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# Optimising minerals transport infrastructure at the system level

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# IFAP: Infrastructure Futures Analysis Platform

The screenshot displays the MapInfo Professional interface with the IFAP Solver window open. The main map shows a geographical area with red circular markers of varying sizes. The IFAP Solver window is open, showing a database path, starting year (2010), and horizon years (20). A data table is visible in the bottom right corner.

**IFAP Solver Options:**

- Database: D:\NFAP\ifap-code\data-modelling\ifap-dev.mdb
- Options: Starting Year: 2010, Horizon Years: 20,  Don't solve instance
- Progress: Idle
- Buttons: Execute, Exit

**MineCentre Browser Table:**

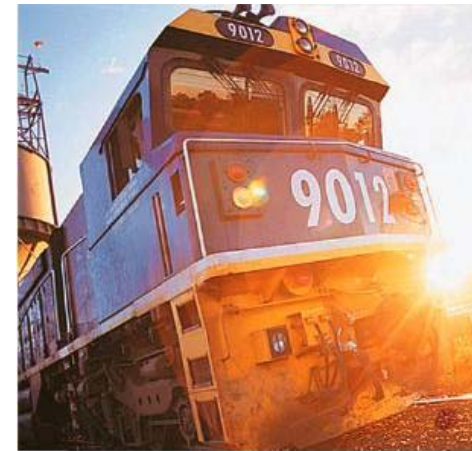
facility	descr
<input type="checkbox"/> MT-ISA_NORTH_MINECENTRE	Mine Centre, North Mt Isa
<input type="checkbox"/> PHOSPHATE-HILL-MINE	Phosphate Hill mine

**Data Table (Bottom Right):**

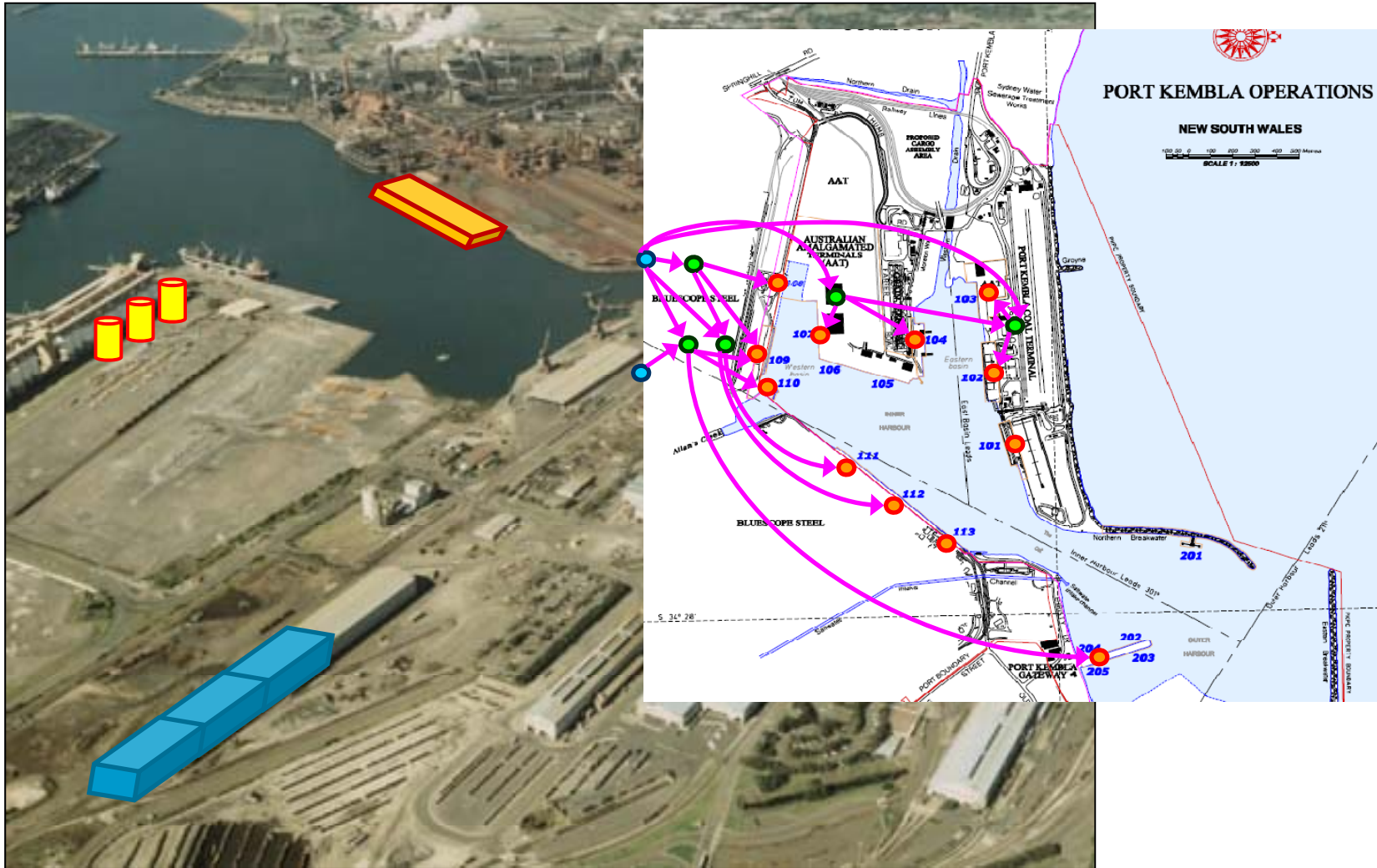
COUNT	ALL_COMM
157	CU;FL;PB;SN;ZN;DO;LST;W;TPZ;BI;AG;A
27	AU;AG;CU;PB;SB;BIS;ST;MARB;LST;MO
139	SN;MO;CU;W;SB;FL;AGGREG;LIME;LST;
2	LST;CU
117	CU;AU;AG;UNK;PB;BI;ZN;MO
91	AG;AU;CU;PB;ZN;MO;BAR;MT;W
2	AU
57	AU;CU;ZN;PB;UNK;FE;MN;MT;IM;RUT;SIS
161	AG;PB;CU;SN;W;BI;ZN;UNK;SB;MO;FL;A
23	AG;AU;SB;UNK;BI;MO;W;FL;PB;ZN
5	AU;MN;CU
6	AU;MN;CU;SB
1	SIL;SIS
3	AU;LST;MN
1	MN
1	AU
2	MN
1	MN
14	AU;BI;SN;W;PHR;BLST
1	AU
1	CU

# Hunter Valley

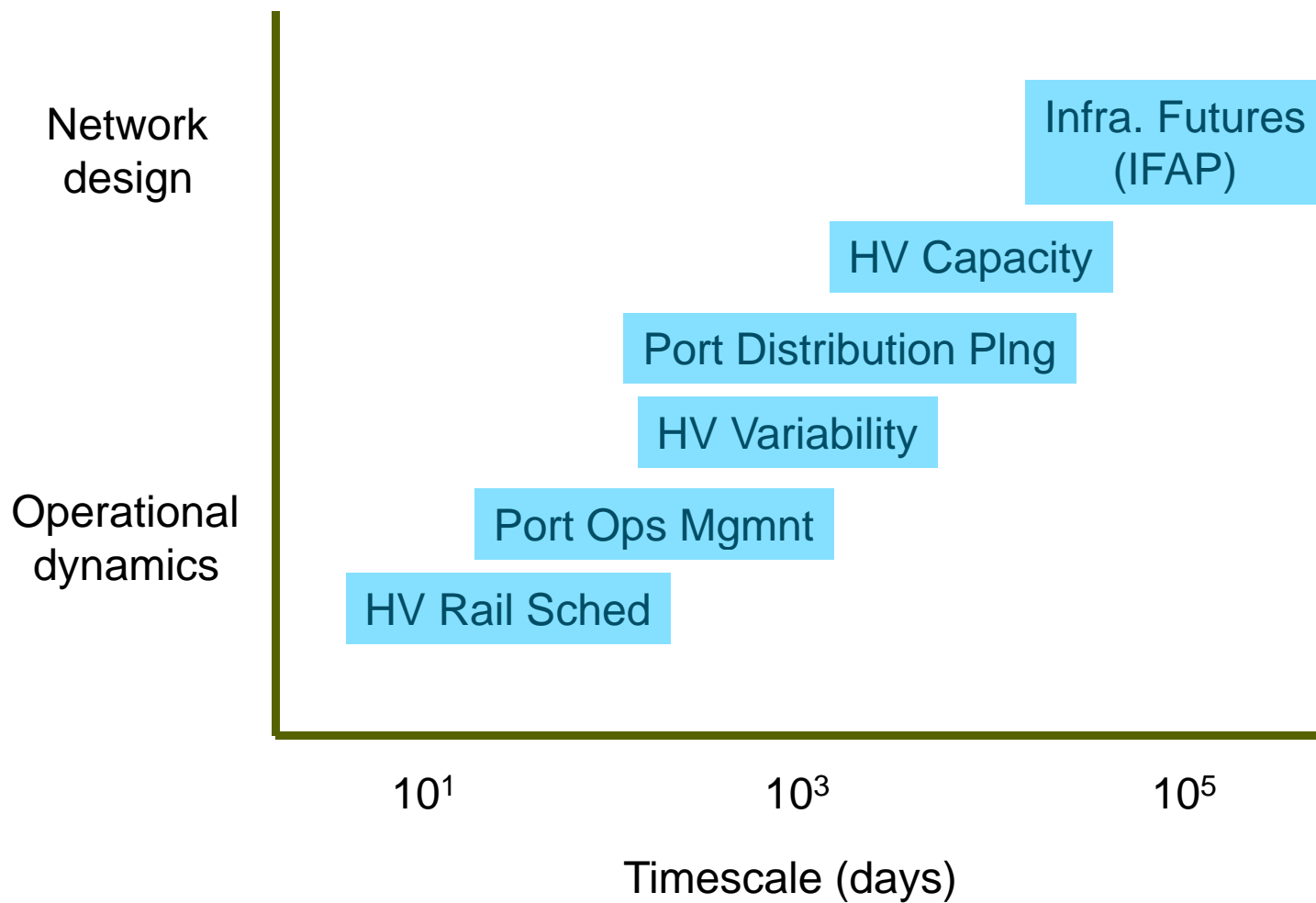
- **Capacity Planning:**
  - Rail network augmentation
  - Inland ports and other smart options
  - Load and unload point upgrades
  - Port changes
- **Capacity Loss**
  - Disruptions, variability and re-planning
- **Rail Scheduling**
  - Construct an optimised rail schedule for a number of days
  - Train trips are subject to system constraints such as load-point capacity limits, turn-around and refuelling delays, and train size limits
  - Optimise for throughput, train consist utilisation, preferred dumper and stacker combinations, and total units used.



# Multi-purpose port planning



# A continuum



# What is hard and needing smartness?

- Quantitatively and exhaustively assessing a vast number of options
- “Routing and sizing” simultaneously
- Data and integration: information systems and culture
- Spatial data management



# Additional smart infrastructure aspects

- Represent smart infrastructure via increases in throughput and capacity parameters
- Understand what “flow regimes” are system optimal and therefore must be brought about operationally
- Mimic smart operations management within infrastructure planning tools
- Demonstrate differences between quite smart and less smart transport operations management approaches



# Where else does this apply?

- Postal and courier networks
- Agriculture and food processing
- Vehicle fleet management
- Service system design and resourcing

