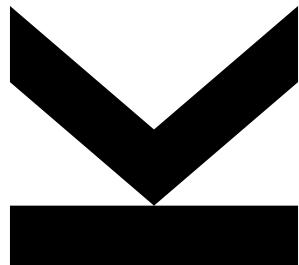


MODELING CONTEXT FOR BUSINESS RULE MANAGEMENT



Felix Burgstaller

Dieter Steiner, Michael Schrefl



MOTIVATION

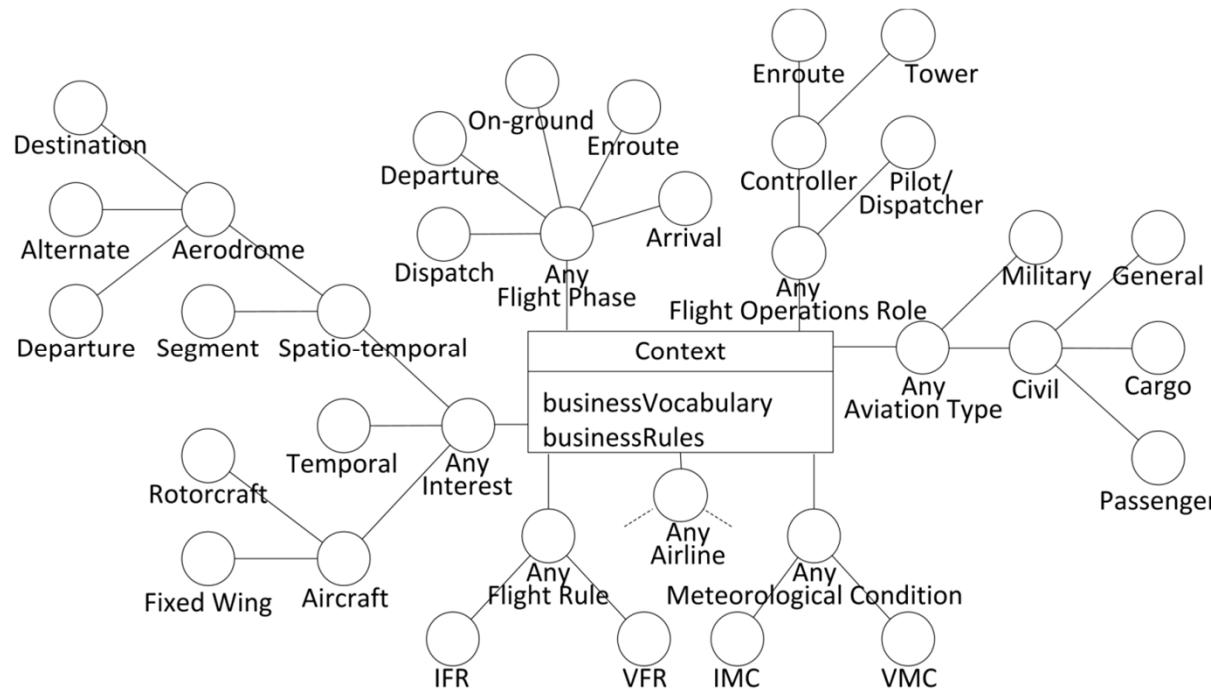
- Number of business rules and business terms is increasing
 - Thus efficient and effective management of business rules and business vocabularies is needed
 - Mostly simple organization techniques
 - Complex organization techniques considering e.g. hierarchical structures are missing
 - Contexts are used in other fields for information organization
 - “Any information that can be used to characterize the situation of an entity” [0]

*We propose the use of contexts to manage business rules
and associated business vocabularies*

[0] Dey, A. K. & Abowd, G. D., Towards a better understanding of context and context-awareness, In HUC '99: Proceedings of the 1st international symposium on Handheld and Ubiquitous Computing, Springer-Verlag, 1999, 304-307

MOTIVATION - SEMNOTAM

- Use Case Semantic Notices to Airmen (semNOTAM)
 - Rule- and ontology-based system
 - Determine Notices to Airmen relevant to e.g. a flight plan
 - Large number of business rules and business terms
 - Depending on the situation different business rules can apply



BACKGROUND ANALYSIS

■ Business rules

- Perspectives on business rules [1,2]
- Types of business rules [2,3,4,5]
 - Information constraints (guidelines and constraints)
 - Derivations (computations and inferences)
 - Action enablers
- Business vocabulary [1-5]
- Business rule principles [6]

[1] Object Management Group, Semantics of Business Vocabulary and Business Rules (SBVR), Object Management Group, 2015

[2] Business Rule Group, Defining Business Rules - What Are They Really?, 2000, http://www.businessrulesgroup.org/first_paper/BRG-whatisBR_3ed.pdf

[3] BRCommunity.com, Business Rules Community (BRCommunity.com): The world's most trusted resource for business rule professionals, 2016, BRCommunity.com

[4] Ross, R. G., Principles of the Business Rule Approach, Addison-Wesley Longman Publishing Co., Inc., 2003

[5] von Halle, B., Business Rules Applied: Building Better Systems Using the Business Rules Approach, Wiley Publishing, 2001

[6] Business Rule Group, Business Rules Manifesto, 2003, <http://www.businessrulesgroup.org/brmanifesto.htm>

BACKGROUND ANALYSIS

- Context & Context models
 - No standard definition!
 - Interpretations of context
 - Representational context
 - Interactional context
 - Features of context-aware systems [7]
 - Tagging
 - Presentation
 - Automatic Execution
 - Context model characteristics/functions

[7] Dey, A. K. & Abowd, G. D., Towards a better understanding of context and context-awareness, In HUC '99: Proceedings of the 1st international symposium on Handheld and Ubiquitous Computing, Springer-Verlag, 1999, 304-307

CONTEXT MODEL REQUIREMENTS

■ Context

- (1) Representational and separate concerns
- (2) Uniform parameters
- (3) Context relationships/hierarchies
- (4) Effects of relationships

■ Context Model

- (5) Purposes: tagging, presentation, automatic execution
- (6) Dynamic (contexts and parameter values)
- (7) Adaptability to specific use cases
- (8) Decontextualization of rules and terms

MULTI-LEVEL CONTEXT MODEL

- Adapted conceptual UML multi-level modeling [8]

- Basic idea

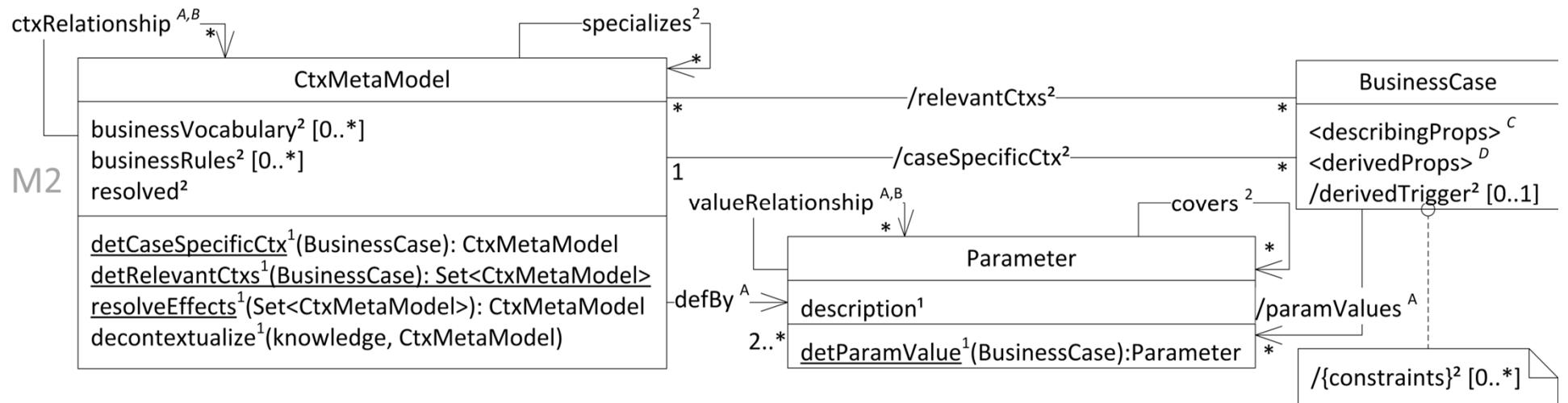
M2	Generic context model for business rules and vocabulary
M1	Domain specific context model (e.g. SemNOTAM)
M0	Application specific contexts and business cases

Context Requirements	
(1) Representational	
(2) Uniform Parameters	
(3) Context relationships	
(4) Effects of relationships	

Context Model Requirements	
(5.1) Tagging	
(5.2) Presentation	
(5.3) Automatic Execution	
(6) Dynamic	✓
(7) Adaptability	✓
(8) Decontextualization	

[8] De Lara, J.; Guerra, E. & Cuadrado, J. S. When and How to Use Multilevel Modelling
ACM Trans. Softw. Eng. Methodol., ACM, 2014, 24, 12:1-12:46

MULTI-LEVEL CONTEXT MODEL



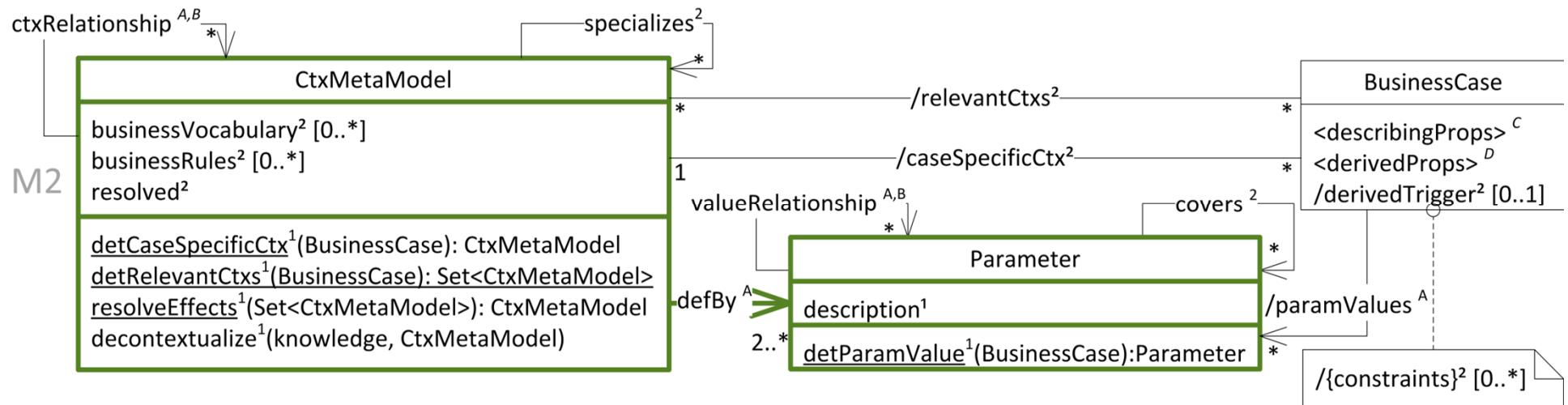
Context Requirements

- (1) Representational
- (2) Uniform Parameters
- (3) Context relationships
- (4) Effects of relationships

Context Model Requirements

- (5.1) Tagging
- (5.2) Presentation
- (5.3) Automatic Execution
- (6) Dynamic
- (7) Adaptability
- (8) Decontextualization

MULTI-LEVEL CONTEXT MODEL



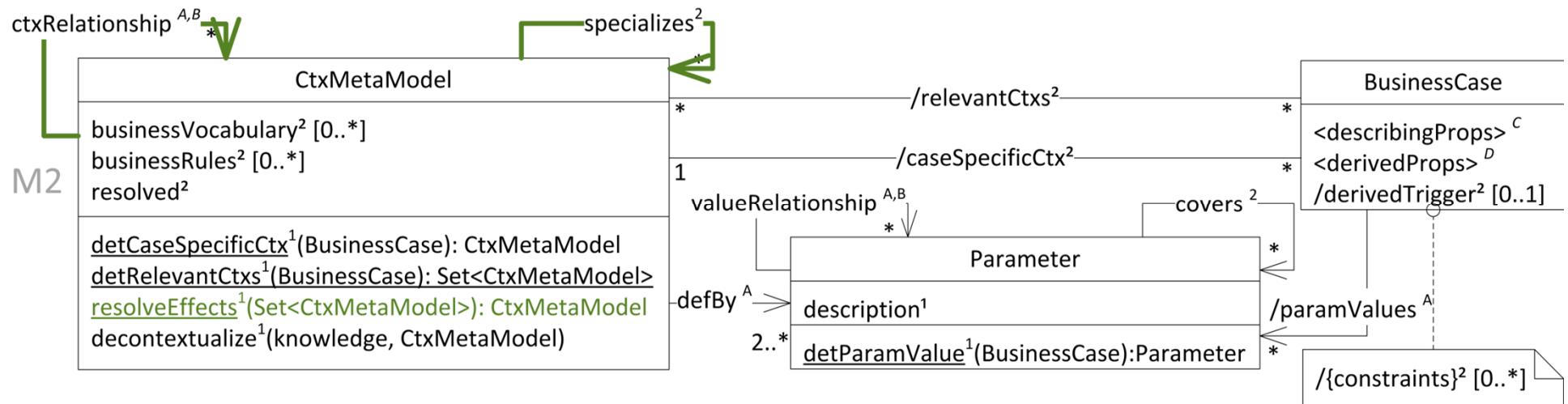
Context Requirements

- | | |
|-------------------------------|---|
| (1) Representational | ✓ |
| (2) Uniform Parameters | ✓ |
| (3) Context relationships | |
| (4) Effects of relationships | |

Context Model Requirements

- | | |
|---------------------------|---|
| (5.1) Tagging | |
| (5.2) Presentation | |
| (5.3) Automatic Execution | |
| (6) Dynamic | ✓ |
| (7) Adaptability | ✓ |
| (8) Decontextualization | |

MULTI-LEVEL CONTEXT MODEL



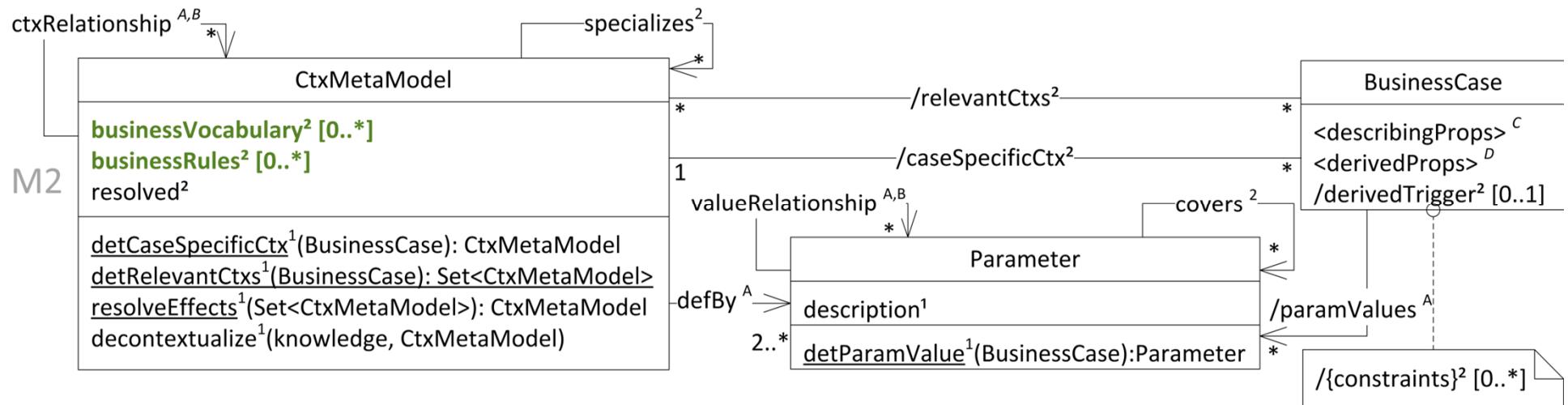
Context Requirements

(1) Representational	✓
(2) Uniform Parameters	✓
(3) Context relationships	✓
(4) Effects of relationships	✓

Context Model Requirements

(5.1) Tagging	
(5.2) Presentation	
(5.3) Automatic Execution	
(6) Dynamic	✓
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(8) Decontextualization	

MULTI-LEVEL CONTEXT MODEL



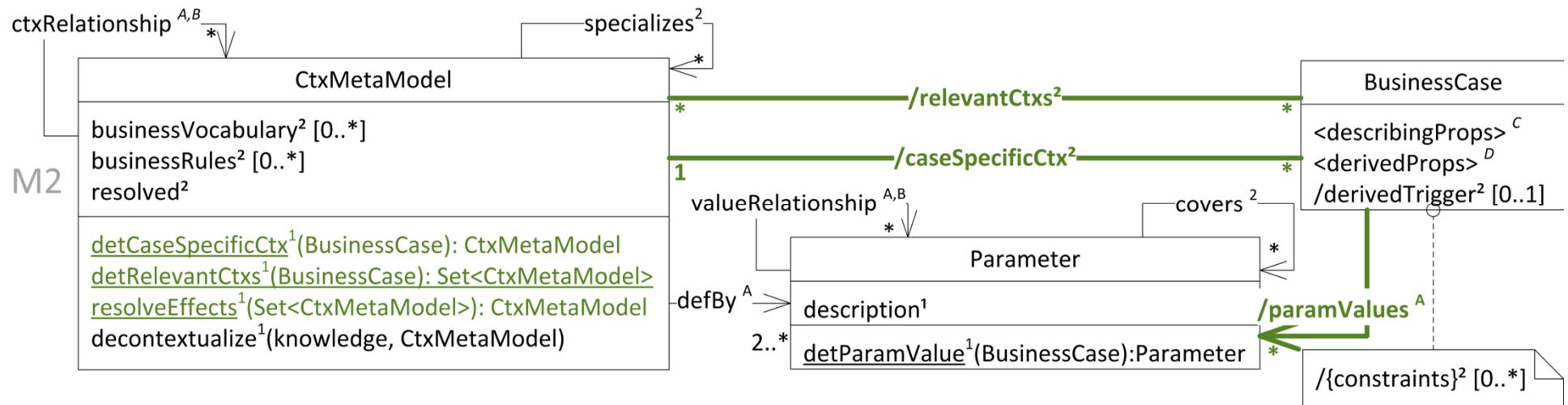
Context Requirements

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Context Model Requirements

(5.1) Tagging	✓
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MULTI-LEVEL CONTEXT MODEL



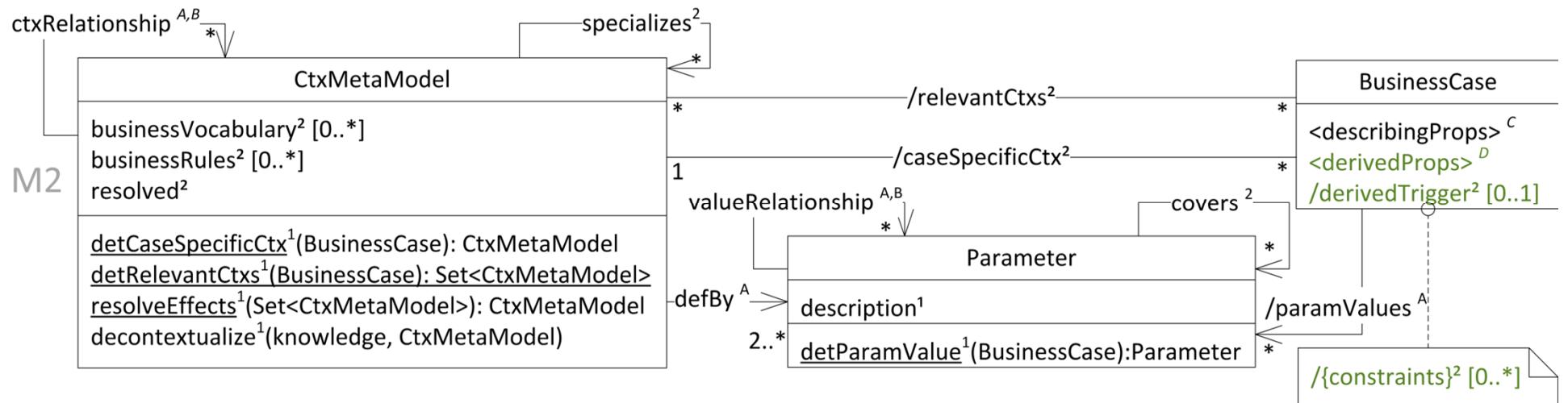
Context Requirements

(1) Representational	✓
(2) Uniform Parameters	✓
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Context Model Requirements

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MULTI-LEVEL CONTEXT MODEL



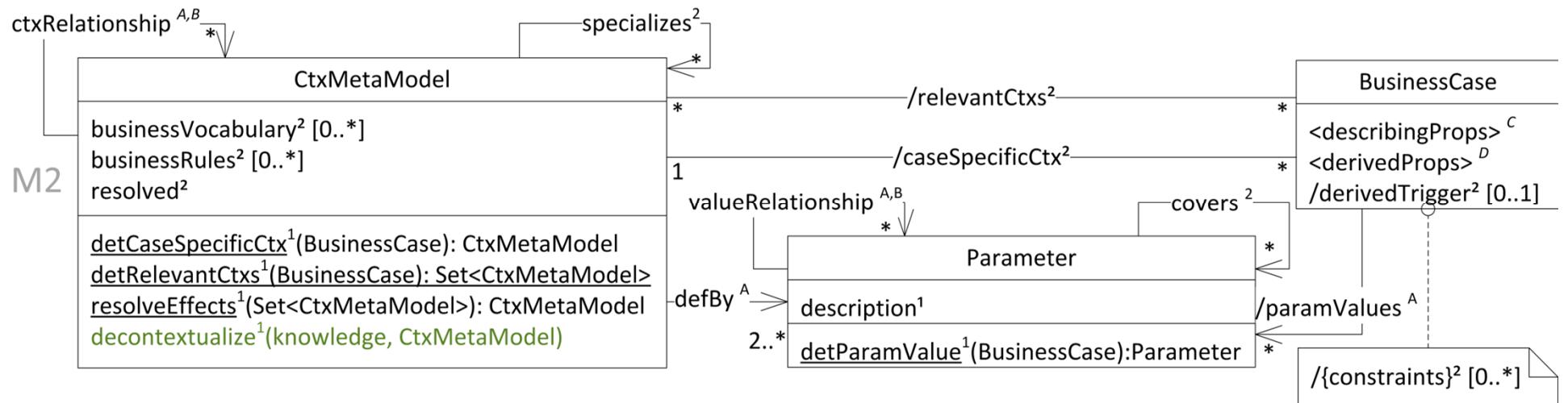
Context Requirements

(1) Representational	✓
(2) Uniform Parameters	✓
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Context Model Requirements

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MULTI-LEVEL CONTEXT MODEL



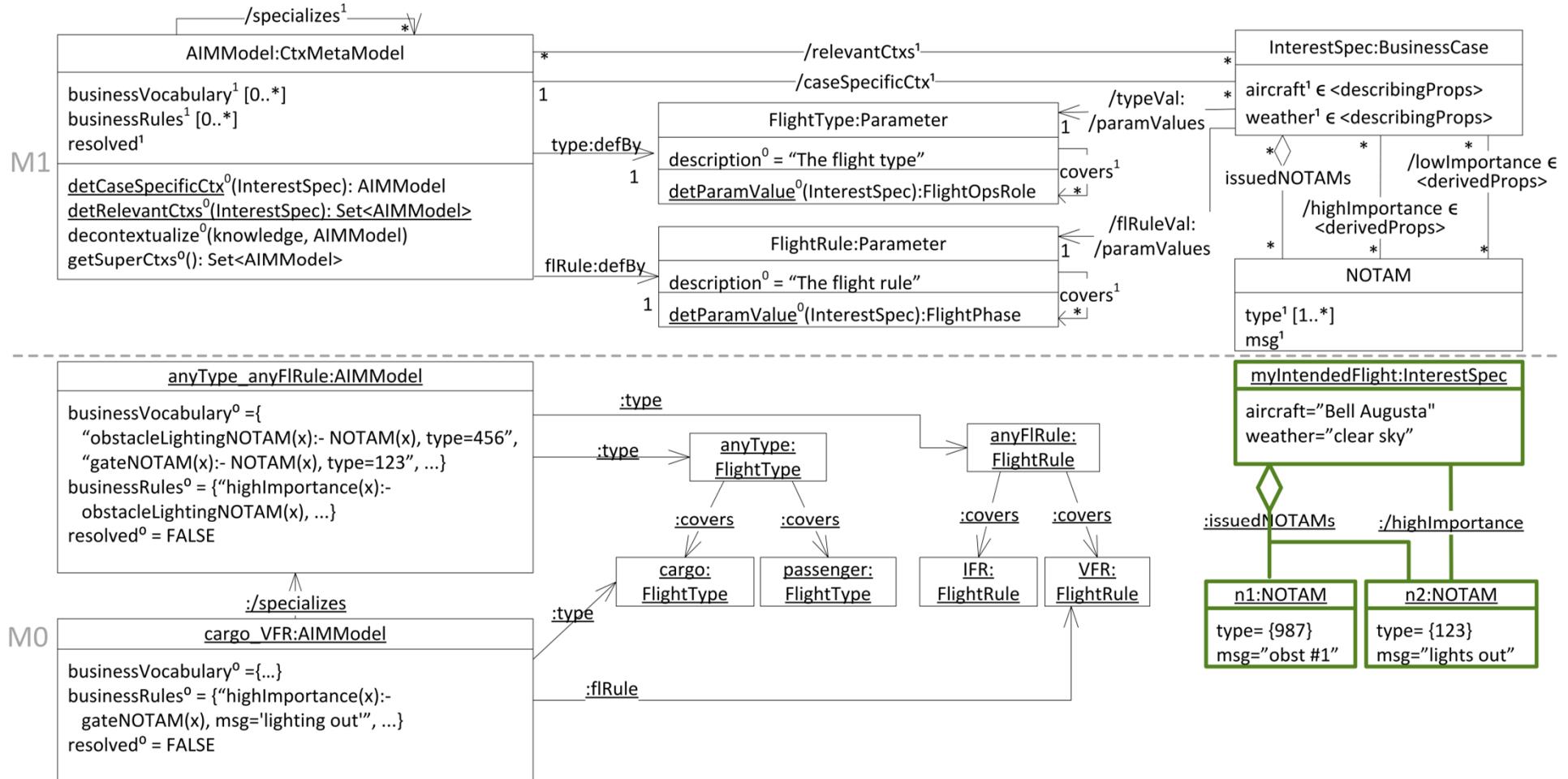
Context Requirements

(1) Representational	✓
(2) Uniform Parameters	✓
(3) Context relationships	✓
(4) Effects of relationships	✓

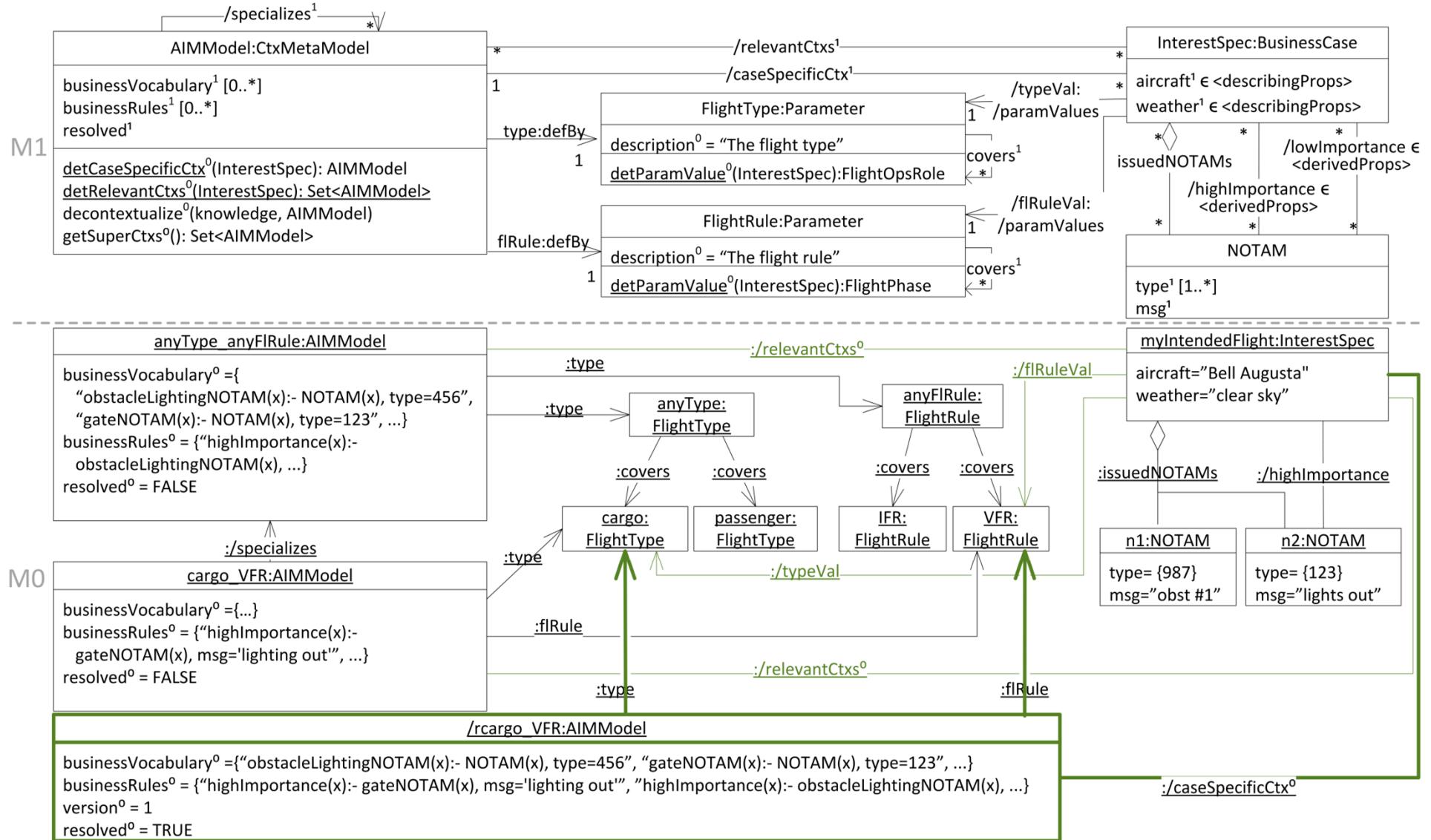
Context Model Requirements

(5.1) Tagging	✓
(5.2) Presentation	✓
(5.3) Automatic Execution	✓
(6) Dynamic	✓
(7) Adaptability	✓
(8) Decontextualization	✓

USE CASE SEMNOTAM



USE CASE SEMNOTAM



CONCLUSION & FUTURE WORK

- Identification of
 - Context characteristics and functions in literature
 - Context model requirements for business rule management

- Development of Multi-level context model using Design Science
 - Automatic determination of relevant contexts
 - Reduced complexity of business rule and term definition
 - Application of rule sets clearly defined (context)
 - Only relevant business rules are evaluated
 - Relationships of context (e.g. hierarchy or inclusion)

CONCLUSION & FUTURE WORK

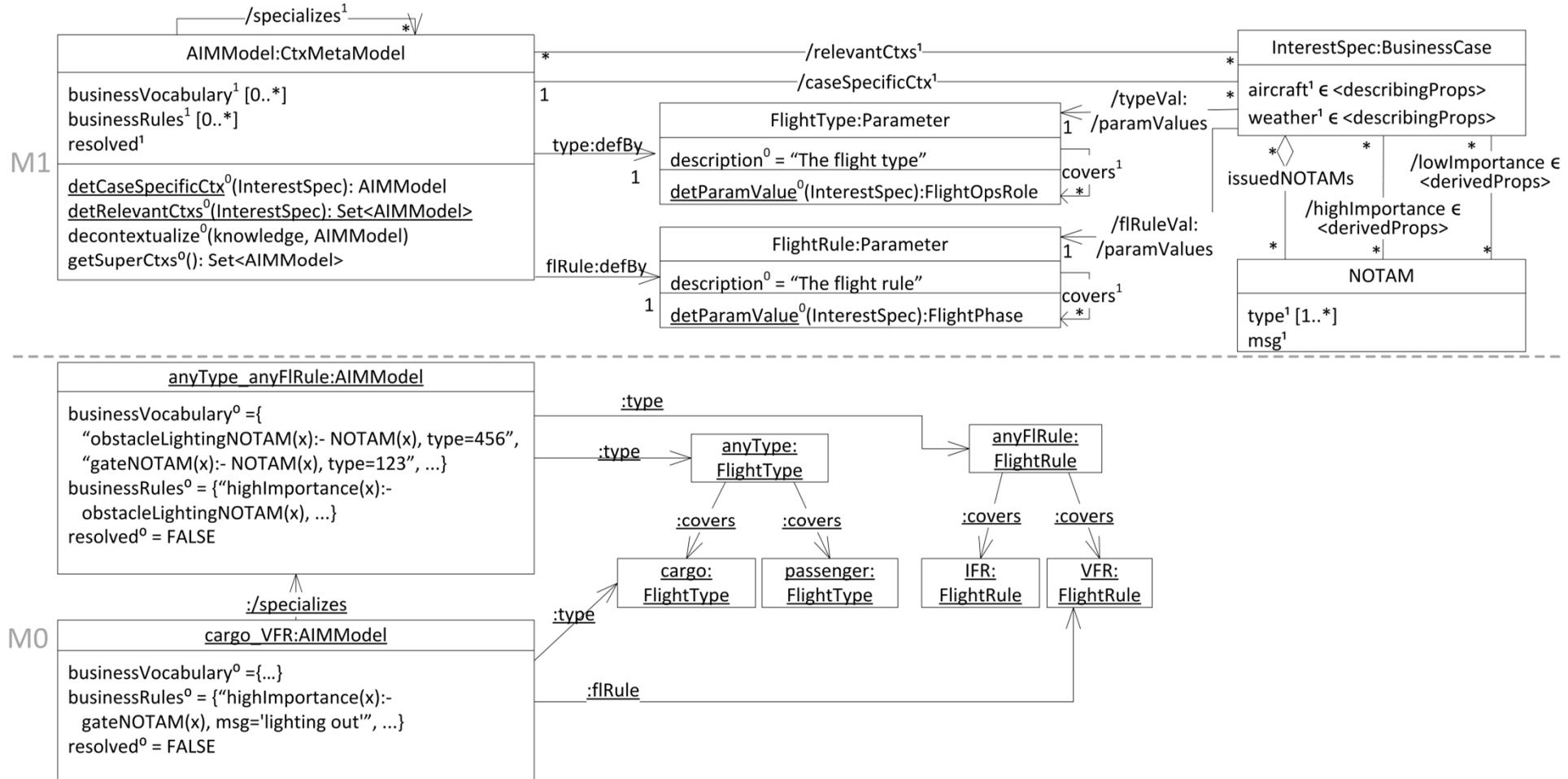
- Development of Multi-level context model using Design Science
 - Additional effort for managing contexts
 - Applicable only in use cases similar to SemNOTAM

- Future work
 - In-depth evaluation
 - Contextualizing rule sets (semi-)automatically
 - Incorporation context quality

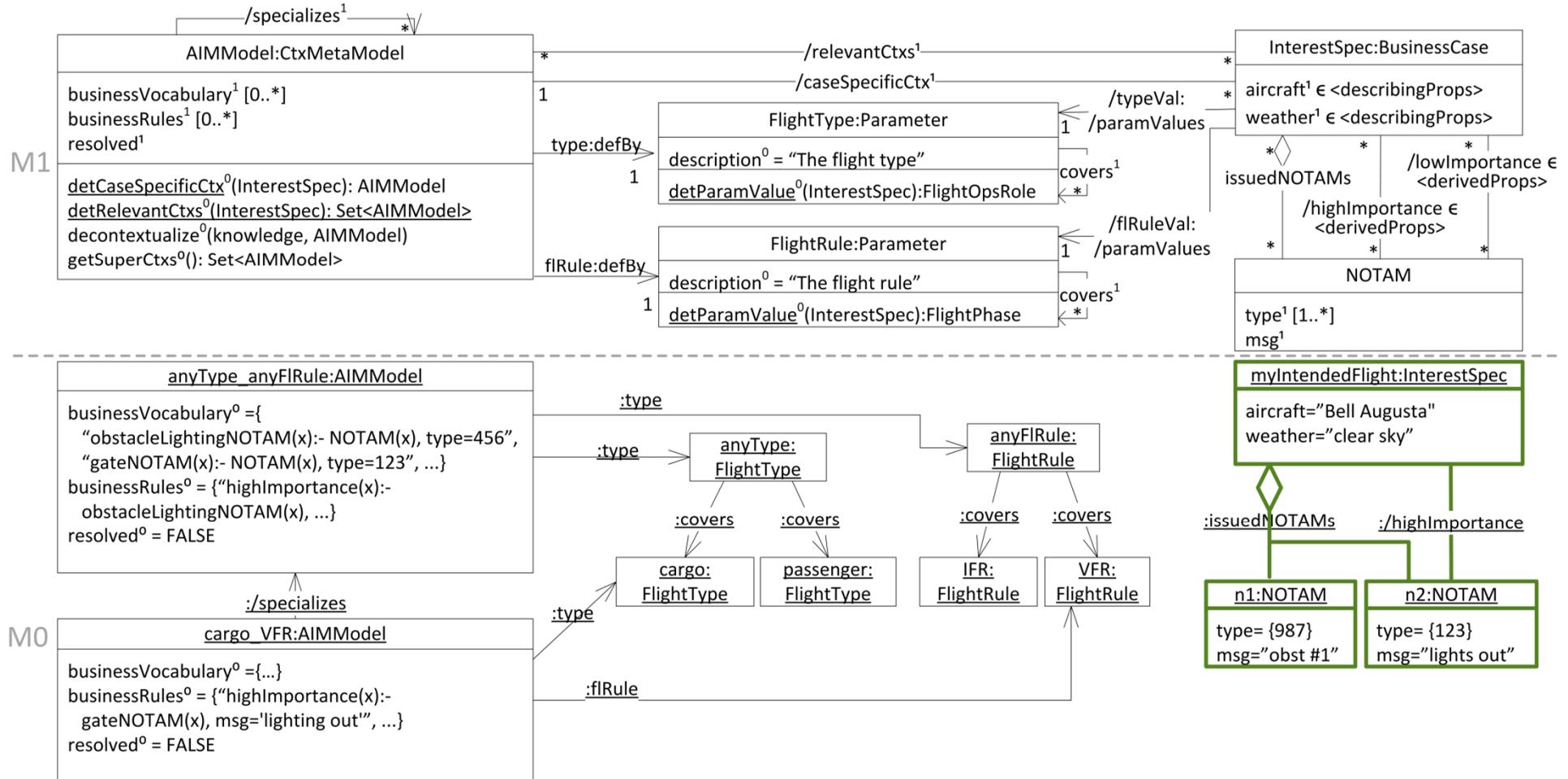


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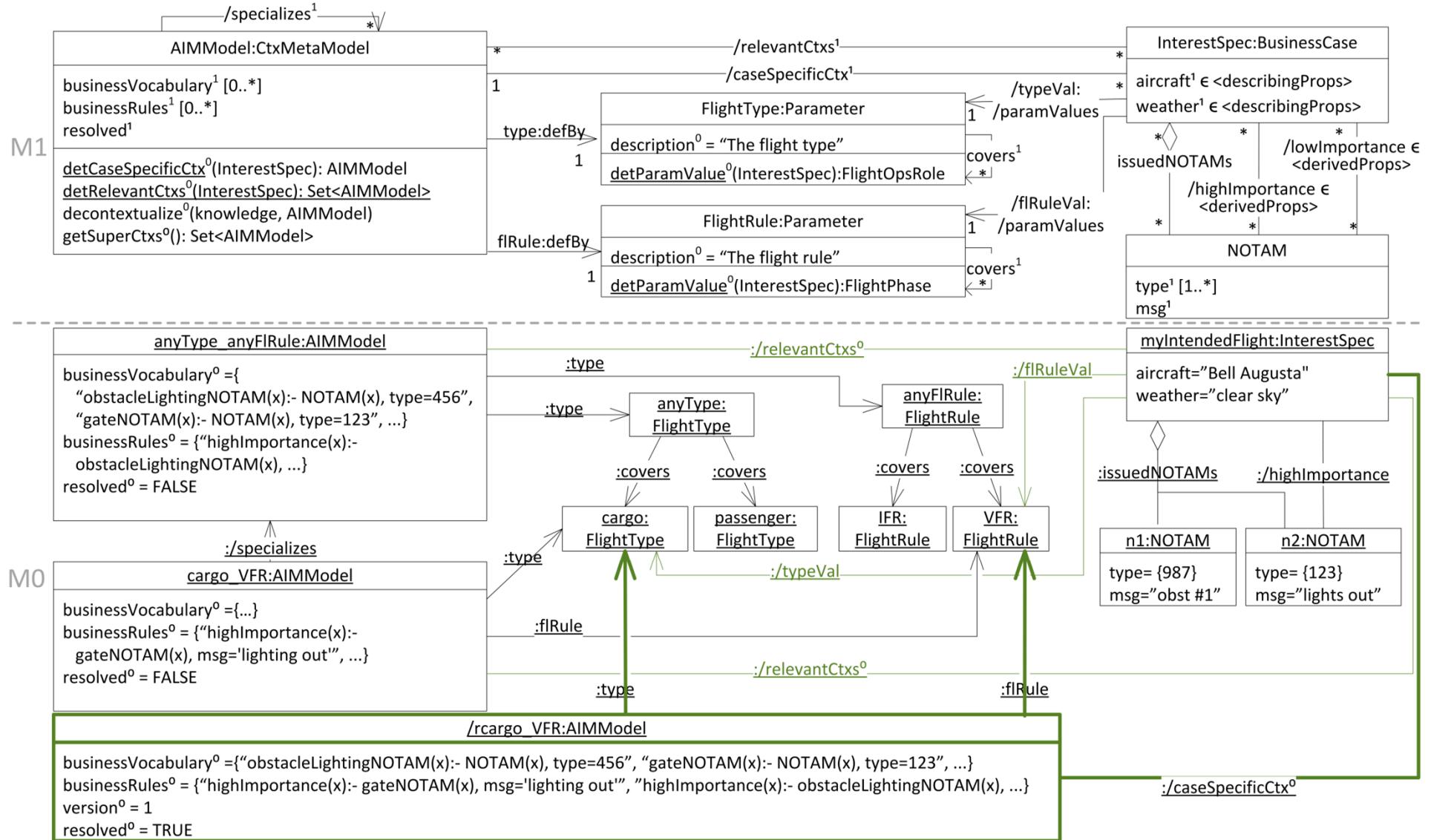
USE CASE SEMNOTAM



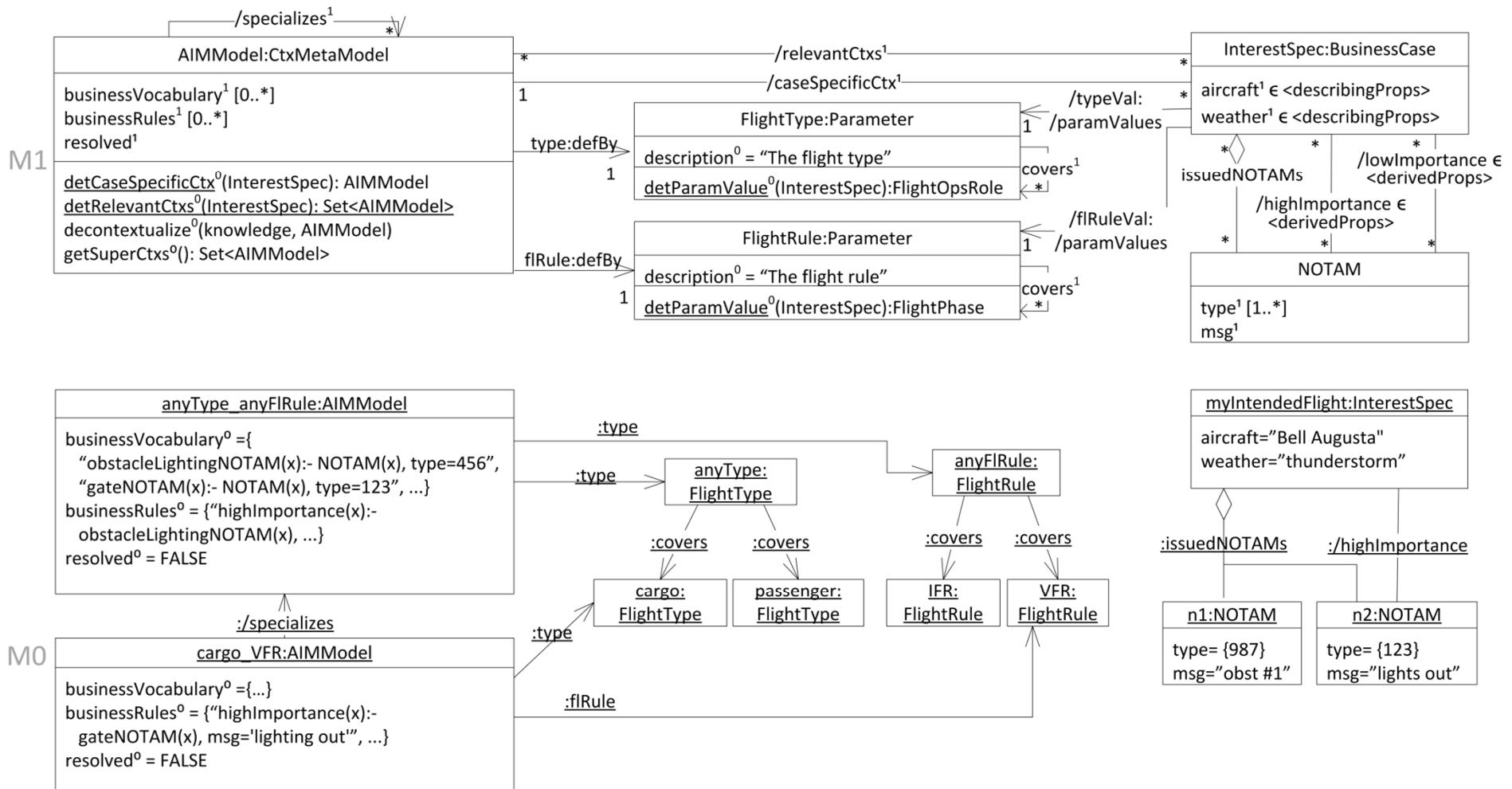
USE CASE SEMNOTAM



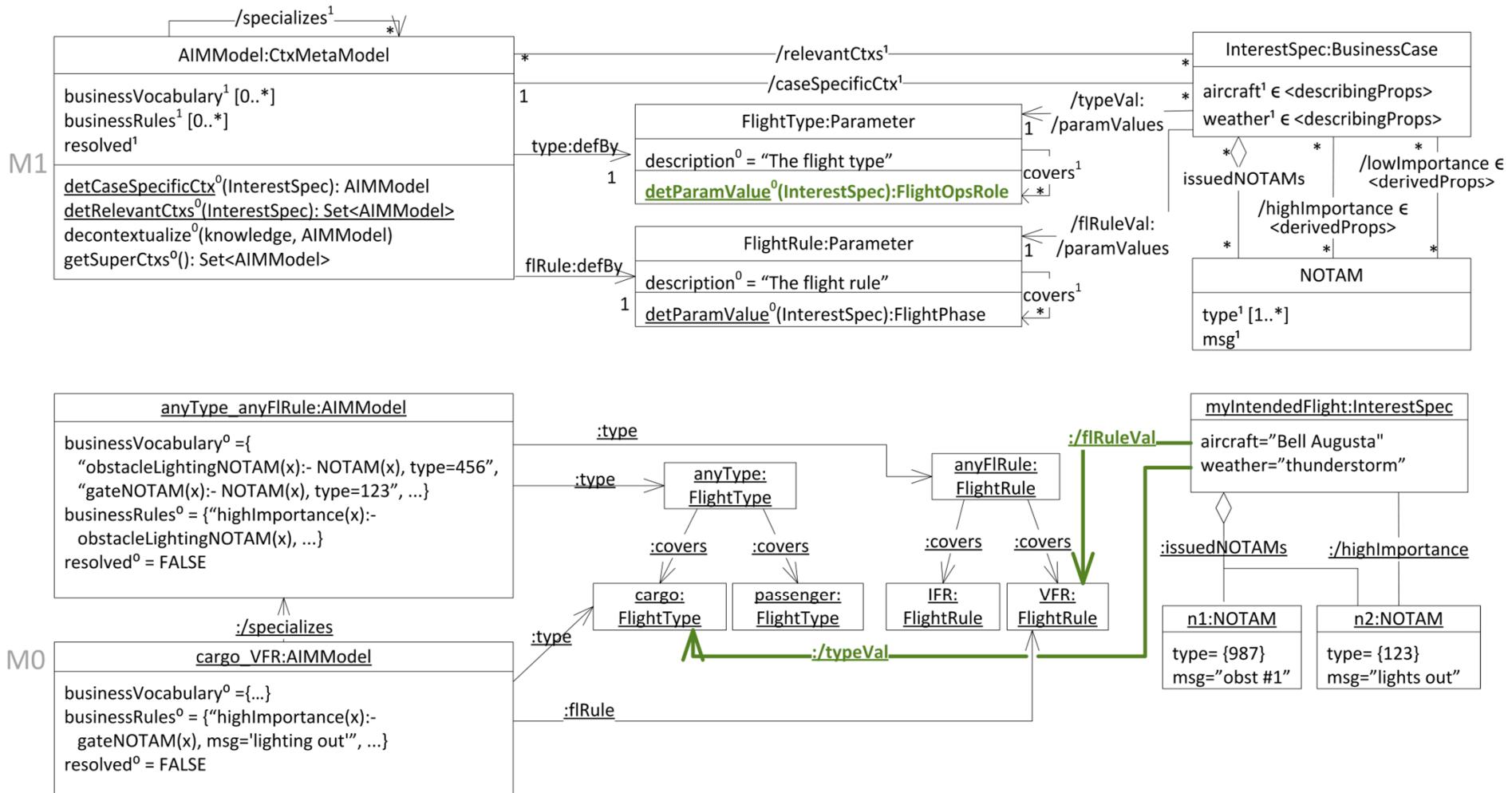
USE CASE SEMNOTAM



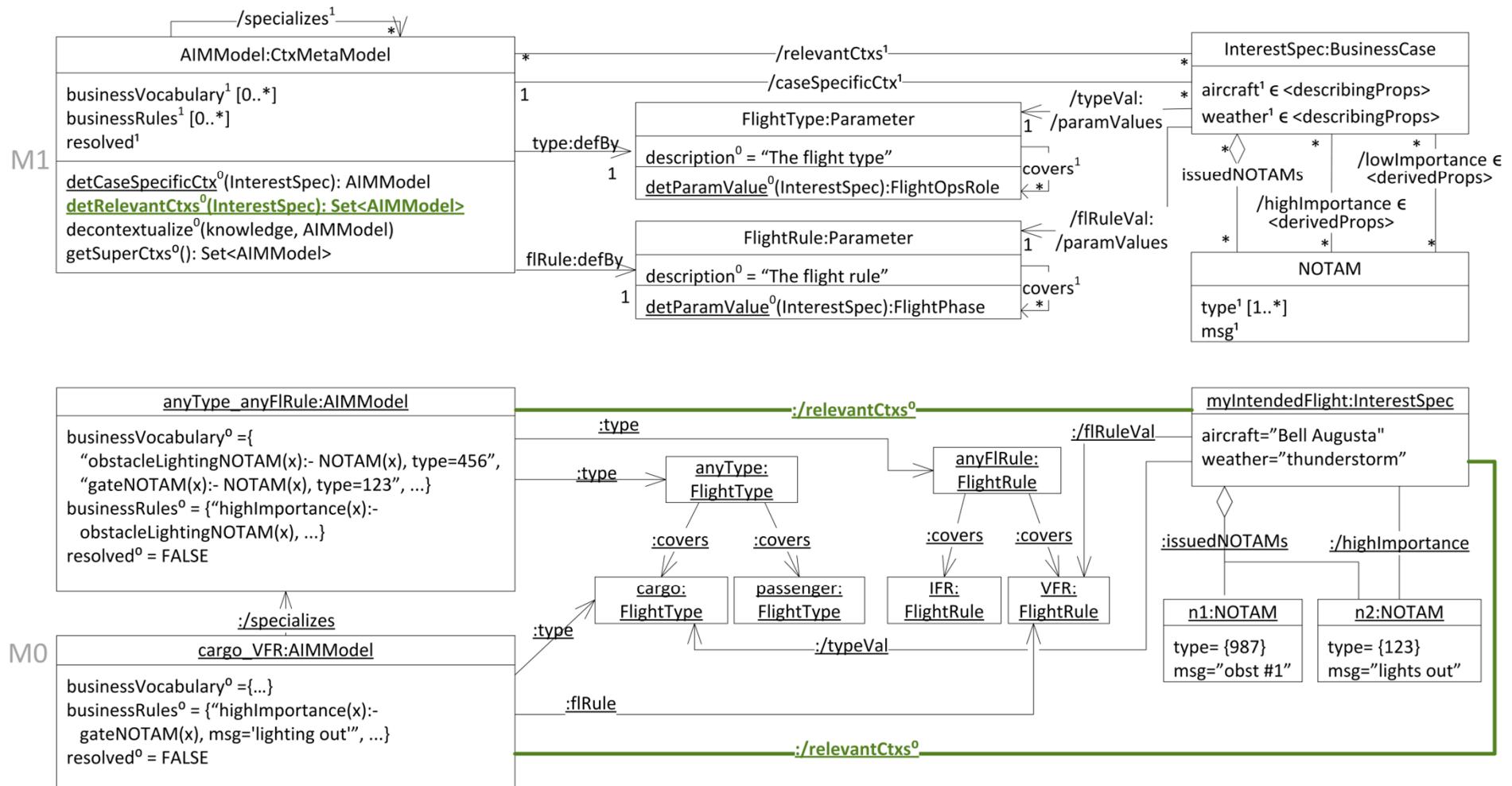
USE CASE SEMNOTAM



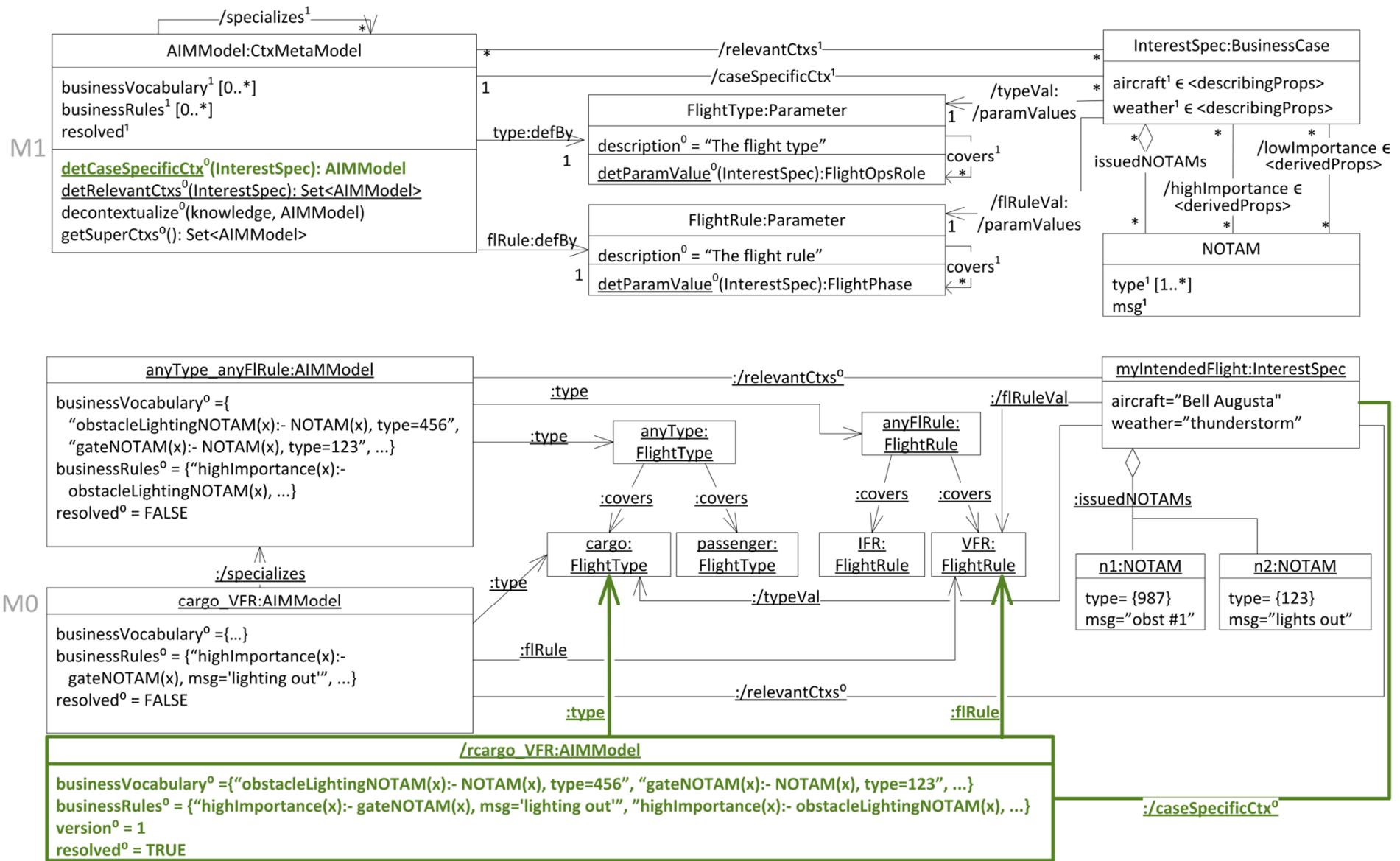
USE CASE SEMNOTAM



USE CASE SEMNOTAM



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USE CASE SEMNOTAM

