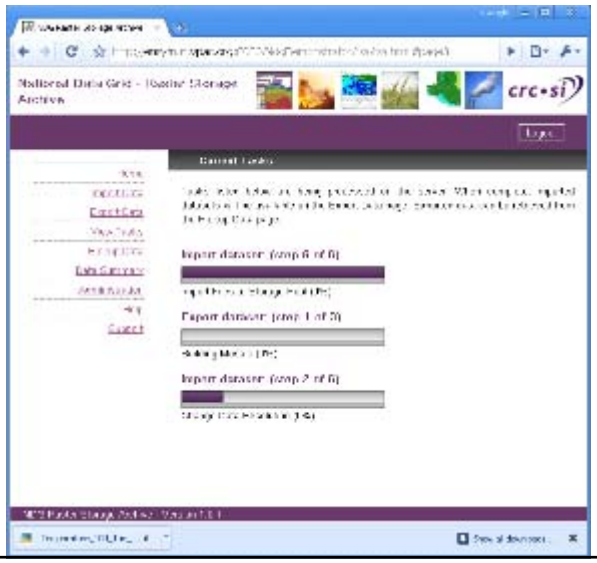

Query


Simple Modelling - weighting

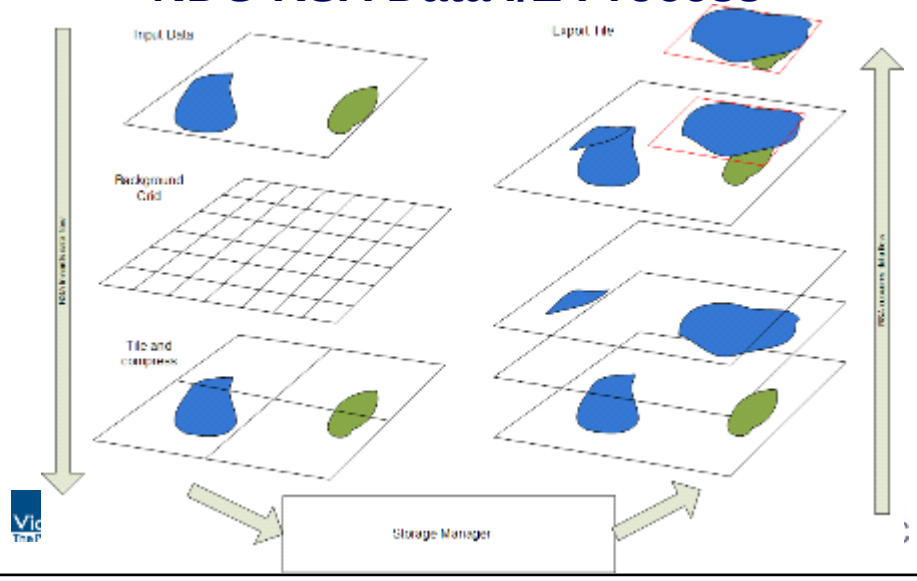
2. Raster Storage Archive - Scalability

- **Data Storage:**
  - Image data formats, Lossless compression (data integrity)
  - Tiled data storage (retrieval performance)
  - Australia-wide multi-resolution index/indices
- **Hardware/software:**
  - Open source software/tools
    - **Geospatial Data Abstraction Library (GDAL) toolkit**
  - Virtual server with load balancing & storage manager
  - Federation of RSA nodes through exchange of index information to maximise custodial control of data at source.

NDG RSA User Interface



NDG RSA Data I/E Process

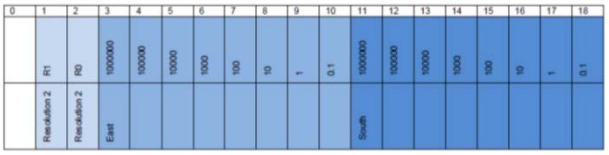


3. National Nested Grid

- **Covers all of continental Australia, Tasmania, nearby islands and ocean surrounds**
- **National Lambert Conformal Conic Projection**
- **GDA 94**

National Nested Grid - Design

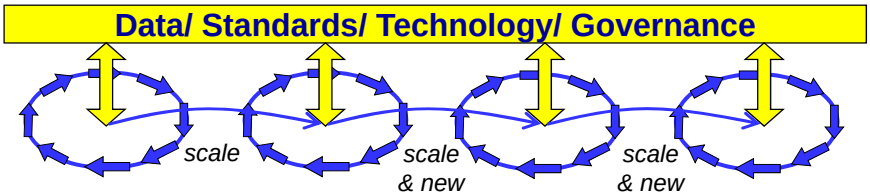
- **8 byte integer**
- **Represented as 18 columns, with one decimal digit in each column**
- **Column allocation:**
  - 0 is blank (reserved)
  - 1,2 are used for resolution code (00 = 0.1m … 05 = 20m etc)
  - 3-10 represent distance “E”; 11-18 represent distance “S”



National Nested Grid

- **Create a unified reference system that**
  - Provides a single, multi-scale index to spatial data
  - Has 12 grid resolutions, from 10km to 10cm
  - Compatible between the geographic data storage format & computing systems (RDBMS)
  - Can be used in existing data systems
  - Can detect Invalid indexes
  - Simplifies integration of disparate datasets
- **Support data sharing & data flow inside & across organisations**

Data Sharing: Climate Change



Changes in rainfall, sea level, temperature etc. in Australia

Changes in rainfall, sea level, temperature etc. in **Gippsland, Victoria**

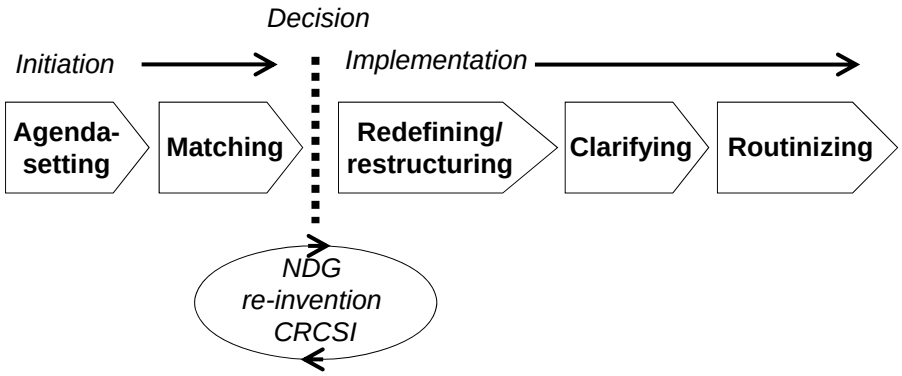
Impact on fire, farming systems, bio-diversity & infrastructure in Gippsland, Victoria

Adaptations – what to grow/build? where? at the suburb/ paddock

Organisational Innovation Process: Changing Identities of NDG

- **Proof of Concept**
  - An infrastructure to manage grid cell data…
- **PEMS**
  - Project Proposal
  - Specification Report
  - Evaluation Report
- **NDG**
  - Project Proposal
  - Specification Report
  - RSA Proposal
  - Design: Nested Grid Indexing System
  - RSA Engineering Report
  - Evaluation Reports

Organisational Innovation Process



Facilitated by project management approach

Future: NDG Production System

- **Just having the 2 prototypes is not enough…**
  - What is the identity for production NDG?
  - How can CRCSI continue to facilitate its diffusion nationally?
  - Who should be engaged?
  - Why should they be interested?
  - How to gain their support?
  - When?

More Information

- http://www.spatialvision.com.au/index.php/national-data-grid-ndg.html
- Or google NDG Demonstrator Project
- Tai.chan@dse.vic.gov.au