

Re-inventing the Map

Experiencing New Zealand: past – present – future

Robert Gibb

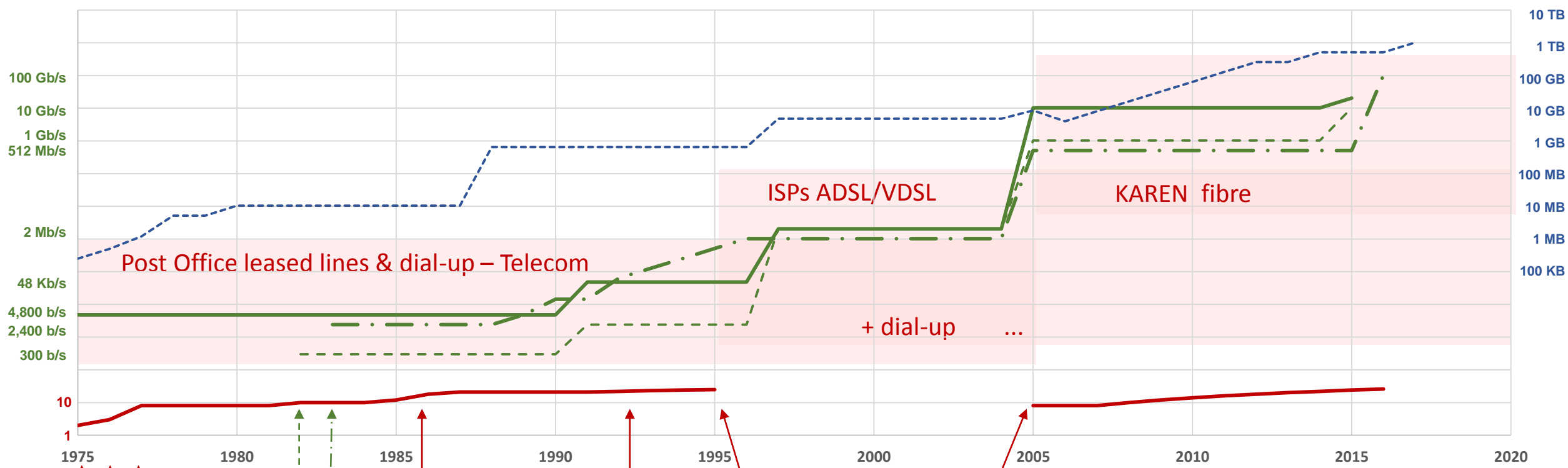
Landcare Research 12 October 2016 LINK Seminar @ MPI



Networks enable communication, sharing & collaboration

NZ Science Network

— NZ Science nodes
 —•— International speed
 — NZ Science Backbone speed
 - - - Access speed
 - - - Removable Storage Capacity Bytes



↑ VUW-Massey
 ↑ Waikato
 ↑ DSIRnet

↑ International
 ↑ MWD
 ↑ MAFnet

↑ TUIAnet > ISPs

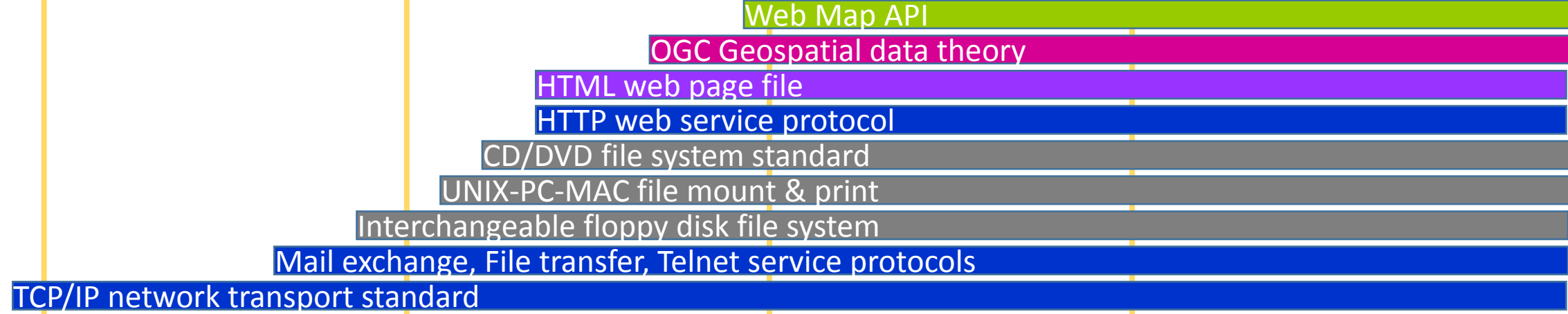
↑ REANNZ



Standards enabling collaboration & interoperability

- User's s/w
- Domain design
- Program API
- Data theory
- File Formats
- Road Rules
- Hardware

- DGGS theory
- TimeSeriesML
- WaterML
- IndoorML
- ANZSoilML
- Earth Observation
- CityGML
- GeoSciML
- Observation & Measurement theory
- Web features & Web Processing API
- GML - Geographic data files



Modelling – desktop to cloud to supercomputer

RIOS python raster

Google Earth Engine

R Spatial

Python spatial

Standards enabling modular software & shared software effort

Web GIS

OSGeo: OpenLayers

Google Earth

Google Maps

PYXIS Innovation: WorldView DGGS

OSGeo: GeoServer

OSGeo: MapServer

Vector GIS

OSGeo: QGIS + GRASS

OSGeo: QGIS

MapInfo

GenaMap

ARC/INFO

pcArc/Info

ArcGIS

MWD: LADEDA

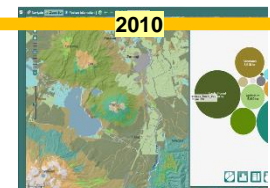
Image Processing

ERDAS

GRASS

DSIR: EPIC

1975 1980 1985 1990 1995 2000 2005 2010 2015 2020



Putting it all together:
enables automation,
communication

Sentinel-2 pipeline
Lidar pipeline
LandSat pipeline
RIOS python raster
OSGeo suite

NeSI.1: IBM
6,000x cores

NeSI.2: ??
????x cores

SGI
100x cores

Soils-mobile
Antarctic Portal
Snap-online
OurEnvironment
maps.scinfo.org.nz

OSGeo suite
x86 servers

EcoSAT software
DEM script

ERDAS +SDK LUNZ

ARC/INFO ArcGIS
x86 workstations

SUN Microsystems workstations & servers

LADEDA DEC mVAX II

GUILD GenaMap

NZ & Antarctic soils portals

MWD: IBM mainframe

1975

1980

1985

1990

1995

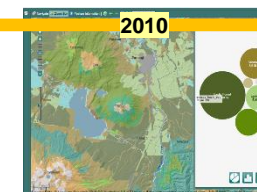
2000

2005

2010

2015

2020



Putting it all together: knowledge from data & modelling

Satellite image cube + Big Data
LandSat + IoT
+ Sentinel >

DGGS theory

Antarctic Env Dom

Antarctic ED 2+

LENZ engine 2

& 3

LENZ

LENZ engine 1

1m Northland

1m GWRC DEM

SPDlib Lidar engine

LUM 1990 (2000) 2008 2012

Land Use NZ

LCDB4 base

LCDB2 base

LCDB3 base

RIOS python raster

OSGeo suite

EcoSAT

25m & 15m DEMs

NeSI.1: IBM
6000x cores

NeSI.2: ??
??x cores

ERDAS +SDK

x86 workstations

ARC/INFO

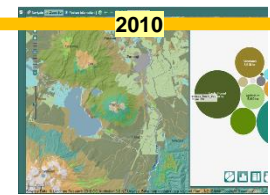
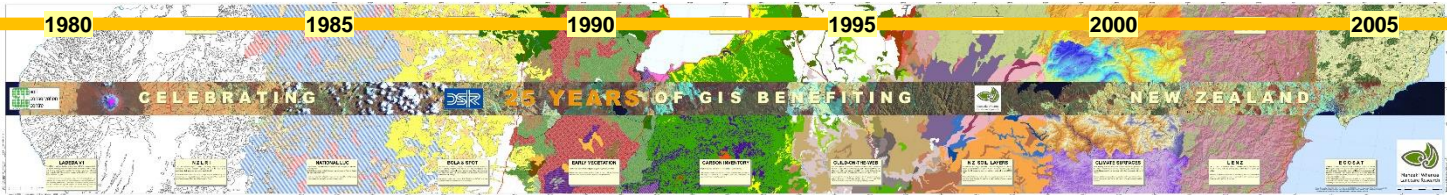
LADEDA

DEC mVAX II

SUN Microsystems workstations & servers

MWD: IBM mainframe

1975 1980 1985 1990 1995 2000 2005 2010 2015 2020



NZLRI field mapping commences
*to support transparent allocation of
 Ministry of Work's erosion control subsidies*

Rogernomics: privatisation & user pays
 - *MoW SCC becomes DSIR Land Resources*
 - *data becomes a source of quick revenue*

CRIs formed under companies act
expected to compete for all funding

LINZ dramatically lowers data charges
reduces cost of topographic data

**Putting it all together:
 Science & Policy**

NZGOAL + CC
encourages open data
CRIs core funding
some collaboration

Challenges
all collaboration

National	Labour	National	Labour	National	?
MWD Soil Conservation Centre Bulk Funded	DSIR Land & Soil 75% bulk funded	CRI Landcare Research (LR) 100% competitive funding		CRI (LR) 40-50% Core Fund	CRI (LR) + Challenges



1981-2016

Acknowledgements:

For much of this period I was either the provider of the infrastructure or the Informatics Team leader. So nothing could have been accomplished without the inspiration, imagination and hard work of the whole team.

Many thanks to all of you !

