



33rd Annual **INCOSE**
international symposium
hybrid event
Honolulu HI USA



Steve Wallace, John Welford, James Donovan

Understanding Interface Criticality in Large Infrastructure Projects

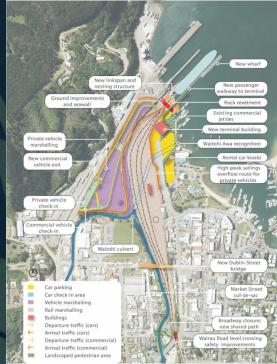
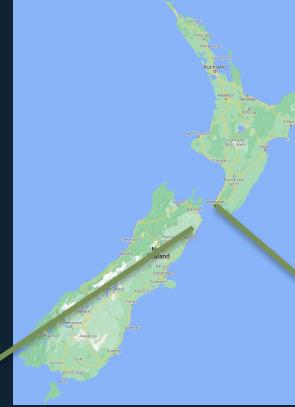
KiwiRail Interislander



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

www.incose.org/symp2023 #INCOSEIS

Inter-island Resilient Connection (iReX) Project



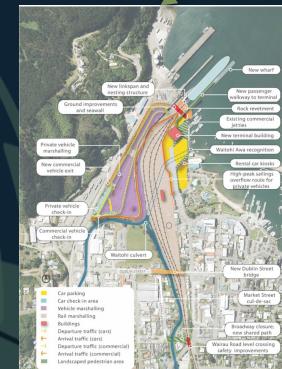
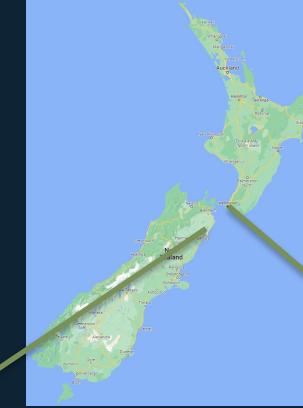
<https://www.irex.co.nz/>

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iReX – Terminals Design



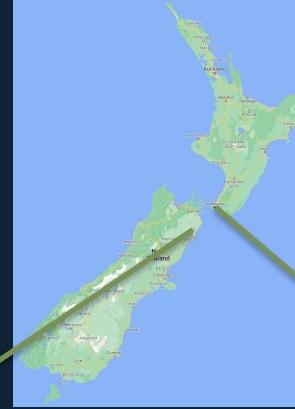
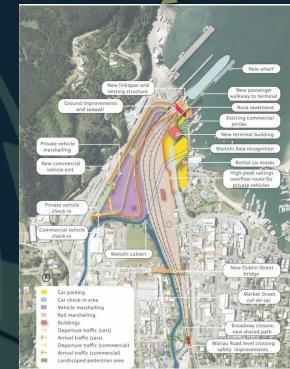
SHOAL



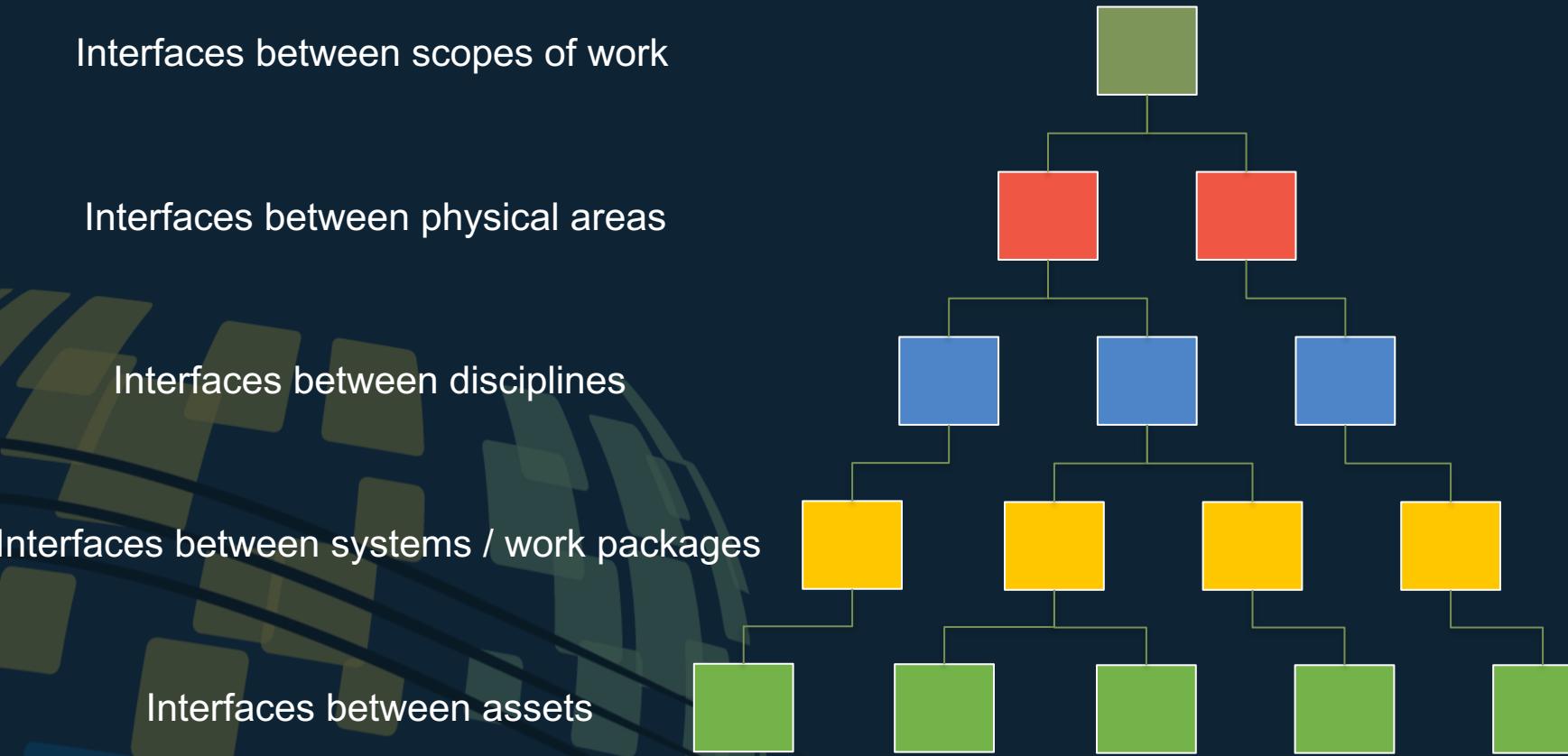
iReX – Terminals Design



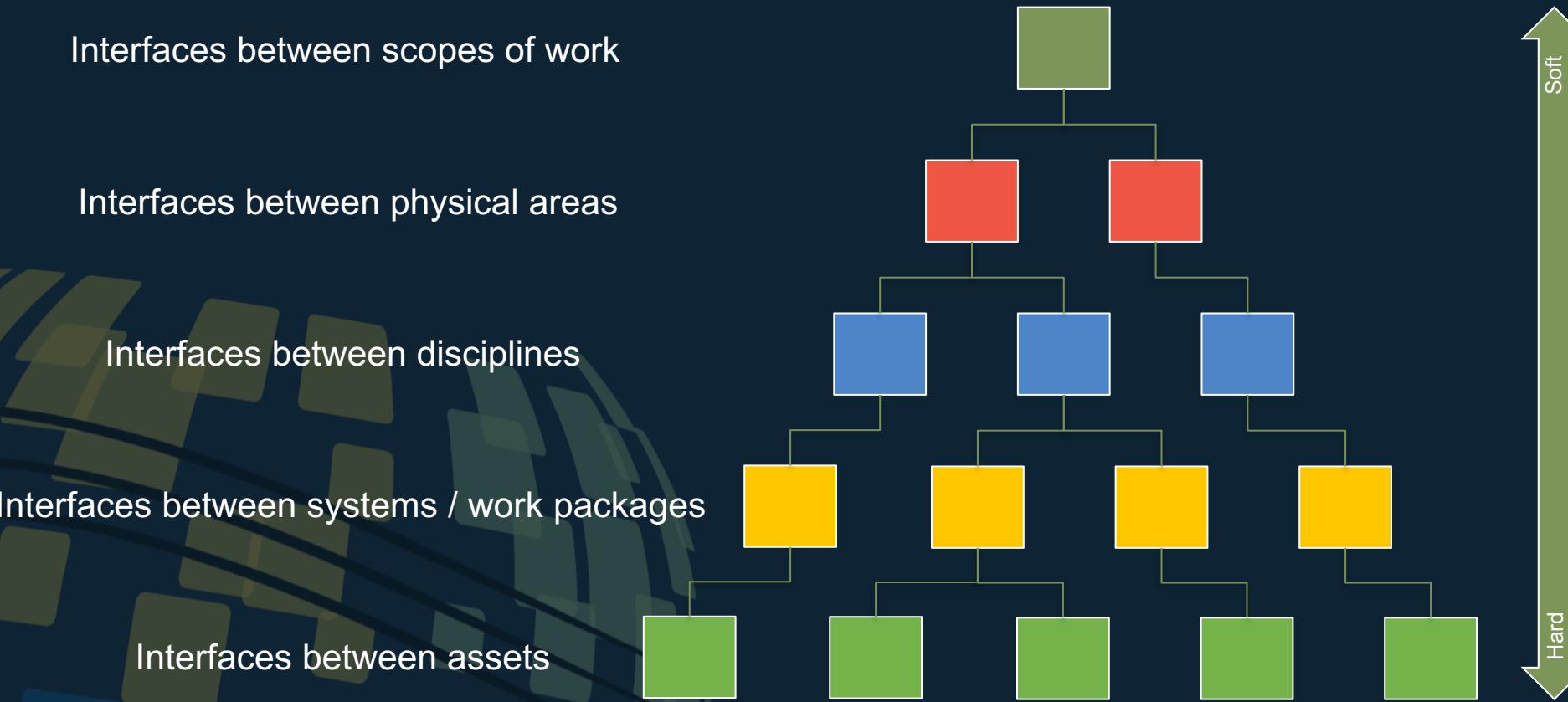
SHOAL



Interface Hierarchy within a Project

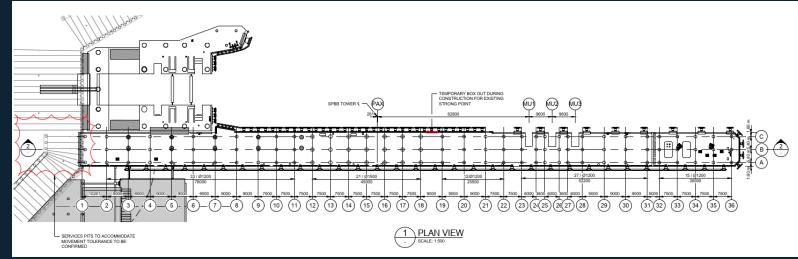


Interface Hierarchy within a Project

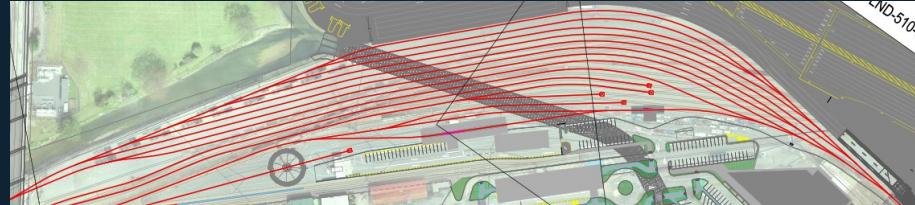


Interface Hierarchy within a Project

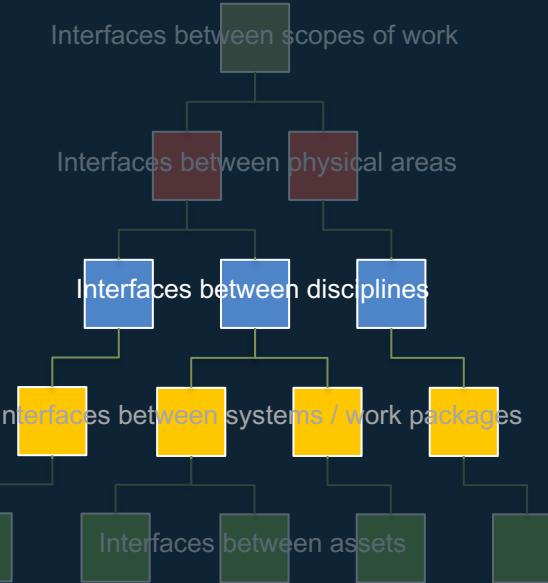
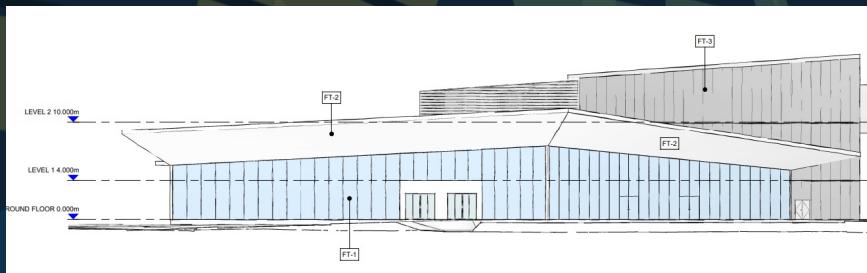
Marine



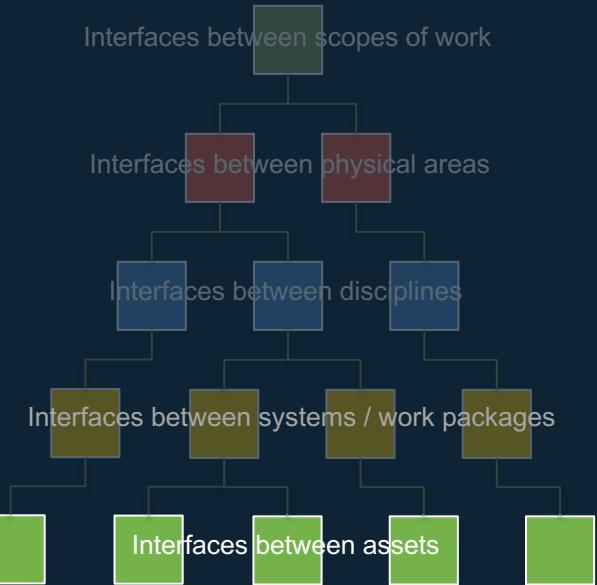
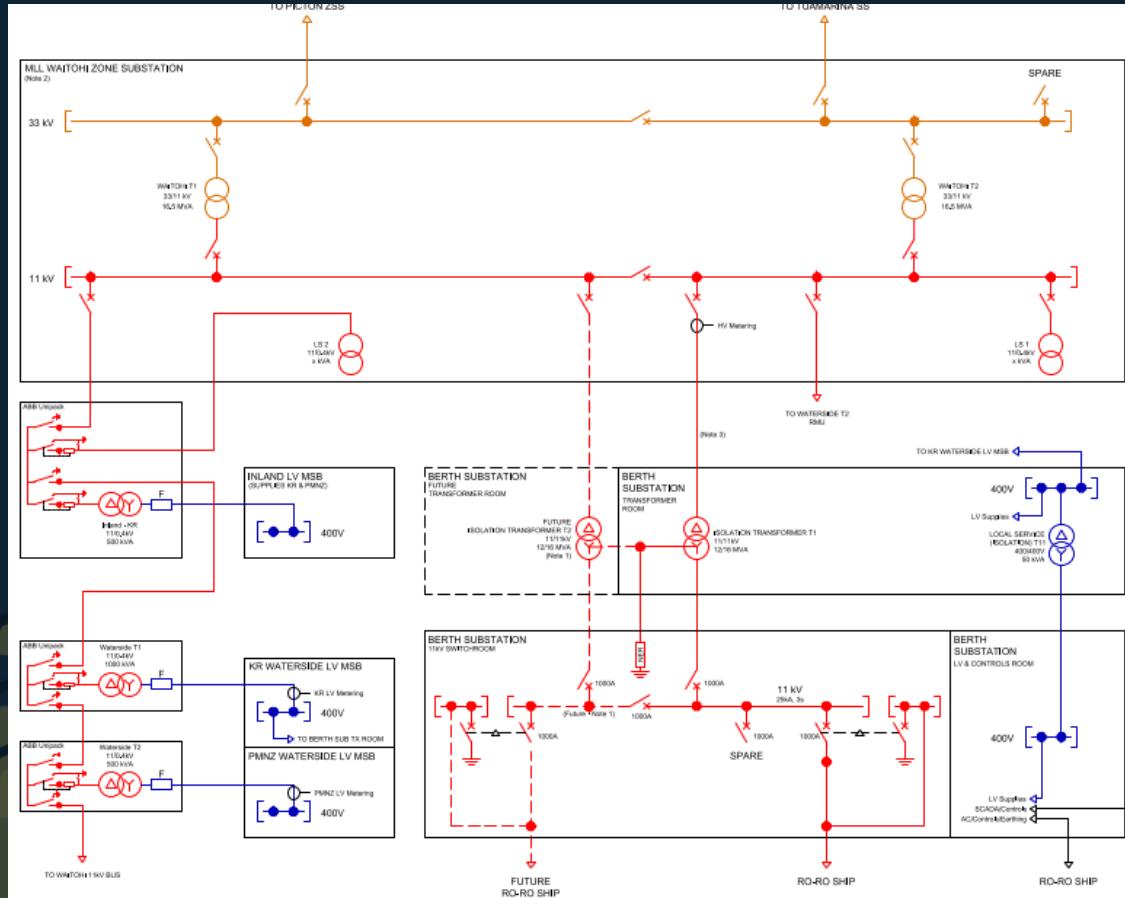
Land



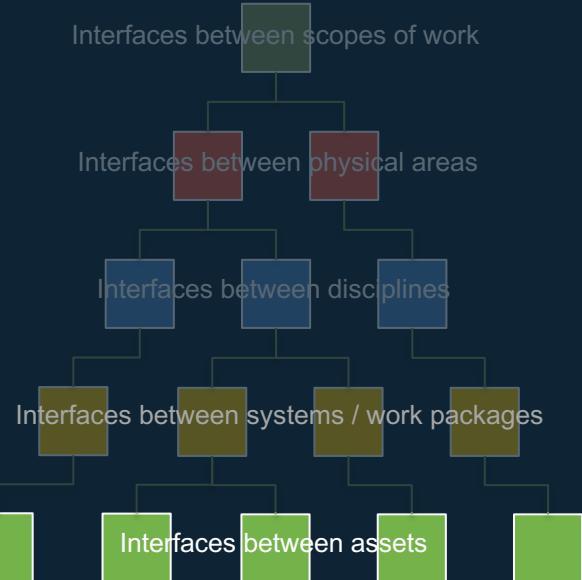
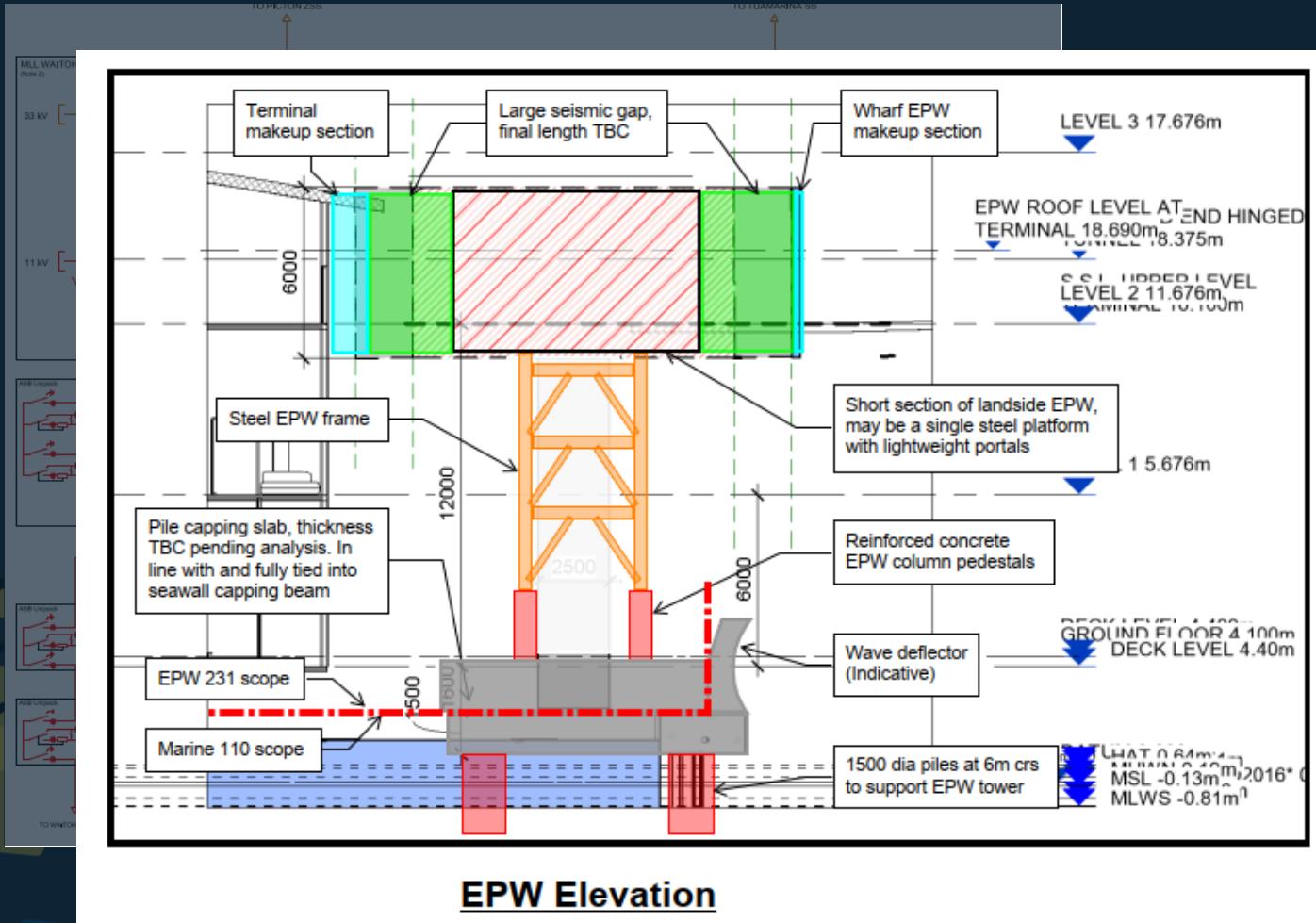
Buildings



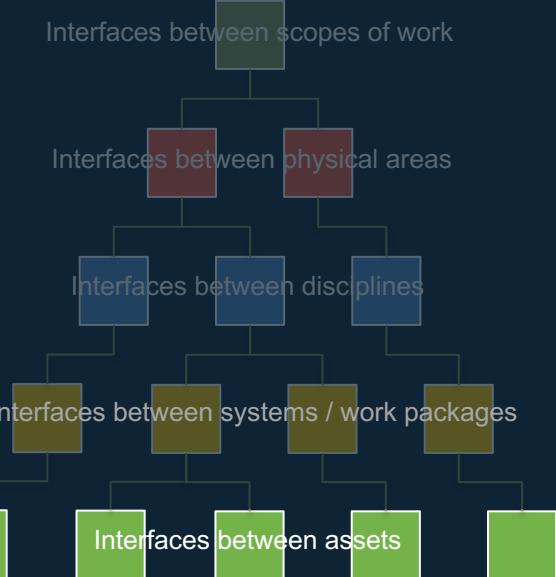
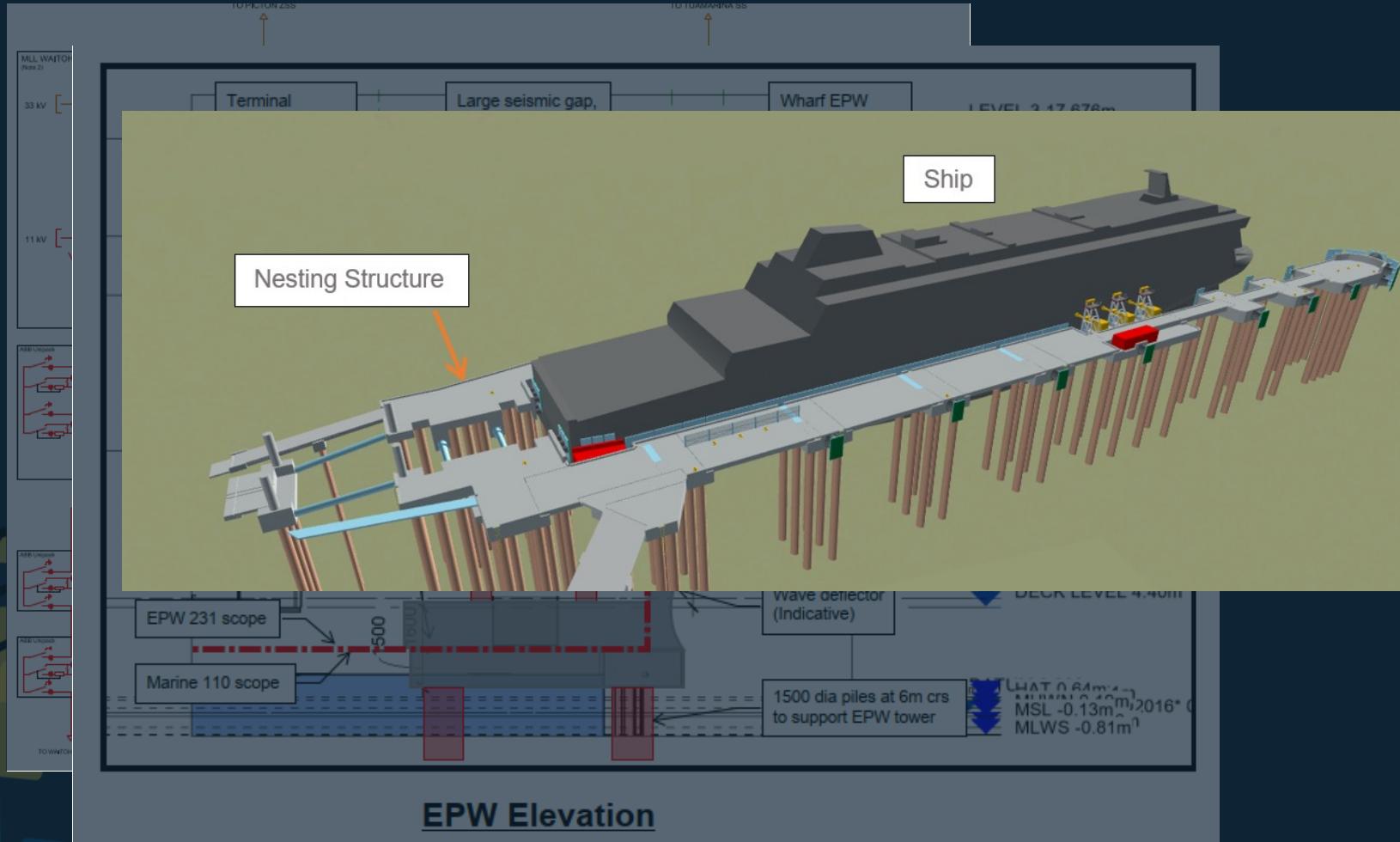
Interface Hierarchy within a Project



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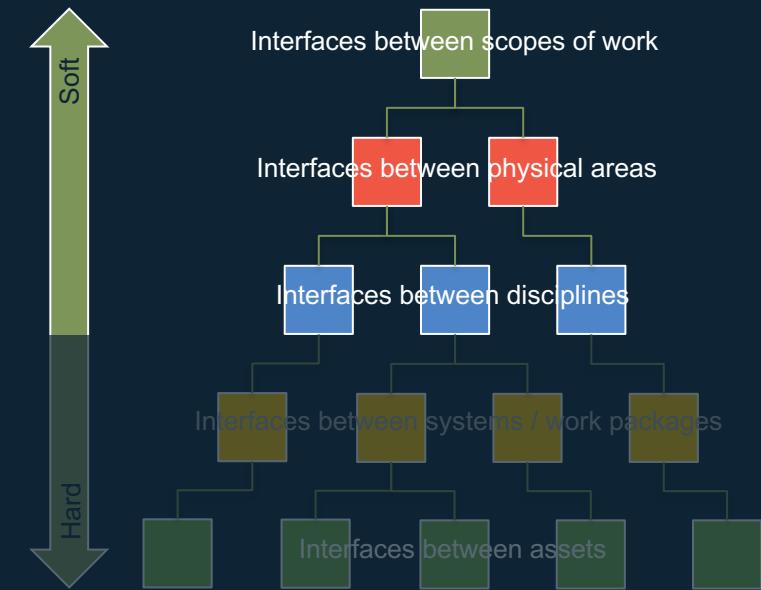


Interface Hierarchy within a Project



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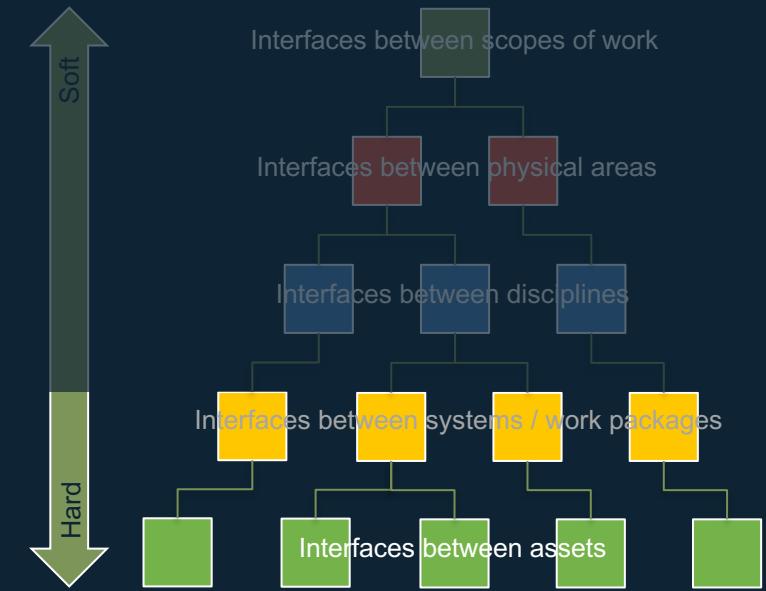
Interface focus of traditional infrastructure projects



Interface Hierarchy within a Project

Interface focus of traditional infrastructure projects

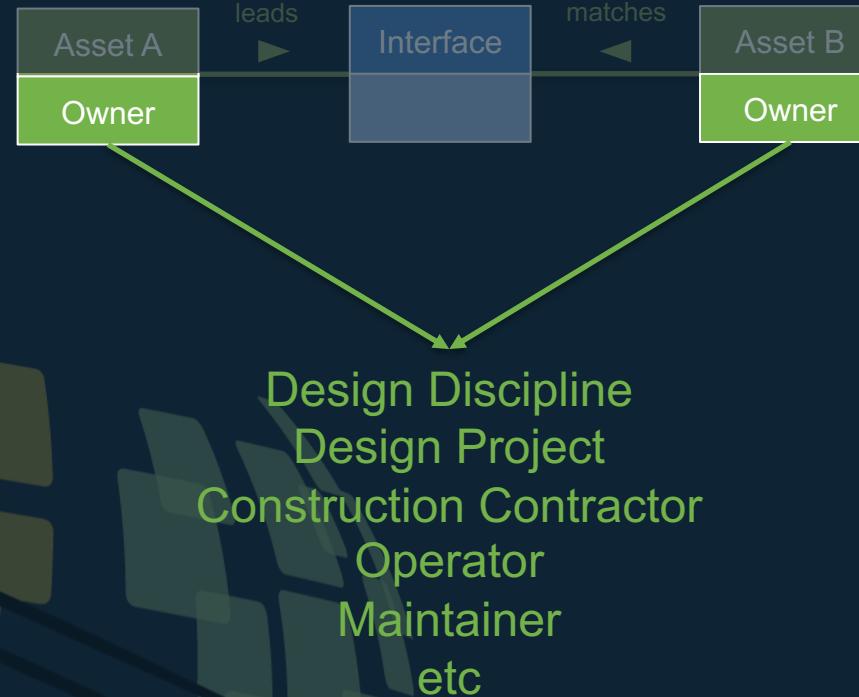
Interface focus of iReX



Interface Ownership and Management



Interface Ownership and Management

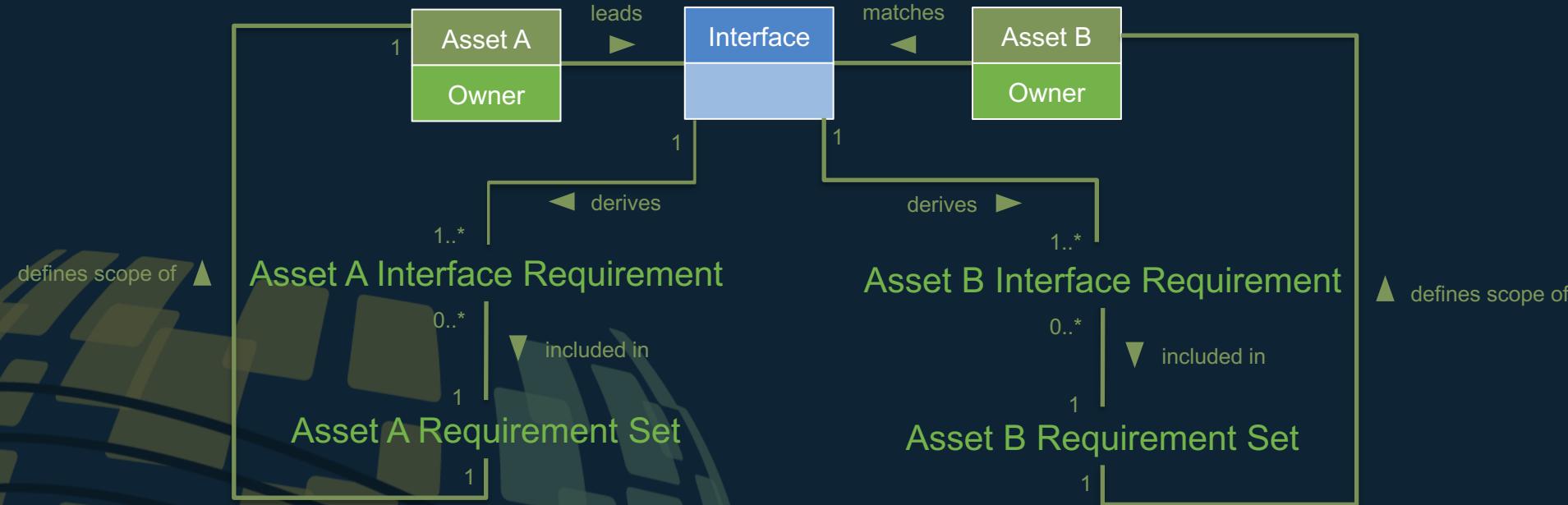


Interface Ownership and Management

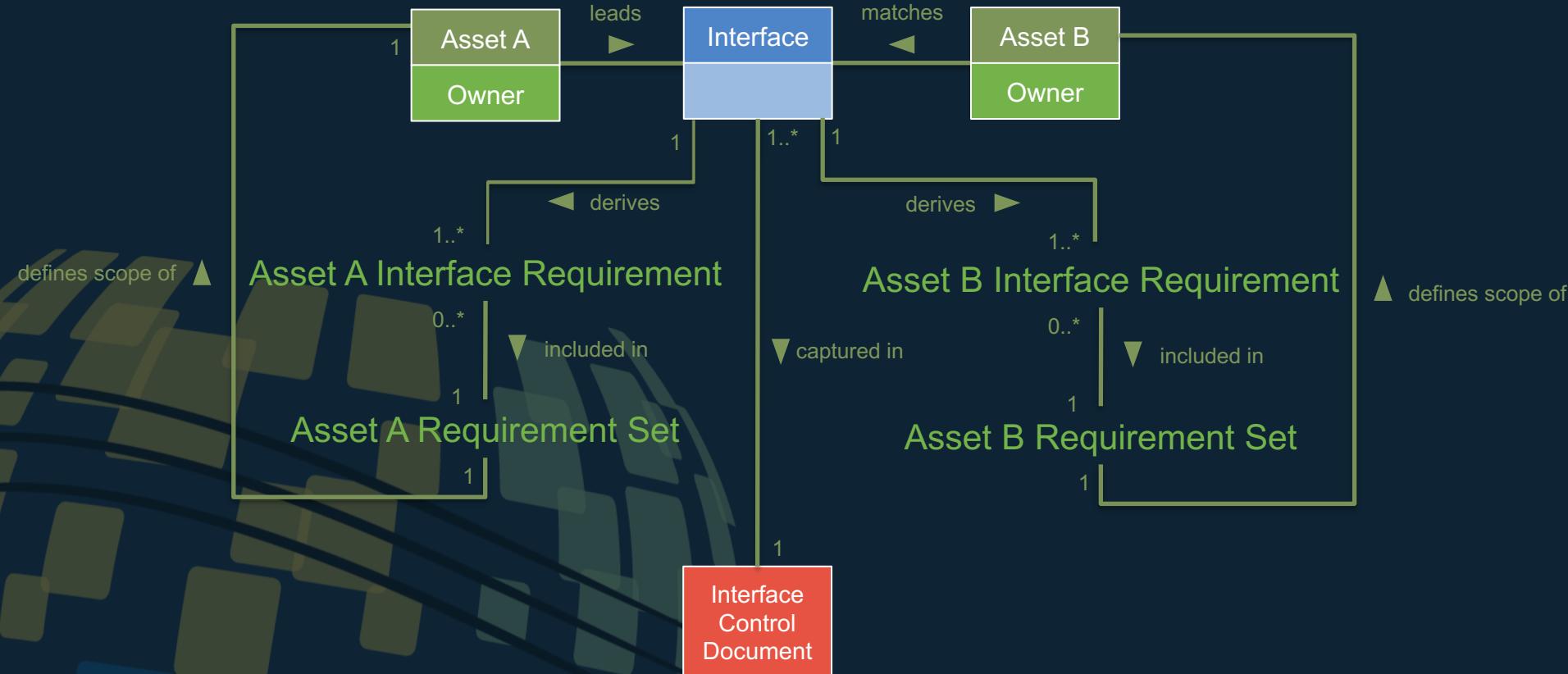


Design Discipline
Design Project
Construction Contractor
Operator
Maintainer
etc

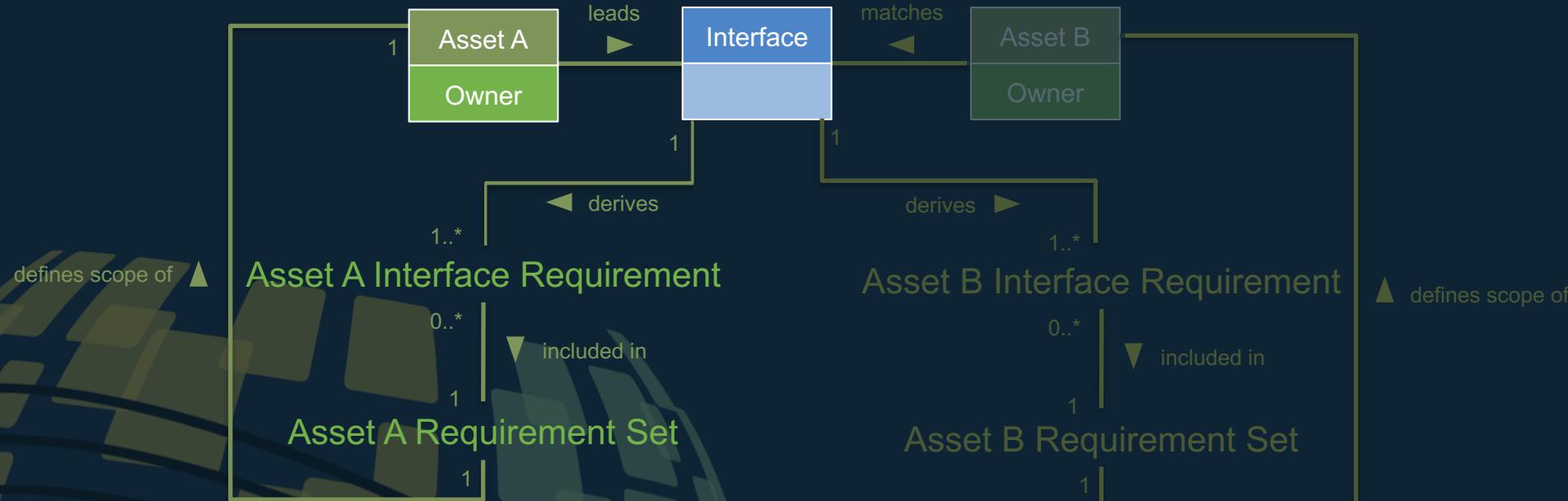
Interface Ownership and Management



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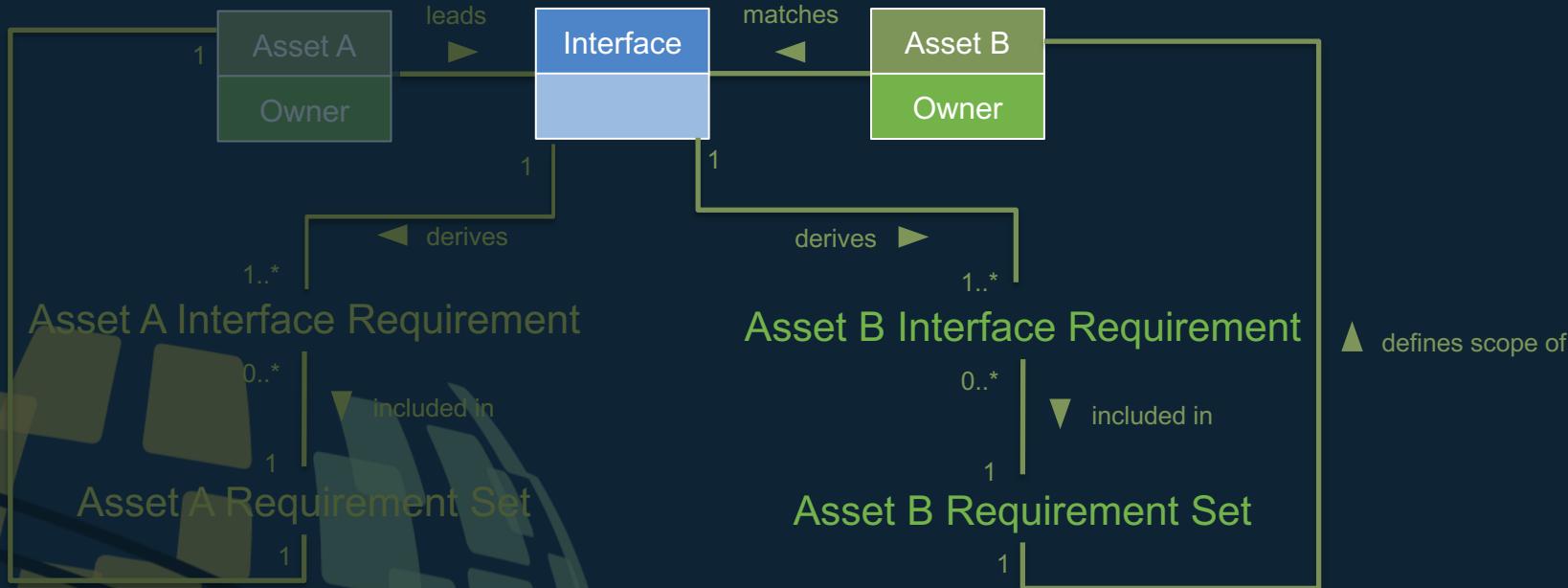


Interface Ownership and Management



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

Interface Ownership and Management



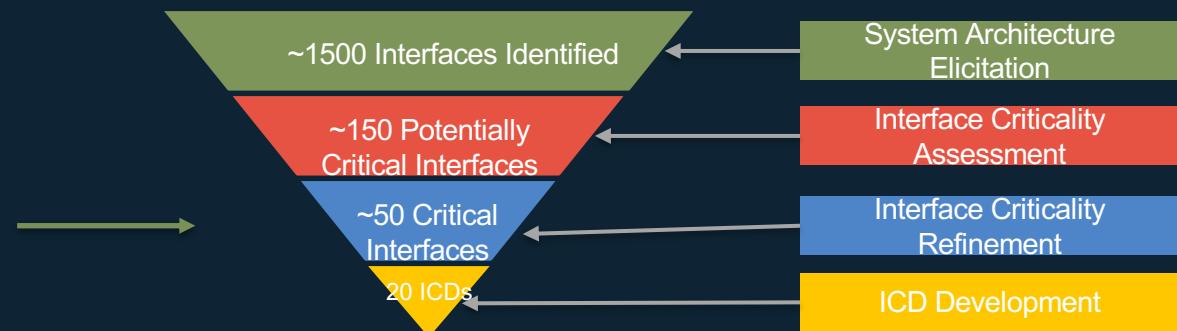
Match Asset Requirement: The Ship pin slot shall be 750 mm in diameter. (Rationale: to accommodate the Picton Lower Linksman king pin +/- 250mm.)

Interface Criticality Assessment

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