The Chartered Institute of Logistics and Transport

Decision Intelligence in Logistics

Combining Generative AI, Optimization, and Human Expertise

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The Chartered Institute of Logistics and Transport

The Chartered Institute of Logistics and Transport in North America (CILTNA)

CILTNA is the North American branch of the Chartered Institute of Logistics and Transport, the largest professional association for transport and logistics in the world, with some 34,000 members in over 30 countries worldwide.

CILT members include CEOs of some of the world's largest transport companies, heads of government agencies, and senior executives in major industry associations.

Our mission is to raise people's knowledge of all aspects of moving people and goods. We offer meetings, events, workshops, webinars, and networks for current and aspiring senior practitioners, managers, and executives. CILTNA concentrates on:

- improving the health and performance of logistics and transport systems as a whole
- developing and applying principles that govern the behaviour of complex systems
- improving the governance of national and global economic frameworks
- improving the performance of supply chains end-to-end
- influencing policy that shapes entire sectors or national or global agendas

Headquartered in Ottawa, CILTNA has chapters in Vancouver, Toronto, Ottawa, Montréal, and the USA with members located across America.

To learn more about CILTNA please visit www.ciltna.com or email us at admin@ciltna.com

Start with the decision; NOT the technology

UNCERTAINTY

Demand, arrivals, weather, disruptions

CONSTRAINTS

Capacity, time, safety, labor, infrastructure

TRADE-OFFS

Service, cost, utilization, resilience

CONTEXT

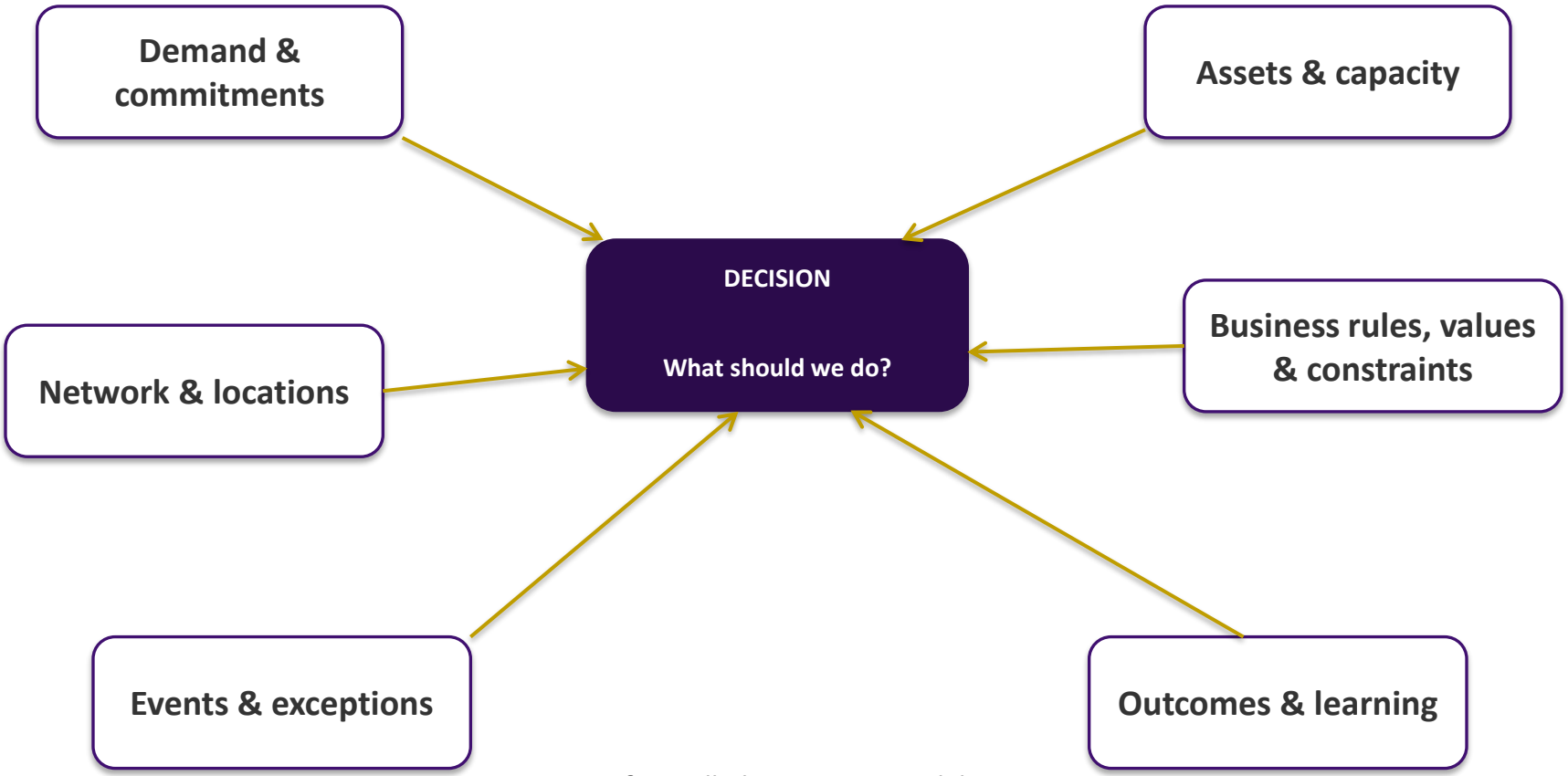
What experienced operators know

GenAI is strong at language: finding, summarizing, explaining, and coordinating information. It does not inherently guarantee a feasible or optimal operating plan.

The useful question is not whether AI can decide, but which combination of tools and people should support the decision.

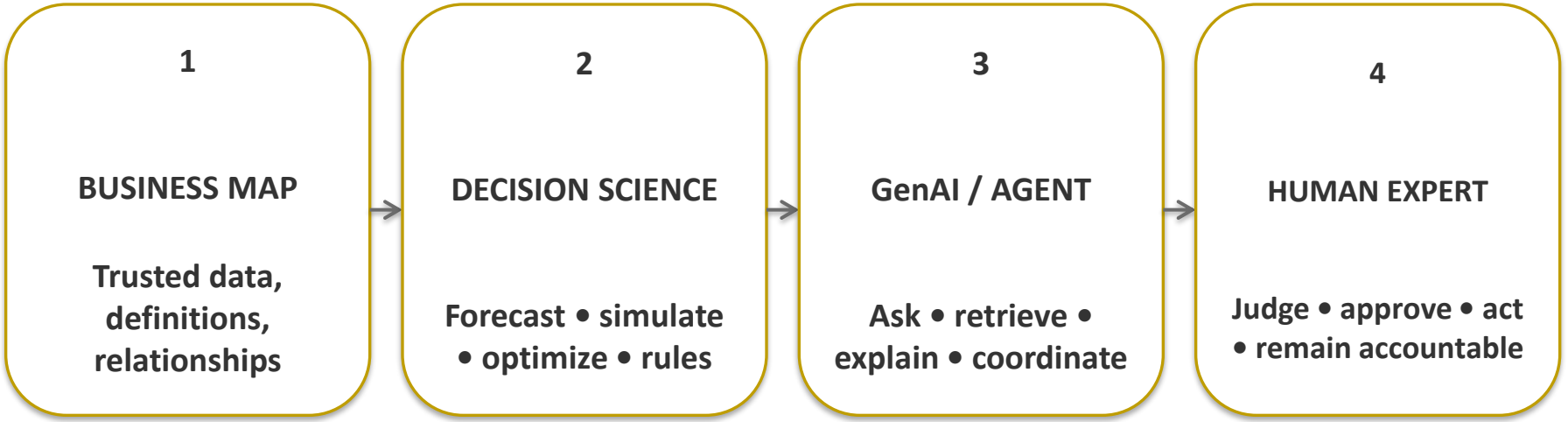
The logistics business map gives AI and people—critical context

A shared operating language connects fragmented systems to the decisions that the business makes.



Often called a semantic model

One integrated decision-intelligence toolkit



Different tools answer different questions. Value comes from orchestration; not from asking one tool to do everything.

A: Road freight trucking use case: the decision

A regional freight network faces a demand surge while capacity is unevenly positioned.

DECISION NEEDED:

Which freight should move on which asset, route, and schedule?

What are we balancing?

- Service commitments
- Total operating cost
- Capacity utilization
- Network balance

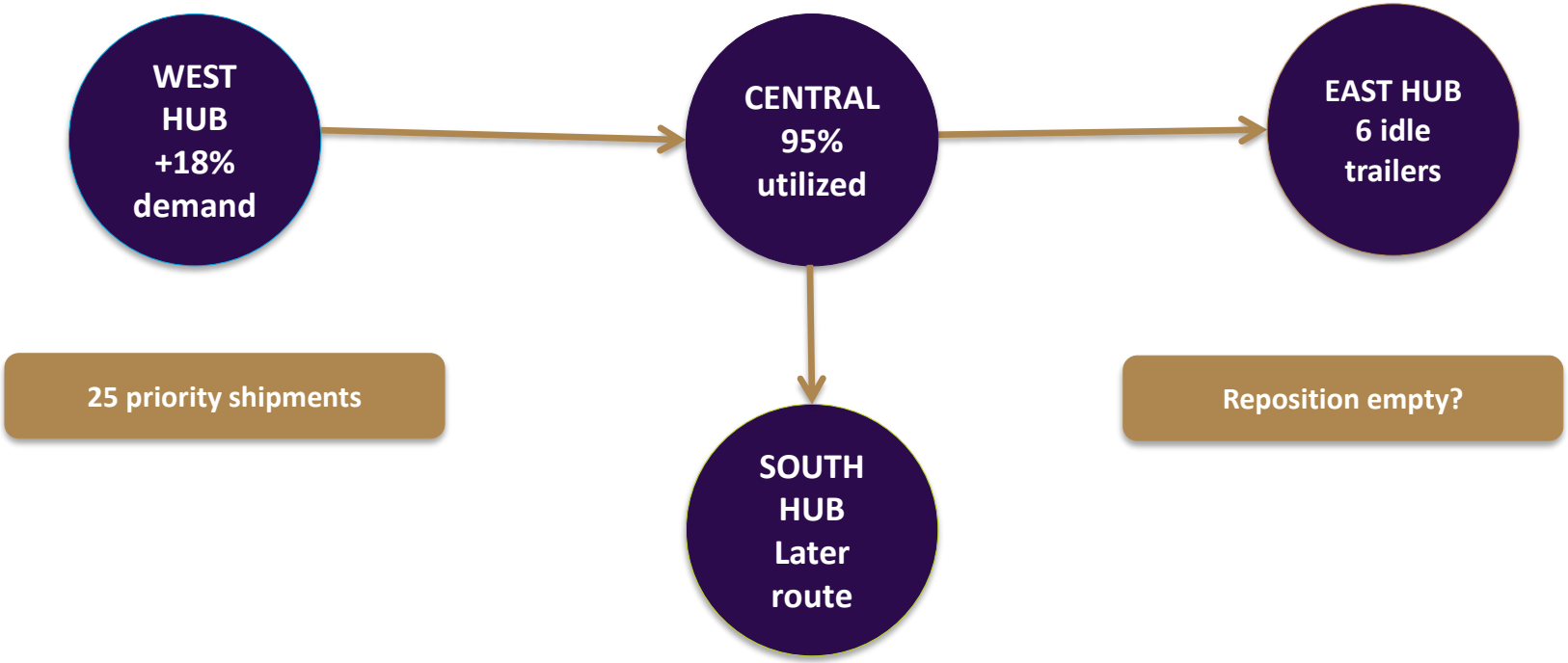
What limits the answer?

- Trailer and driver availability
- Facility throughput
- Travel and handling time
- Customer requirements

A local capacity shortage becomes a network decision

ROAD FREIGHT

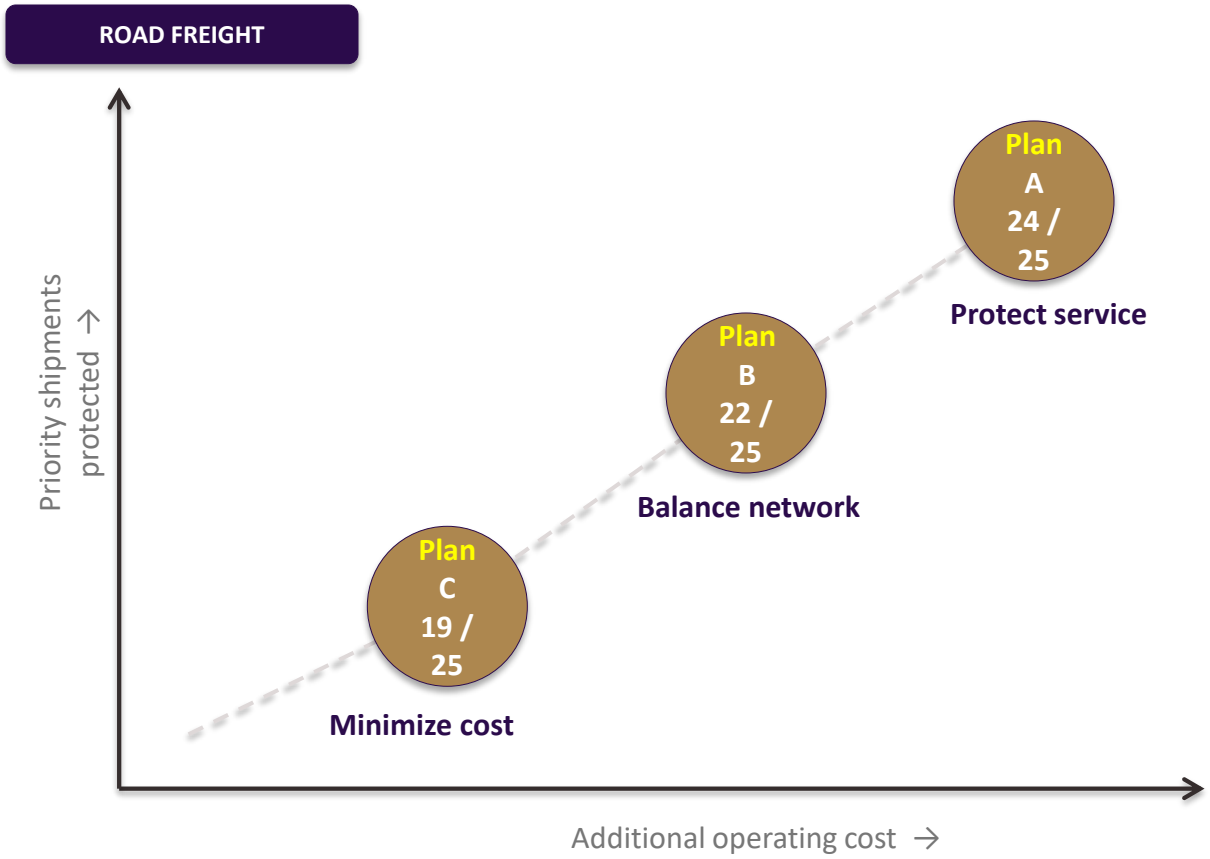
Tomorrow: demand and equipment will be in the wrong places



DECISION | Which freight moves on which asset, route, and schedule, and without creating tomorrow's shortage elsewhere?

A shipment-level fix can improve today but can create tomorrow’s shortage

The best plan depends on what “best” means



GenAI EXPLAINS
Plan B protects fewer priority shipments than A but avoids overloading Central and improves tomorrow's position.

PLANNER FINDS that Central capacity has been overstated. New plan: reduce throughput by 15% and recalculate.

REVISED RESULT: Plan B is not feasible; a modified Plan A becomes preferred.

The model tests feasible alternatives. GenAI explains consequences. The planner tests reality.

B: Port and terminal use case: the decision

A delayed vessel causes yard occupancy to rise and equipment availability to tighten.

DECISION NEEDED:

How should berth, yard, gate, and equipment plans be re-sequenced?

What are we balancing?

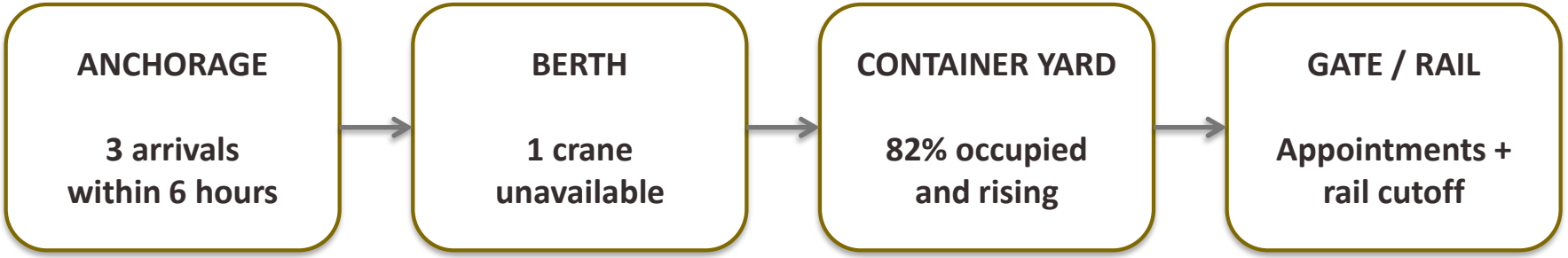
- Vessel and truck turnaround
- Yard fluidity
- Customer commitments
- Operating efficiency

What limits the answer?

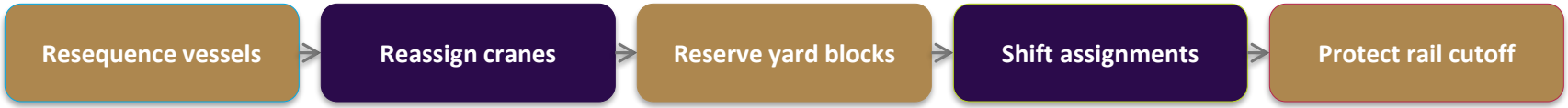
- Berth windows and draft
- Yard slots and stacking rules
- Crane and labor availability
- Safety and customs holds

Vessel bunching connects berth, yard, gate, and rail decisions

PORT / TERMINAL



One change propagates across the terminal



DECISION | Which combination of berth, crane, yard, gate, and rail changes improves the terminal as a whole?

Improving berth productivity can worsen yard congestion and disrupt land-side commitments.

Test the ripple effects before changing the operating plan

PORT / TERMINAL

INTUITIVE (INCOMPLETE) PLAN | *MOVE DELAYED VESSEL AHEAD*

- Earlier discharge
- Concentrated yard demand
- Extra rehandles
- Gate retrieval slows
- Truck queues increase

Apparent benefit: Delayed vessel departs 4 hours earlier.

COORDINATED (COMPLETE) PLAN | *OPTIMIZE THE TERMINAL*

✓ **Keep berth order**	Avoid discharge surge
✓ **Reassign crane**	Protect critical window
✓ **Reserve yard space**	Separate rail-bound boxes
✓ **Adjust appointments**	Smooth gate demand
✓ **Protect cutoff**	Preserve onward connection

Simulation reveals • Optimization coordinates • Experts validate

GenAI makes consequences understandable; models make them testable; experts make them credible.

C: Railway use case: the decision

A disruption blocks a corridor, causing equipment and crews to become unbalanced.

DECISION REQUIRED:

Which trains, cars, crews, and routes should be reassigned—and in what sequence?

What are we balancing?

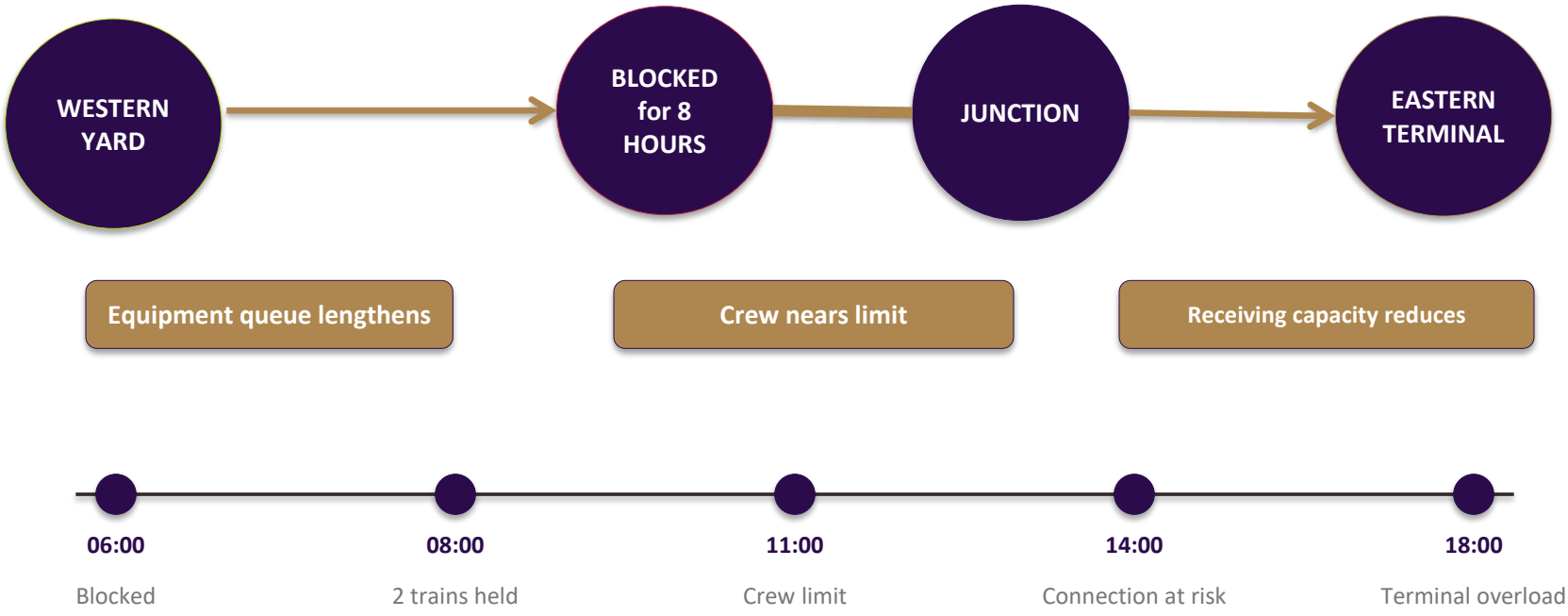
- Network recovery time
- Customer service
- Equipment cycle time
- System stability

What limits the answer?

- Track and terminal capacity
- Crew qualifications and hours
- Train composition
- Safety and operating rules

A corridor closure creates a cascading network problem

RAILWAY



Clearing the blocked corridor fastest may not produce the fastest network recovery.

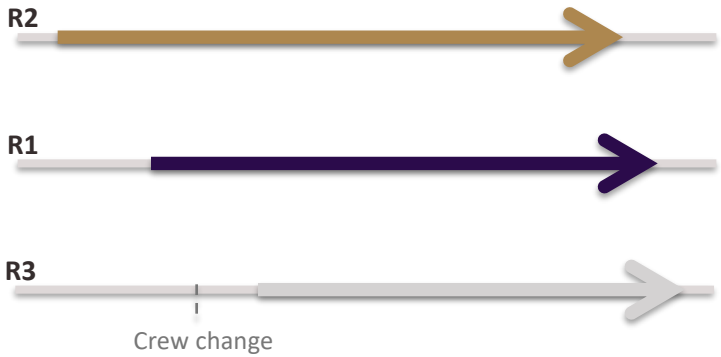
Recovery requires optimizing the *sequence*—not one train

RAILWAY

OPTION A | FIRST DELAYED, FIRST RELEASED

Fast corridor clearance:
Receiving-terminal surge

OPTION B | NETWORK-BALANCED SEQUENCE



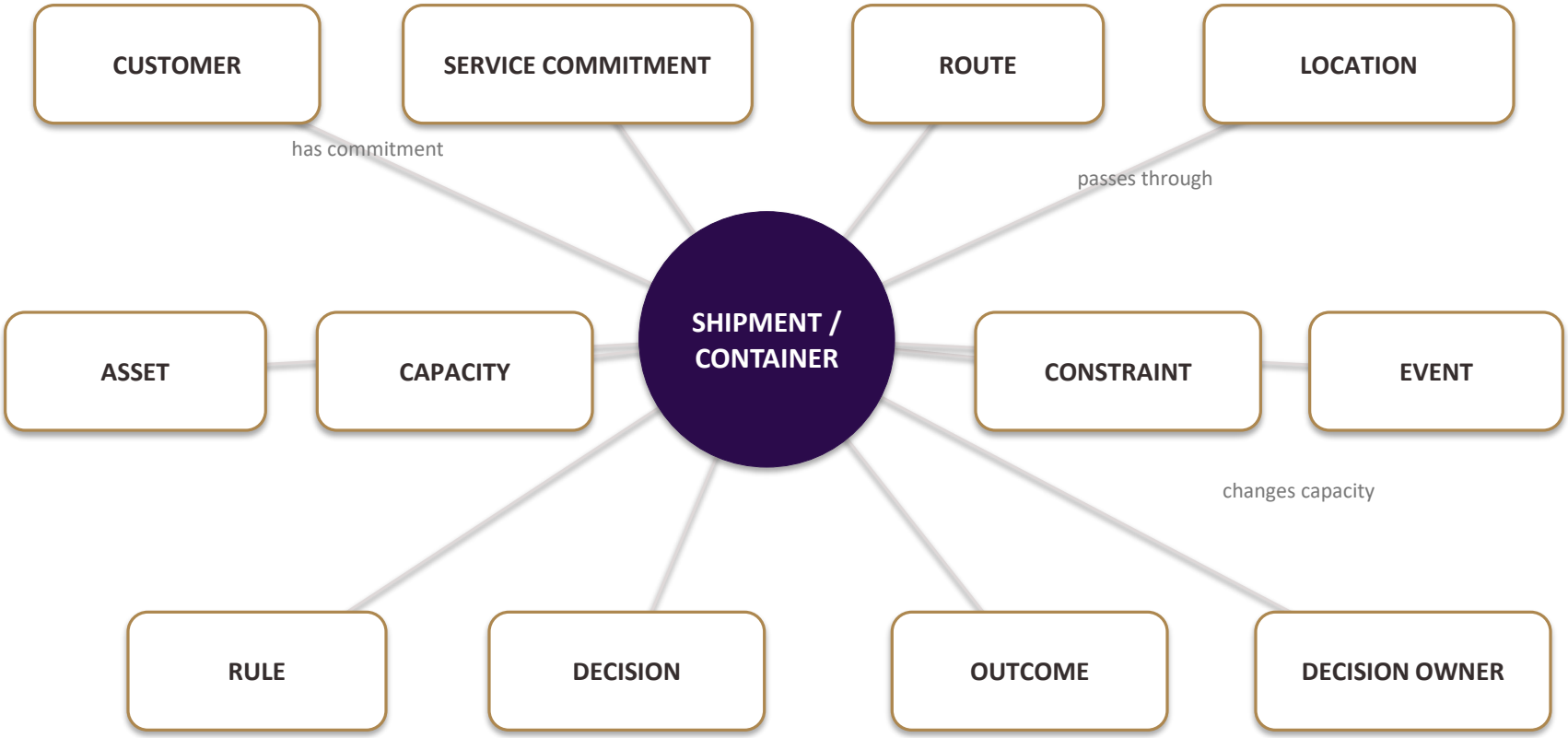
Protects connection:
Matches terminal capacity

EXPERT REFRAMES THE OBJECTIVE | From "clear the corridor fastest" to "restore stable network flow safely."

Human expertise may improve the goal being optimized, not merely approve the answer.

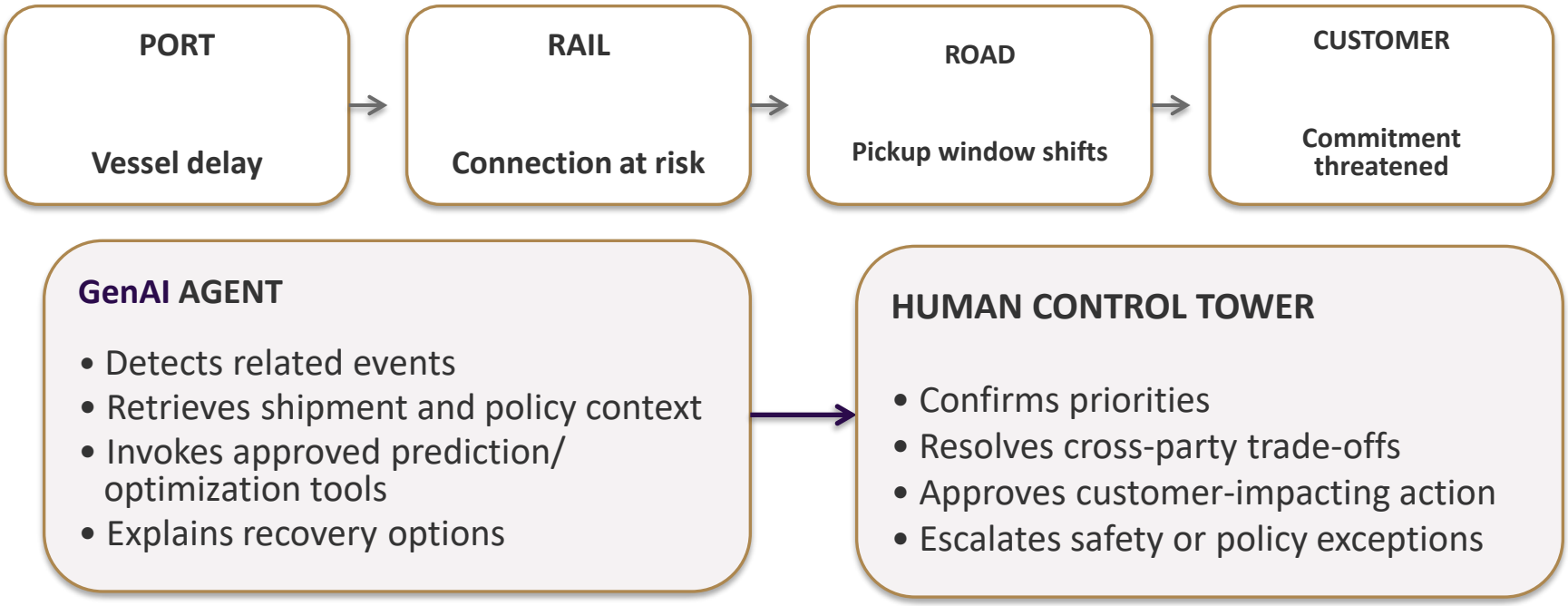
The business map connects events to decisions

SEMANTIC MODEL



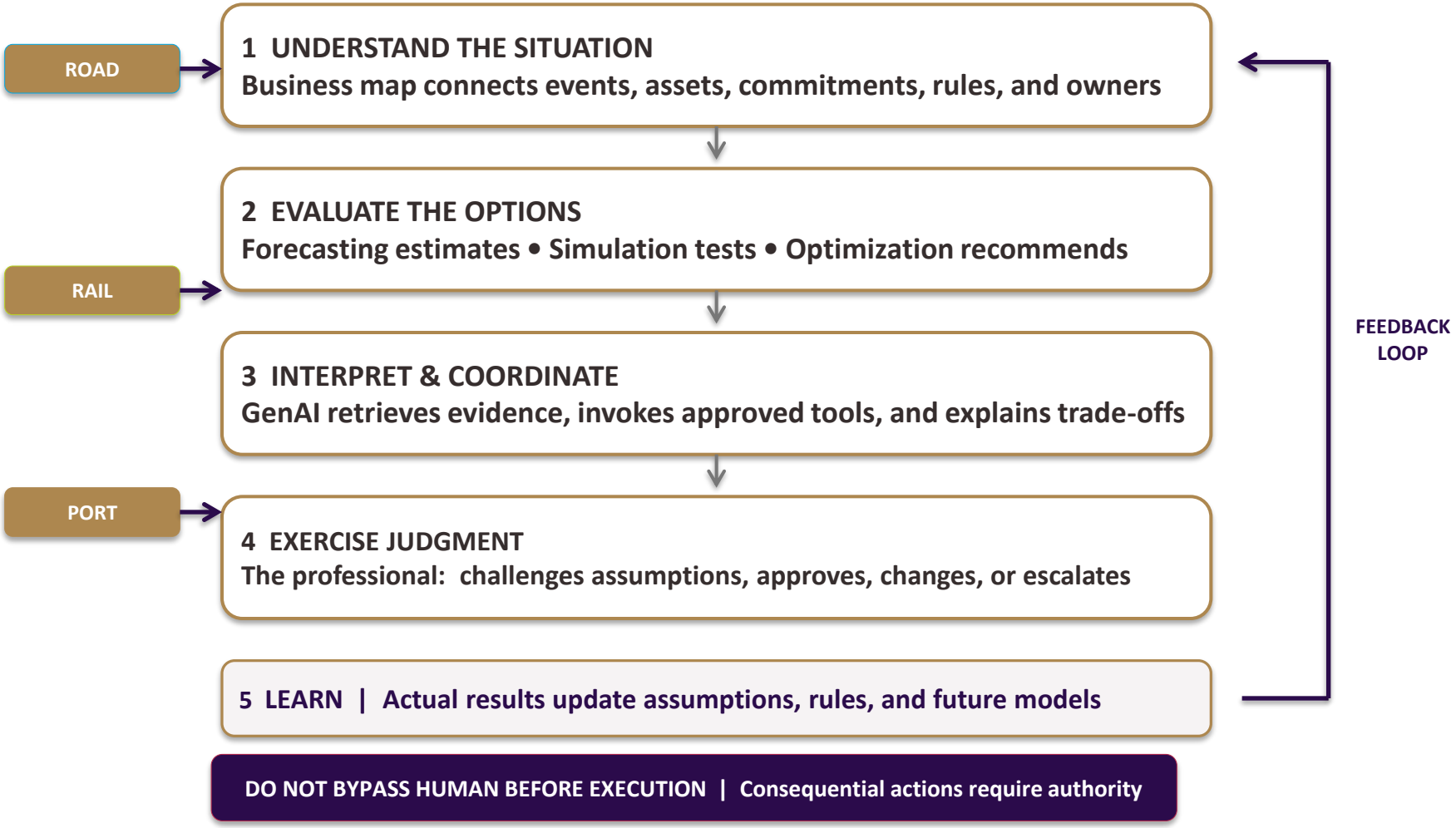
The semantic model represents how the business understands operations—not merely where fields are stored.

Intermodal disruption: one shipment, several decision owners



The business map links the same shipment across modes, organizations, systems, and decisions.

A decision moves through four layers—and back again



Autonomy should match consequence

Control the risks—and start with one real decision

Risk → practical control

Confidently wrong answer	Ground in trusted sources; require evidence
Infeasible recommendation	Validate through rules, models, and experts
Sensitive information	Access control, data boundaries, and logging
Unclear accountability	Named decision owner and approval point

A practical starting path

1. Choose one recurring decision
2. Map data, rules, constraints, and owners
3. Baseline current performance
4. Pilot with experts in the loop
5. Measure, learn, and expand deliberately

Where does your organization face a recurring decision bottleneck?

GenAI complements decision-science and logistics expertise
It does not replace either.

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Questions and follow-up welcome

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