



**33<sup>rd</sup>** Annual **INCOSE**  
international symposium

hybrid event

Honolulu HI USA



Steve Wallace, John Welford, James Donovan

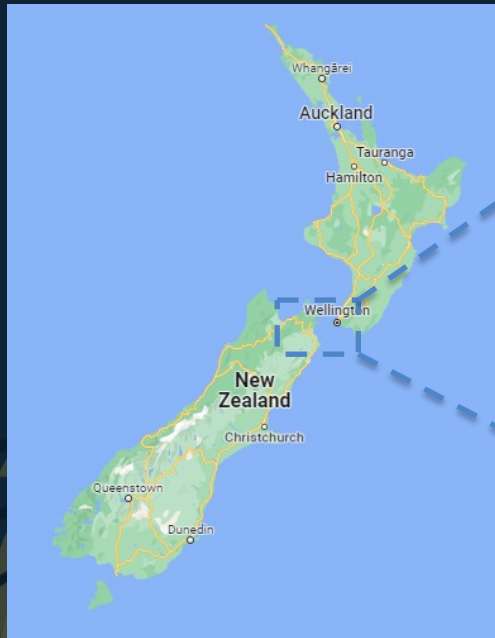
# Understanding Interface Criticality in Large Infrastructure Projects

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15-20 July - 2023

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# KiwiRail InterIslander



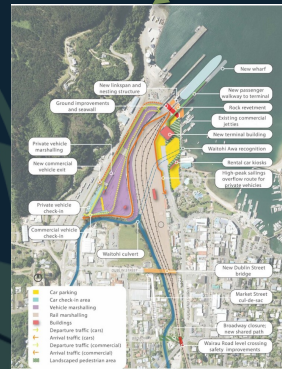
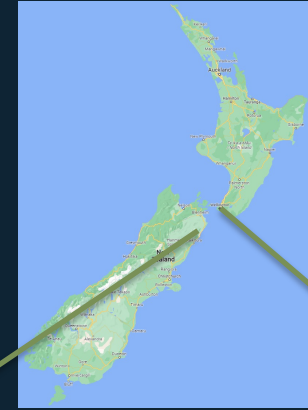
<https://www.interislander.co.nz/>

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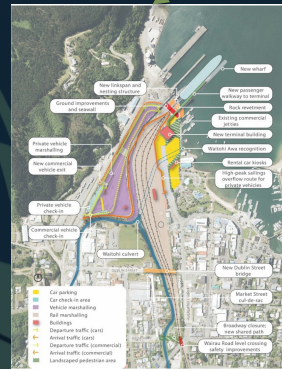
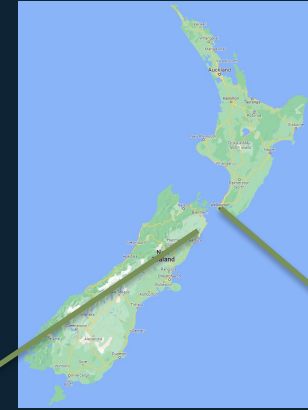
<https://www.irex.co.nz/>

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# iReX – Terminals Design



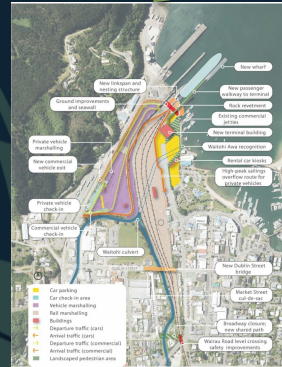
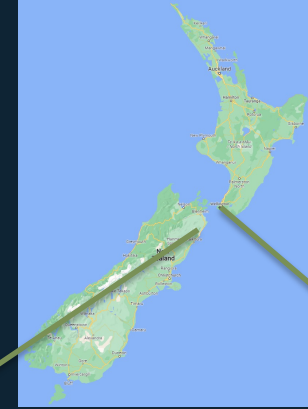
SHOAL



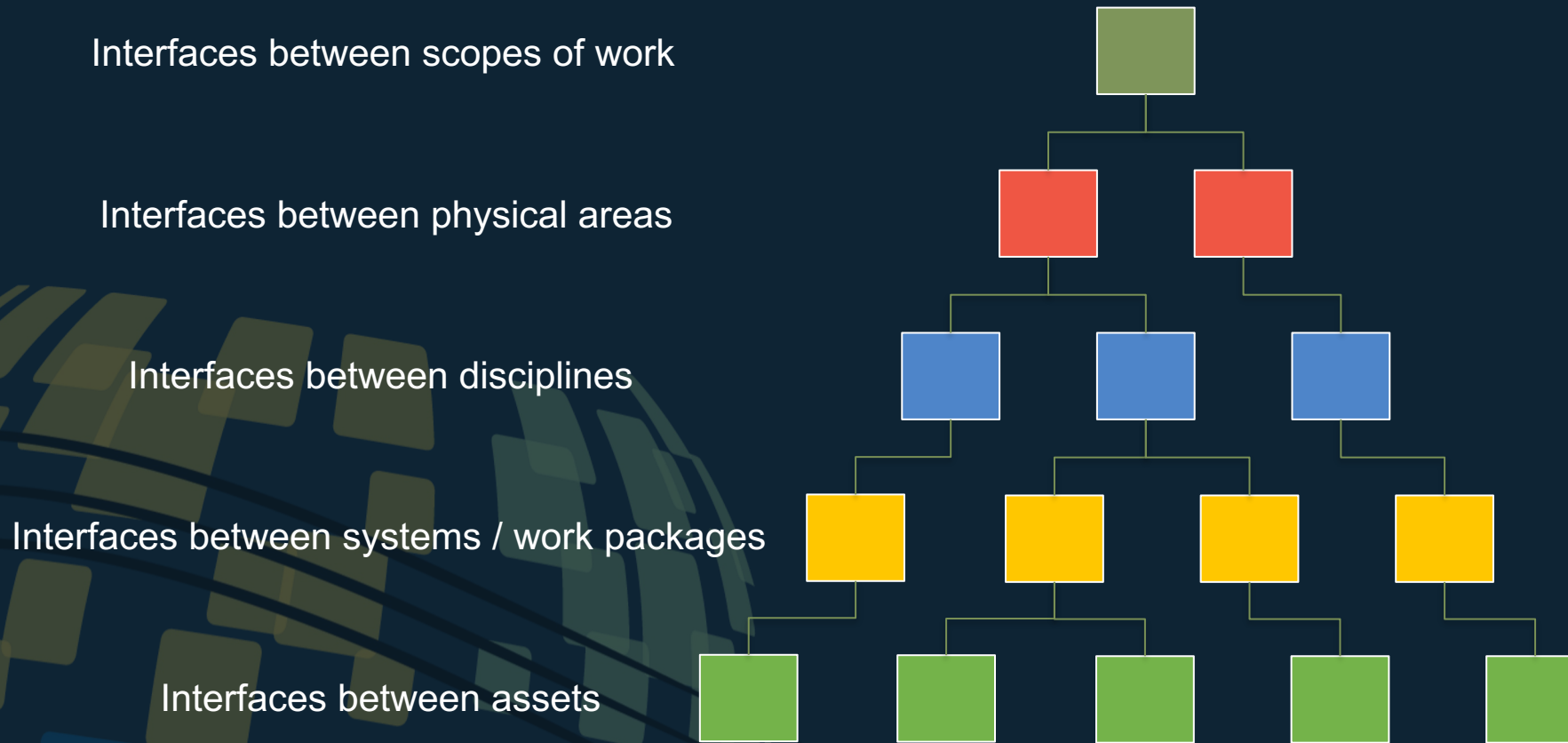
# iReX – Terminals Design



# SHOAL



# Interface Hierarchy within a Project





# Interface Hierarchy within a Project

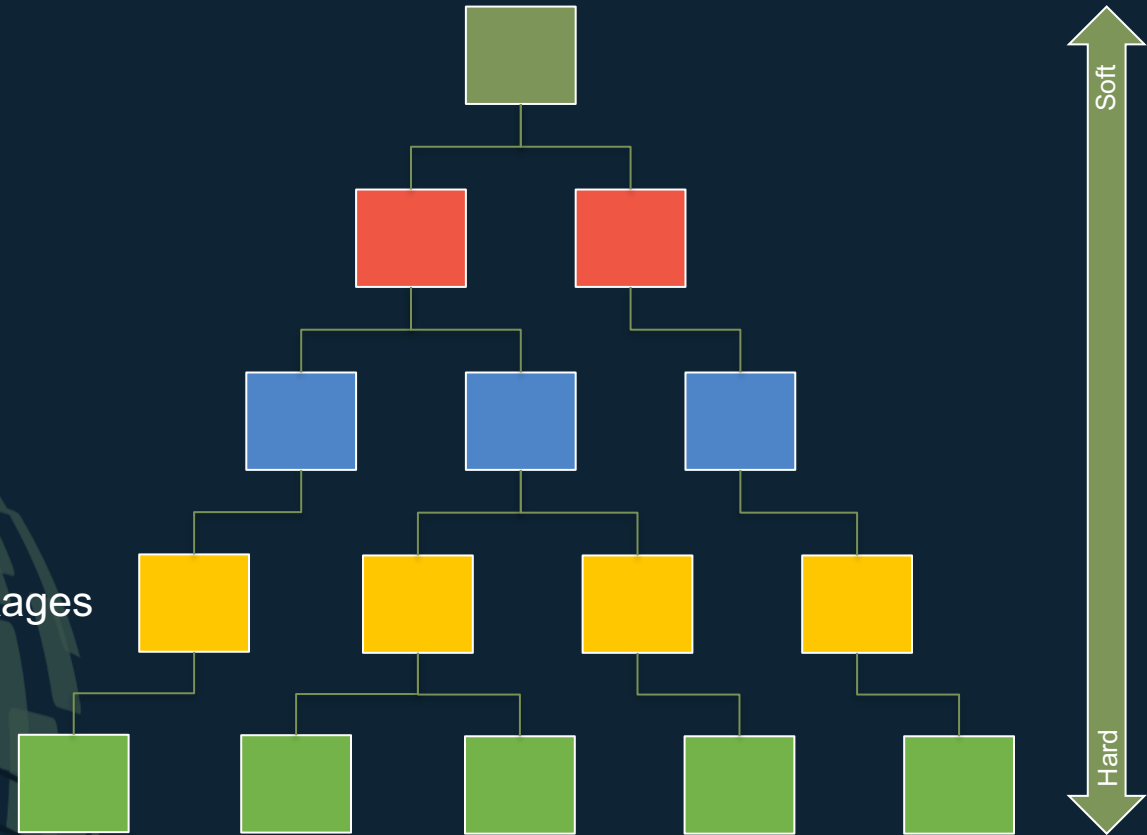
Interfaces between scopes of work

Interfaces between physical areas

Interfaces between disciplines

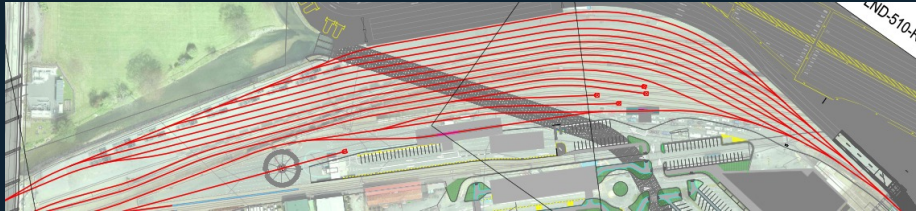
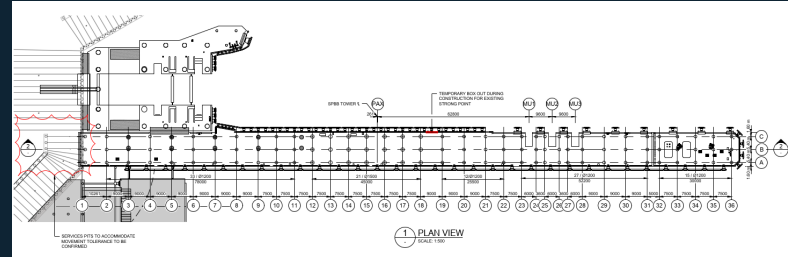
Interfaces between systems / work packages

Interfaces between assets



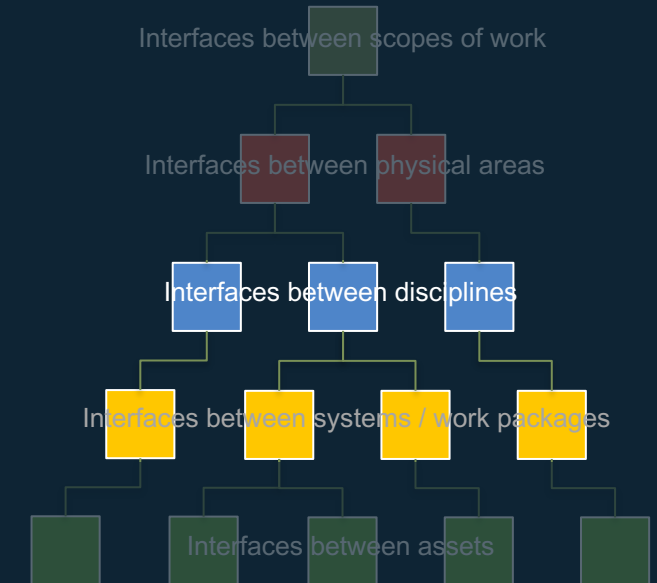
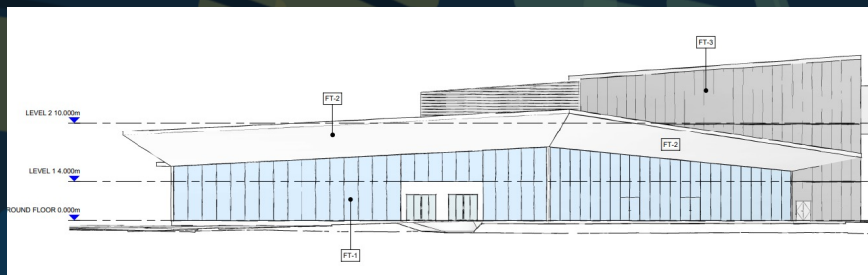
# Interface Hierarchy within a Project

Marine



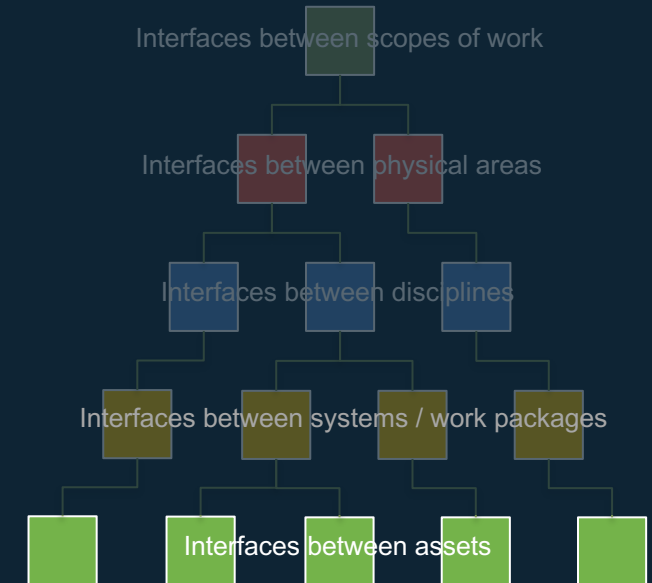
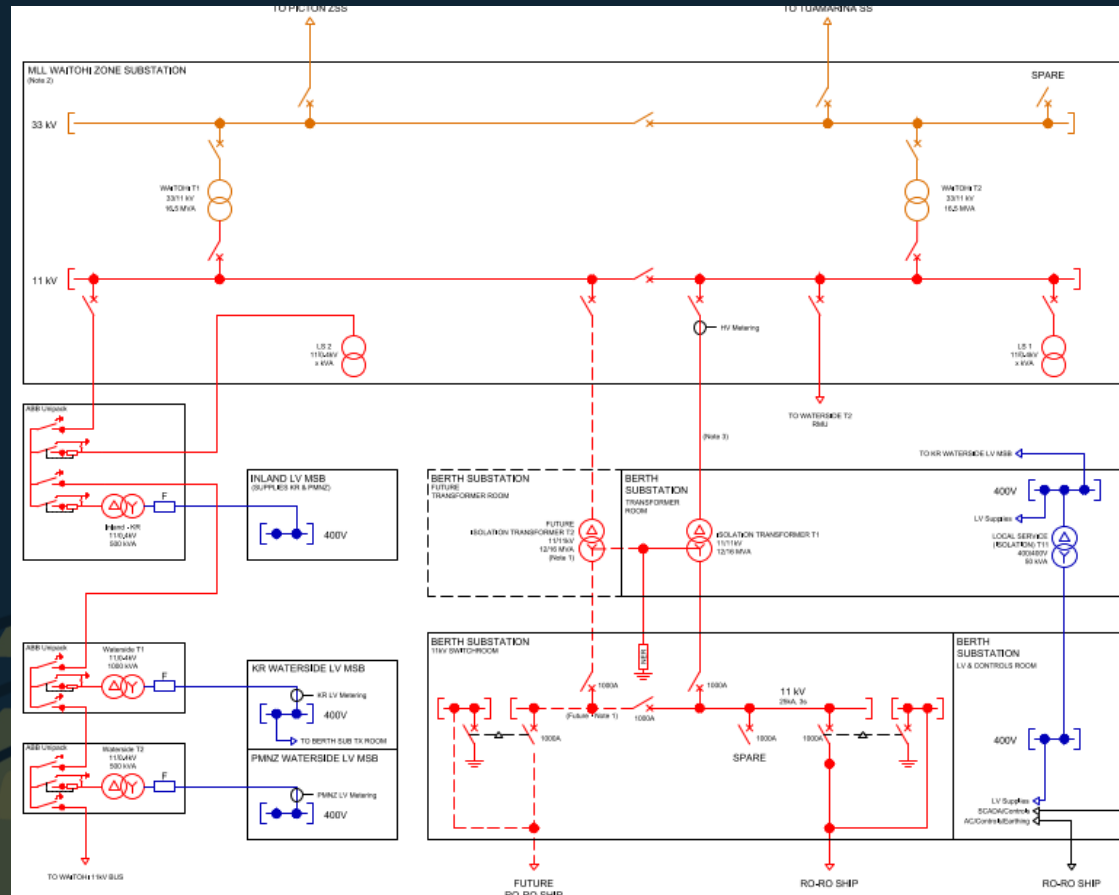
Land

Buildings

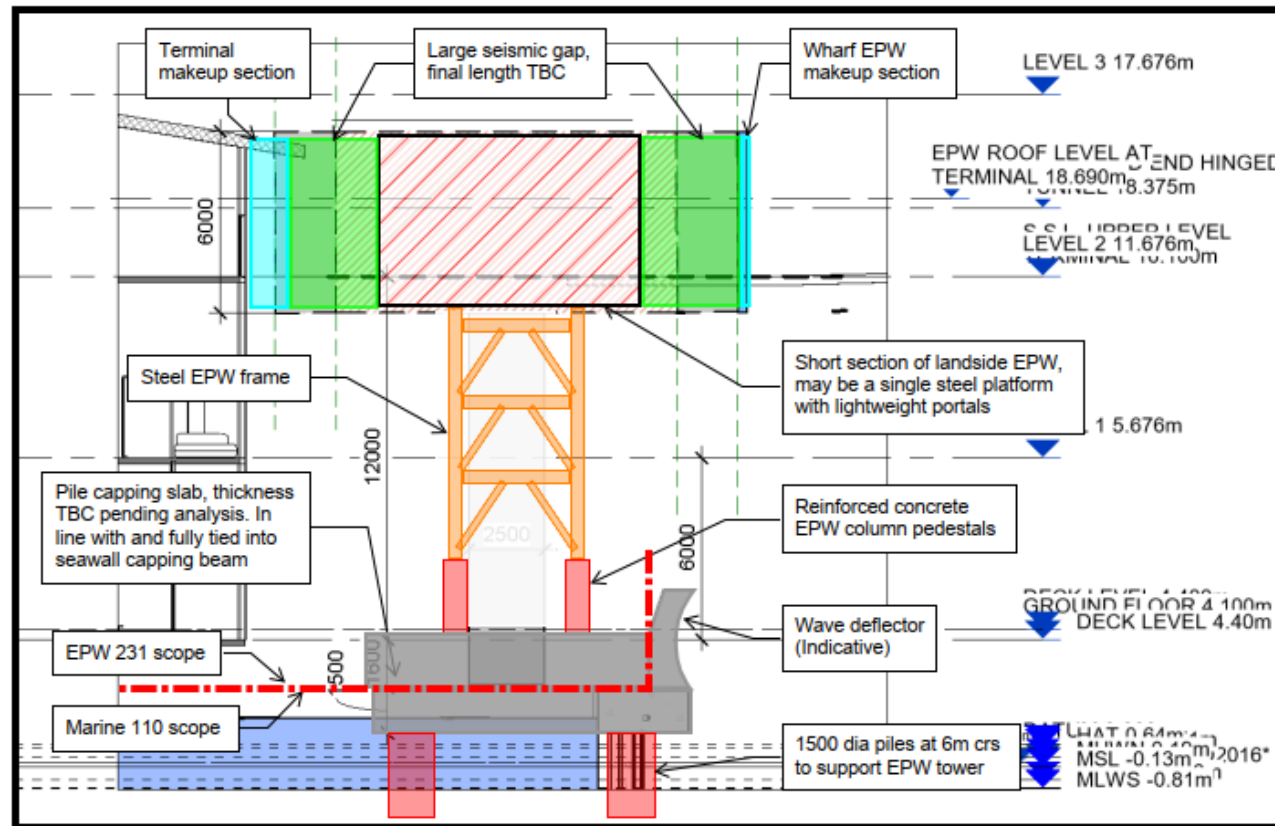




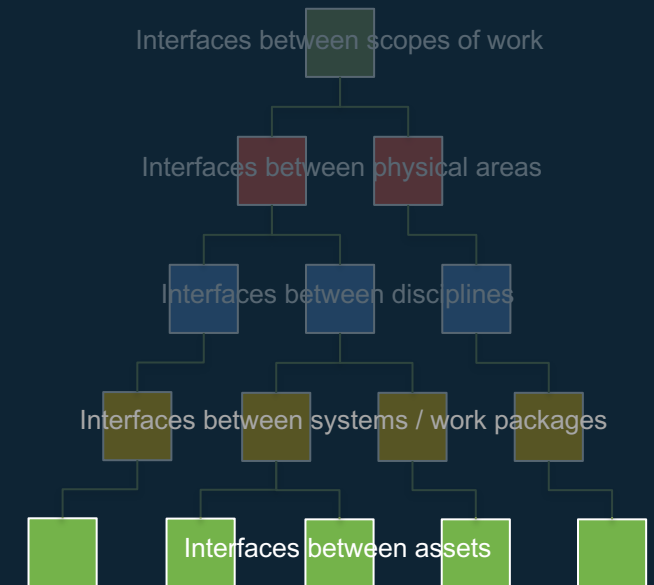
# Interface Hierarchy within a Project



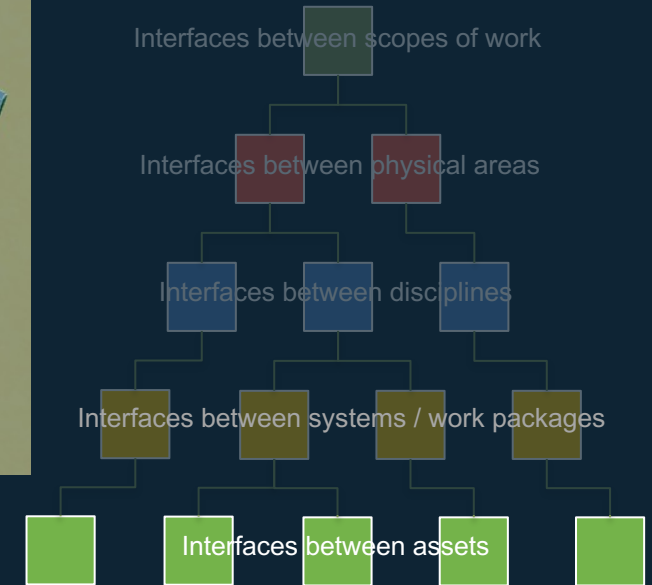
# Interface Hierarchy within a Project



**EPW Elevation**



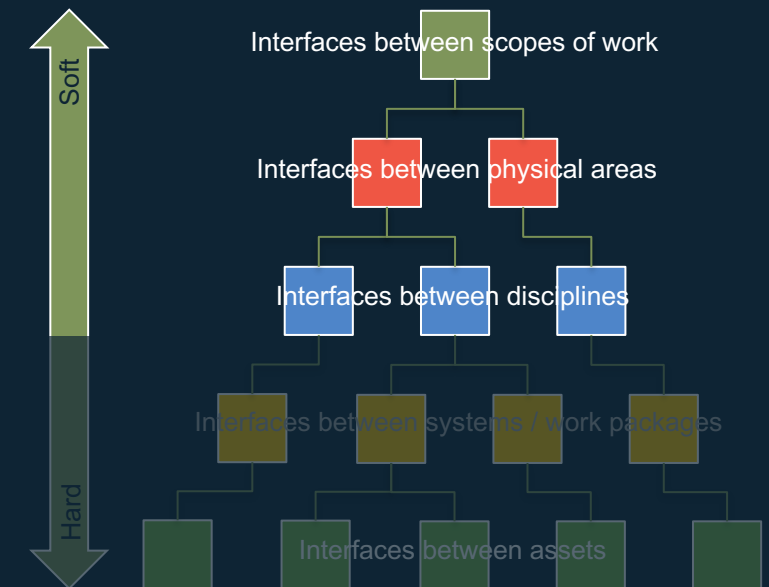
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# Interface Hierarchy within a Project

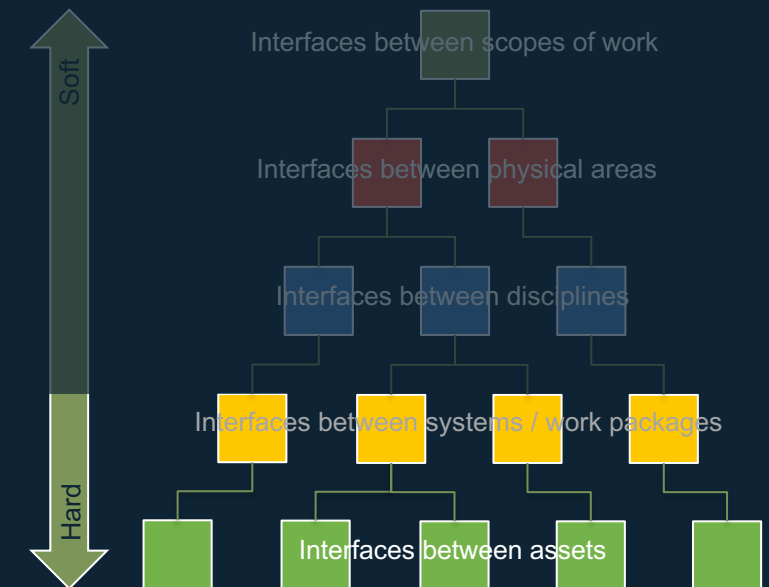
Interface focus of traditional infrastructure projects



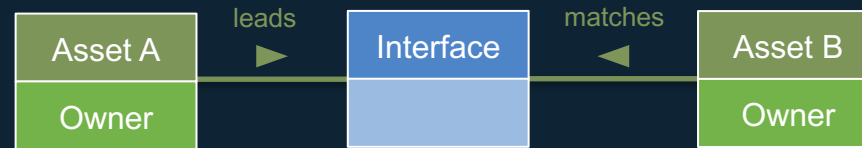
# Interface Hierarchy within a Project

Interface focus of traditional infrastructure projects

Interface focus of iReX

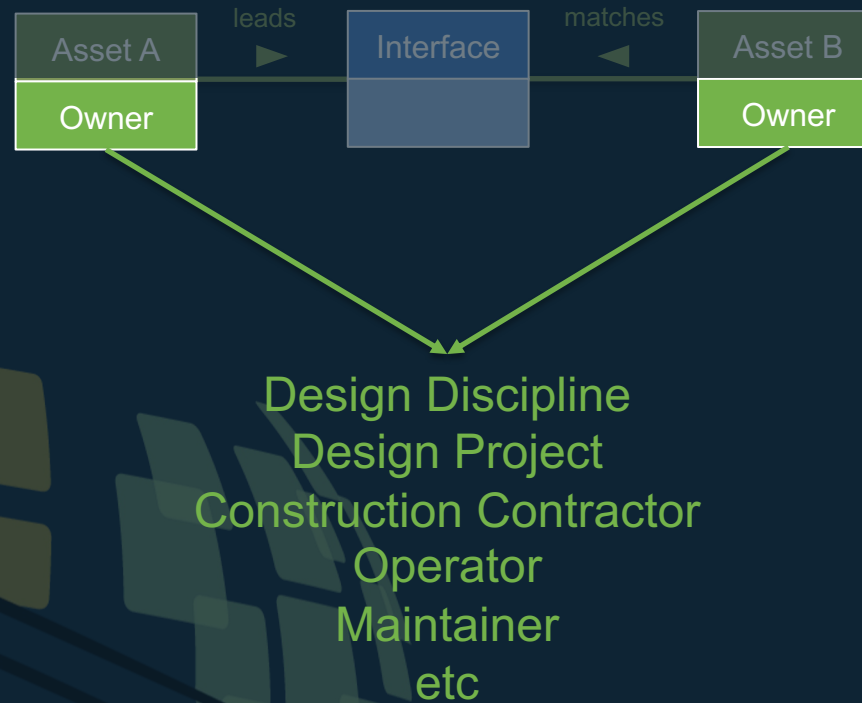


# Interface Ownership and Management

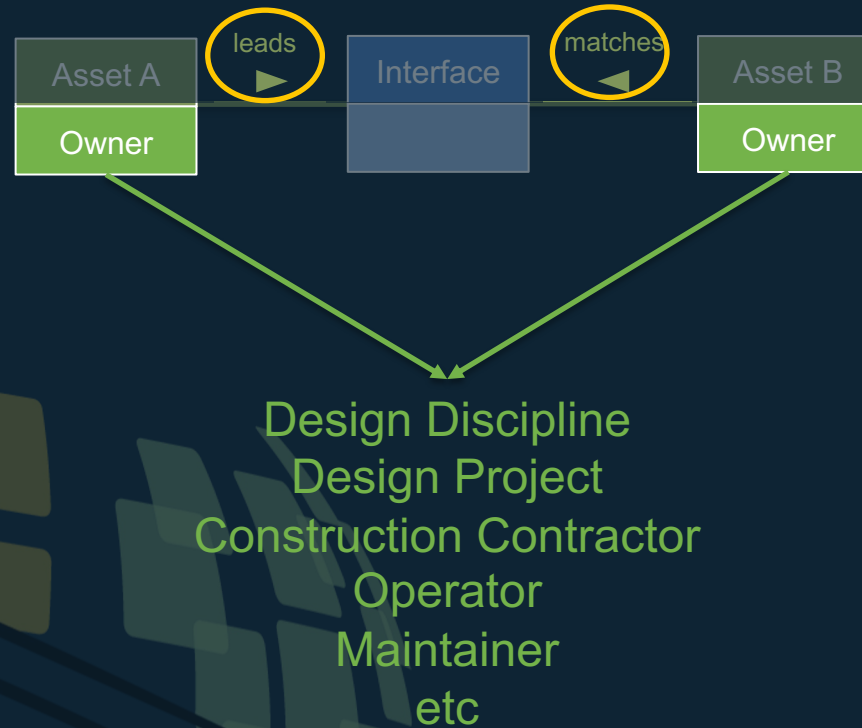




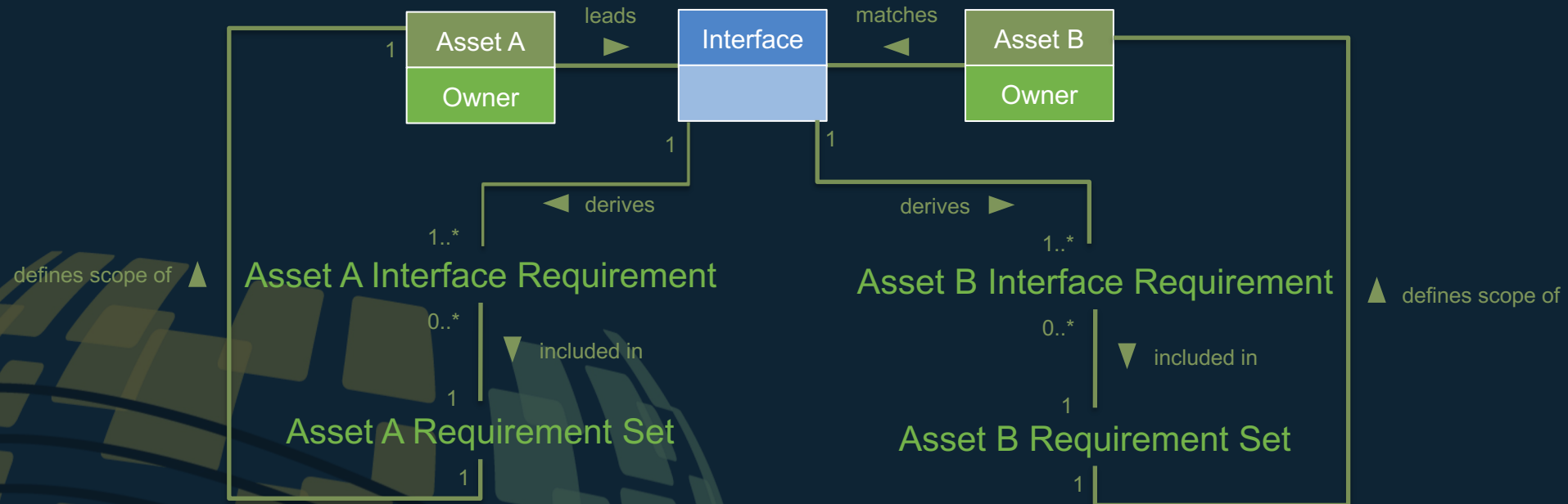
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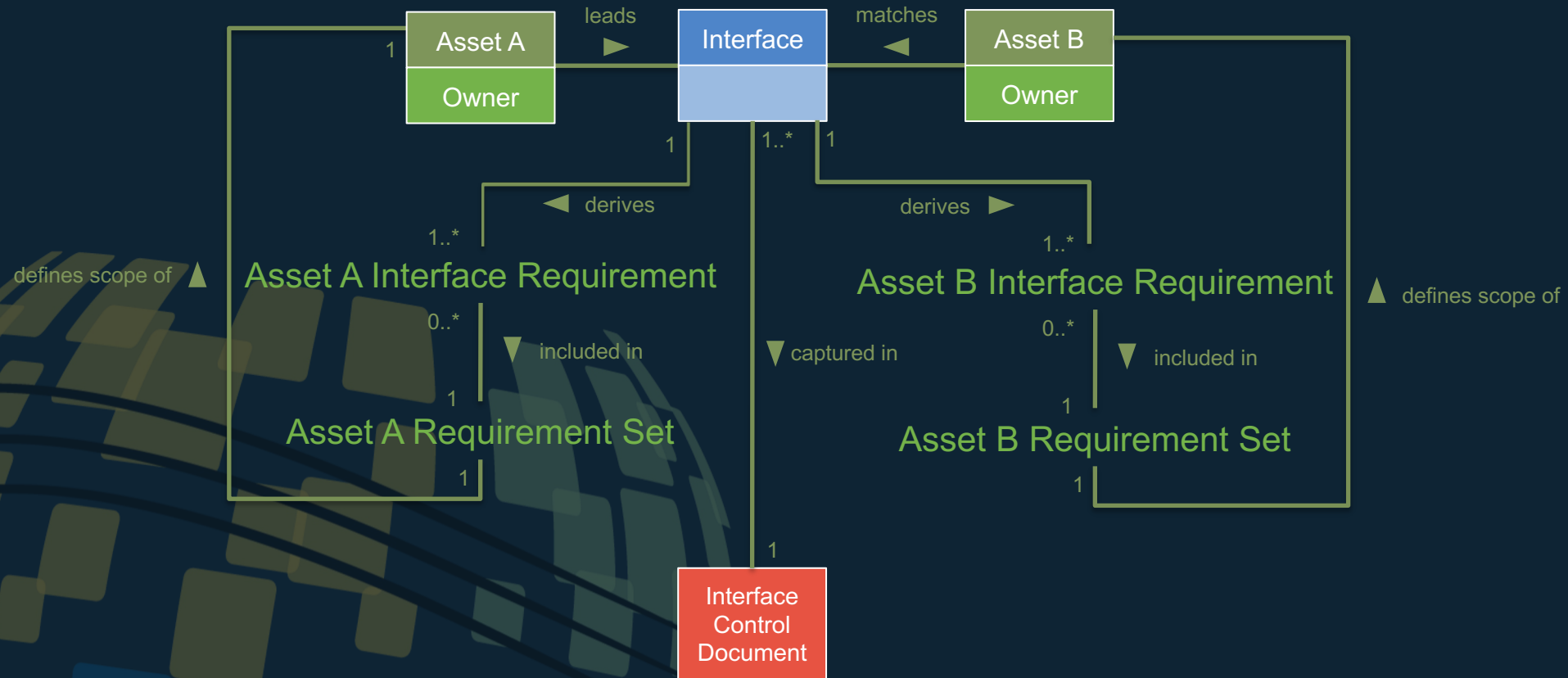


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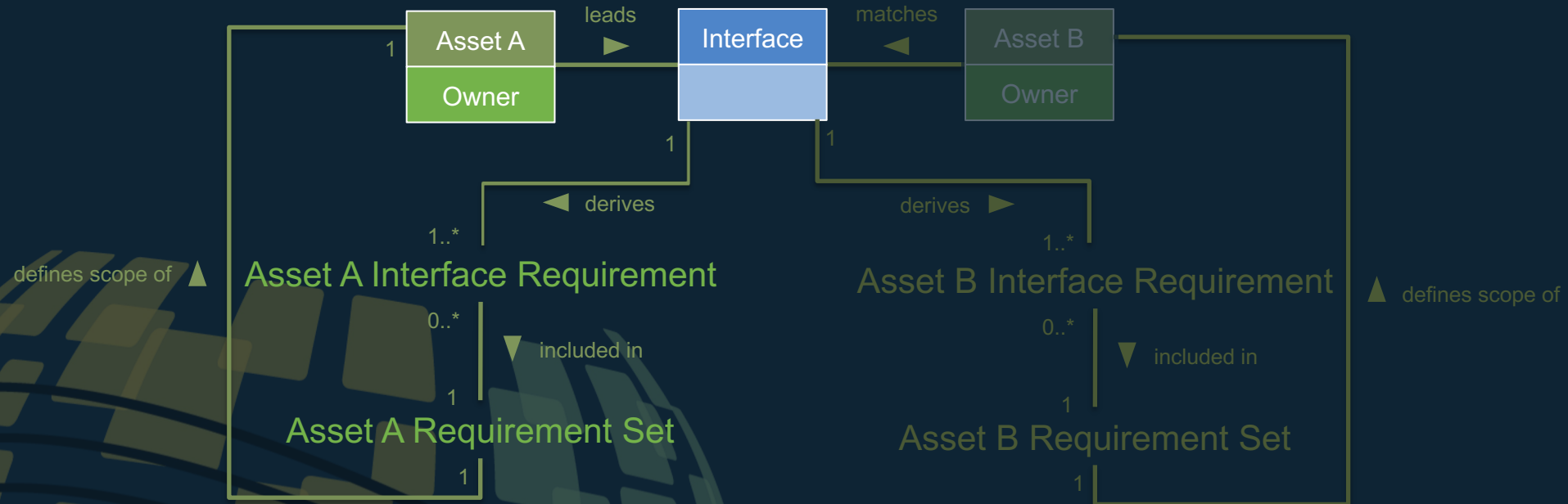




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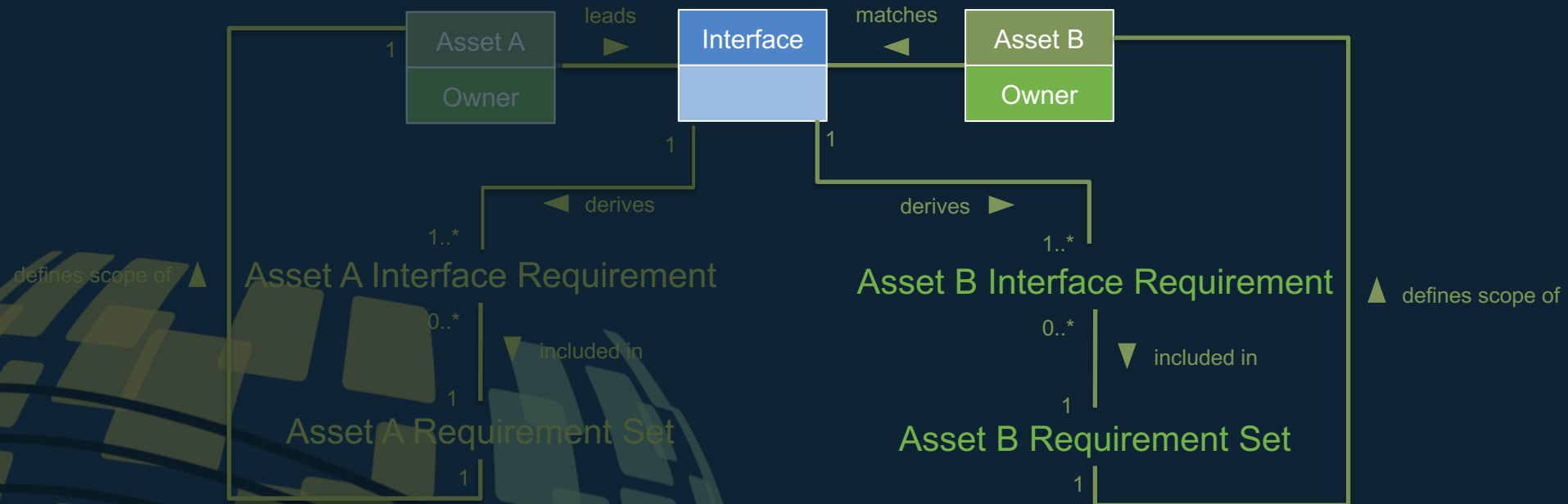


# Interface Ownership and Management



Lead Asset Requirement: The Picton Lower Linkspan king pin shall be 250 mm in diameter.

# Interface Ownership and Management



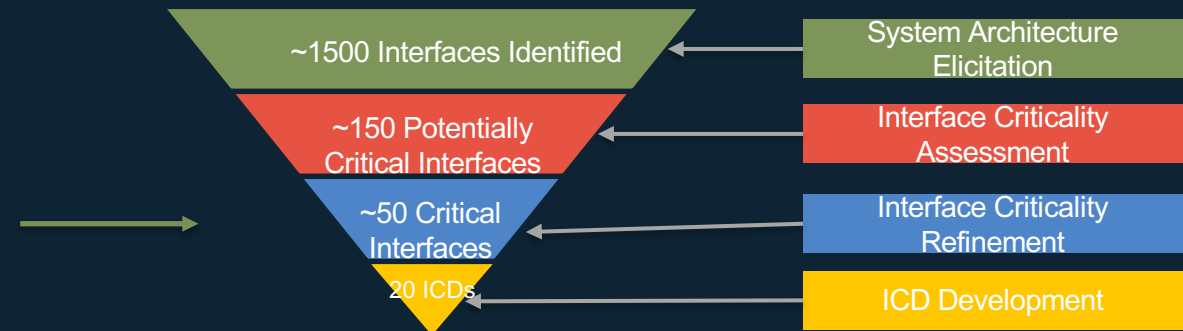
Match Asset Requirement: The Ship pin slot shall be 750 mm in diameter. (Rationale: to accommodate the Picton Lower Linkspan king pin +/- 250mm.)

# Interface Criticality Assessment

Category	Rating	Score
Impact to Project Delivery and Operation	Significant impact to delivery and operation	4
	Moderate impact to delivery and operation	3
	Low impact to delivery and operation	2
	Negligible impact to delivery and operation	1
Impact to Safety	Significant risk to life safety	4
	Moderate risk to life safety	3
	Low risk to life safety	2
	Negligible risk to life safety	1
Compliance to Standards	Bespoke complex arrangements, departure from standards	3
	Bespoke arrangement, no standards available	2
	Designed to approved standards	1
Delivery Team	Two entirely separate organisations	5
	One organisation with a subcontractor	3
	Two separate teams within one organisation	2
	Within one team within one organization	1
Complexity of interface	5 or more interface types	3
	2 to 4 interface types	2
	Singular interface type	1

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# Outcomes

- Design Team Engagement
  - Difficult to get engagement early in the design phase
  - As design matured, the risk around the critical interfaces increased and design team engagement improved
- External 'Match' Party Engagement
  - Engagement was also problematic
  - Primarily due to the external parties not having an active contract at the time that ICD engagement was required
- Recommendations
  - In future projects include interface register and ICD development and delivery milestones within the project programme

# Conclusion

- A systems approach to interface identification and management is needed to support increased infrastructure design complexity
- Interface quantity can be focused through interface criticality assessment and design team engagement (~3% of total interfaces identified as critical)
- Interface requirements for critical interfaces are verified as part of the standard design verification process
- This approach should be tied into design gate pass criteria to enable increased design team engagement



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