Collaborative model-driven software engineering (MDSE) in Industry

The purpose of this questionnaire is to identify and understand the practices and needs of industrial practitioners in Collaborative Model-Driven Software Engineering.

The target audience of this questionnaire is: industrial practitioners with experience on model-driven engineering in collaborative settings. We will ask you to think of a previous project you have been (or still are) involved in, and provide your answers based on that project.

Please, refer to the following one-pager for more context on Collaborative Model-Driven Software Engineering: https://bit.ly/3ftaG8c.

Filling out this questionnaire will take approximately 15-20 minutes. To alleviate the cognitive load on the respondents, the majority of the questions are closed-ended.

Your participation in this research is anonymous. The responses will be handled with care and confidentiality; no information will be recorded that can be traced back to individuals. Should you choose to receive the final research report, we will e-mail it to you once we have aggregated and analyzed the data, and drawn the essential conclusions.

This research is carried out jointly by the Software and Sustainability Research Group, Vrije Universiteit Amsterdam (the Netherlands), and the Department of Computer Science and Operations Research, University of Montreal (Canada).

Thank you for your time and cooperation.

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* Required

Demographics and company information

In this section, you will be asked to answer general demographic questions.

1.	Primary background *
	Mark only one oval.
	Technical (STEM)
	Business
	Other:
2.	How many years of professional experience do you have in model-driven
	software engineering? *
3.	Your current role at your company *
4.	Location of your company unit (country and city)
5.	Company size (number of employees) *
	Mark only one oval.
	1-9
	10-24
	25-49
	50-99
	100-249
	250-499
	500+
6.	Primary sector of your company *

Information about your chosen project In the remainder of this questionnaire, please, answer the questions by considering a recent significant project you have been (or still are) involved in, and in which collaborative modeling was applied.

If you have been involved in more than one project like that, please consider ${\bf ONLY}$ ${\bf ONE}$ project.

What is the primary application domain of the project? Please state only one domain. (Examples: finance, networking, tourism, Internet of Things, etc.)
On average, how many users were collaborating on the same models? *
Which modeling platforms have been used during the project? Please, use the "Other" option to list every platform other than the ones mentioned. *
Check all that apply. □ Eclipse □ Jetbrains MPS □ MetaEdit+ Other: □
What is the approximate overall duration of the project (in months)? * Please, use the "Other" option if you wish to specify the exact number Mark only one oval
Mark only one oval. 0-3 4-12 13-24 25-36 37-48 49-60 61+ Other:

11. Can you provide a rough estimation of the size of the software system bein developed?									
	Feel free to use the m components, etc.	metric you find more convenient here, such as: lines of code, number of							
12.	What is the avera	age size of the models on which collaboration is happening?							
	Mark only one ova	al.							
	small (less tl	nan 100 elements)							
	medium (bet	ween 100 and 999 elements)							
	large (1000 e	elements and more)							
MD	laborative SE I: Model nagement	The model management aspect of collaborative MDSE deals with managing the lifecycle of models, including their creation, editing, manipulation, and storage.							

1. State-of-the-practice

Please, indicate how frequently you have encountered the following means of model management. To answer this question, please consider a recent significant project you have been (or still are) involved in, and in which collaborative modeling was applied. If you have been involved in more than one project like that, please consider ONLY ONE project.

13. Models and languages *

In your project, how frequently did you encounter the following means of model management?

	never	rarely	sometimes	often	always	l don't know.
Collaboration at the model level						
Collaboration at the metamodel level						
Multi-view modeling (e.g., different views for different stakeholders)						
Use of general- purpose modeling languages (e.g., UML, CAD)						
Use of domain- specific languages						
Import of an external language into the modeling environment						
Projectional editing						

14. Model manipulation *

In your project, how frequently did you encounter the following means of model manipulation?

	never	rarely	sometimes	often	always	I don't know.
Model validation						
Model execution						
Model debugging						
Model browsing/search						
Model testing (by defining the test cases in the models)						
Lazy loading of the models/workspace						
Round-trip engineering (from model to code and back)						
Code generation						
Model transformations						
Integration with build/DevOps tools (e.g., cmake, Jenkins)						
Database integration						
Metrics of model complexity						
Natural Language Processing (for model building)						

15. Editors and modeling environments *

In your project, how frequently did you encounter the following editors and environments?

Mark only one oval per row.

16.

	never	rarely	sometimes	often	always	I don't know.				
Visual editors										
Textual editors										
Tabular editors										
Tree-based editors										
Sketch-based editors										
Editors supporting multiple types of notations (e.g., textual and graphical at the same time).										
Desktop-based modeling environment										
Web-based modeling environment										
Mobile-based modeling environment										
Have you encountered any other means of model management in addition to those listed above? Please, consider your chosen project when answering.										

2. Needs

Considering a **potential future project**, please, assess the usefulness of the following means of model management.

17. Models and languages *

In a potential future project, how useful would you find the following means of model management?

	definitely not useful	probably not useful	neutral	probably useful	definitely useful	I don't know.
Collaboration at the model level						
Collaboration at the metamodel level						
Multi-view modeling (e.g., different views for different stakeholders)						
Use of general- purpose modeling languages (e.g., UML, CAD)						
use of domain- specific languages						
Import of an external language into the modeling environment						
Projectional editing						

18. Model manipulation *

In a potential future project, how useful would you find the following means of model manipulation?

	definitely not useful	probably not useful	neutral	probably useful	definitely useful	I don't know.
Model validation						
Model execution						
Model debugging						
Model browsing/search						
Model testing (by defining the test cases in the models)						
Lazy loading of the models/workspace						
Round-trip engineering (from model to code and back)						
Code generation						
Model transformations						
Integration with build/DevOps tools (e.g., cmake, Jenkins)						
Database integration						
Metrics of model complexity						
Natural Language Processing (for model building)						

19. Editors and modeling environments *

In a potential future project, how useful would you find the following editors and environments?

	definitely not useful	probably not useful	neutral	probably useful	definitely useful	I don't know.
Visual editors						
Textual editors						
Tabular editors						
Tree-based editors						
Sketch-based editors						
Editors supporting multiple types of notations (e.g., textual and graphical at the same time).						
Desktop-based modeling environment						
Web-based modeling environment						
Mobile-based modeling environment						

20.	From your experience, do you need any other model management techniques/tools in addition to those listed in the previous question?												
	Please, consider a potential future project when answering.												
ME Me	Illaborative DSE II: Pans of Illaboration	groupwo MDSE in	ork across th clude versicues, consiste	ne involved oning syster	OSE deals with fac stakeholders. Typ ns, diff and merg ement mechanis	oical means ing tools, re	of collabora eal-time colla	ation in aborative					
Please questi collab	ate-of-the-pra e, indicate how frec on, please conside orative modeling w der ONLY ONE proje	luently you r a recent s ras applied	significant p	roject you h	ave been (or still	are) involv	ed in, and in	which					
21.	Stakeholder r In your project, h access control?	_				ns of stake	holder mana	gement and					
	Mark only one o	oval per ro	W.										
			never	rarely	sometimes	often	always	I don't know.					
	Role-based ac	cess											
	Authentication authorization corporate data (e.g., LDAP, AD	from abase											
	Anonymous a	ccess											
	User identifica	ation											
	User presence visualization	•											

22. Collaboration dynamics *

In your project, how frequently did you encounter the following collaboration dynamics?

Mark only one oval per row.

	never	rarely	sometimes	often	always	I don't know.
Real-time collaboration						
Offline (non-Real-time) collaboration						
Human-Machine collaboration						

23. Versioning *

In **your project**, how frequently did you encounter the following versioning techniques/tools?

	never	rarely	sometimes	often	always	I don't know.
Model differencing						
Model differencing based on the modeling language, not on the file contents (XML)						
Internal versioning support						
External version control (e.g., Git, SVN)						
Model merging						
Version branching						
Undo-redo support during collaboration						
History						

24. Conflicts and consistency *

In **your project**, how frequently did you encounter the following conflict- and consistency management techniques/tools?

Mark only one oval per row.

	never	rarely	sometimes	often	always	I don't know.
Locking						
Prevention of conflicts						
Conflict awareness features (e.g., warnings, prompt actions)						
Automation of conflict resolution						
Manual conflict resolution						
Metrics of degree of conflict/inconsistency						
Eventual consistency						
Push notifications on conflicts						

25. Network architecture & robustness

In your project, how frequently did you encounter the following network and robustness techniques?

	never	rarely	sometimes	often	always	I don't know.
P2P (serverless) network architecture						
Cloud-based network architecture						
Failure recovery						

26.	Have you encountered any other means of collaboration in addition to those listed above?									
	Please, consider your ch	osen project \	when answerii	ng.						
2. N€	eeds									
Consi	dering a potential future p	oroject , please	e, assess the ι	isefulness c	of the followin	g means of co	ollaboration.			
27.	Stakeholder management & access control *									
	In a potential future project , how useful would you find the following means of stakeholder management and access control?									
	Mark only one oval per row.									
		definitely not useful	probably not useful	neutral	probably useful	definitely useful	l don't know.			
	Role-based access									
	control									
	Authentication and authorization from corporate database (e.g., LDAP, AD)									
	Anonymous access									
	User identification									

28. Collaboration dynamics *

In a potential future project, how useful would you find the following collaboration dynamics?

	definitely not useful	probably not useful	neutral	probably useful	definitely useful	I don't know.
Real-time collaboration						
Offline (non-Real- time) collaboration						
Human-Machine collaboration						

29. Versioning *

In a potential future project, how useful would you find the following versioning techniques/tools?

	definitely not useful	probably not useful	neutral	probably useful	definitely useful	l don't know.
Model differencing						
Model differencing based on the modeling language, not on the file contents (XML)						
Internal versioning support						
External version control (e.g., Git, SVN)						
Model merging						
Version branching						
Undo-redo support during collaboration						
History						

30. Conflicts and consistency *

In a **potential future project**, how useful would you find the following conflict- and consistency management techniques/tools?

	definitely not useful	probably not useful	neutral	probably useful	definitely useful	I don't know.
Locking						
Prevention of conflicts						
Conflict awareness features (e.g., warnings, prompt actions)						
Automation of conflict resolution						
Manual conflict resolution						
Metrics of degree of conflict/inconsistency						
Eventual consistency						
Push notifications on conflicts						

definitely not useful	probably not useful	neutral	probably useful	definitely useful	I don know
	not useful	not useful not useful	not useful not useful	not useful not useful useful useful	not useful not useful useful useful useful

Collaborative MDSE III: Communication The communication aspect of collaborative MDSE deals with facilitating a rich exchange among the involved stakeholders, in order to augment the technical information carried by the models. Typical means of communication are chats, wikis, model annotations, comments, change proposals, and forums.

1. State-of-the-practice

Please, indicate how frequently you have encountered the following means of communication. To answer this question, please consider a recent significant project you have been (or still are) involved in, and in which collaborative modeling was applied.

If you have been involved in more than one project like that, please consider ONLY ONE project.

33.	Synchronous communicat	ion	*
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In your project, how frequently did you encounter the following synchronous means of communication?

Mark only one oval per row.

	never	rarely	sometimes	often	always	l don't know.
Chat						
Audio						
Voice						
Hand gestures						
Face-to-face						
Change review sessions						
Screen sharing						

34. Asynchronous communication *

In **your project**, how frequently did you encounter the following asynchronous means of communication?

	never	rarely	sometimes	often	always	I don't know.
Email						
Wiki						
Forum						
Proposals						
Voting						
Annotations						
Comments						
Feedback						
Reviews						
Call-For-Attention						
Sticky notes						
Tags						
Conflicts table						
Multimedia annotations						
Commit messages						
Integrated professional-social networking						

Communication	rarely	sometimes	often	always	l k
means built into the modeling tools					(
Communication means NOT built into the modeling tools (e.g., an external teleconferencing tool, or a stand-alone messaging app)					(

35.

Integration *

Considering a **potential future project**, please, assess the usefulness of the following means of communication.

37. Synchronous communication *

In a **potential future project**, how useful would you find the following synchronous means of communication?

	definitely not useful	probably not useful	neutral	probably useful	definitely useful	I don't know.
Chat						
Audio						
Voice						
Hand gestures						
Face-to-face						
Change review sessions						
Screen sharing						

38. Asynchronous communication *

In a **potential future project**, how useful would you find the following asynchronous means of communication?

	definitely not useful	probably not useful	neutral	probably useful	definitely useful	I don't know.
Email						
Wiki						
Forum						
Proposals						
Voting						
Annotations						
Comments						
Feedback						
Reviews						
Call-For-Attention						
Sticky notes						
Tags						
Conflicts table						
Multimedia annotations						
Commit messages						
Integrated professional-social networking						

39.	Integration	*

In **your project**, how frequently did you encounter the following levels of integrating communication tools into modeling tools?

Mark only one oval per row.

	definitely not useful	probably not useful	neutral	probably useful	definitely useful	I don't know.
Communication means built into the modeling tools						
Communication means NOT built into the modeling tools (e.g., an external teleconferencing tool, or a standalone messaging app)						
From your experient in addition to those Please, consider a poten	listed in th	ne previous	question		on techniqu	ues/tools

Comments and contact details

40.

Thank you very much for your feedback on collaborative MDSE in practice. We believe the information collected in this questionnaire will lead to valuable insights. If you are interested in receiving the final research report, please, feel free to leave your contact details below, and we will e-mail it to you once we have aggregated and analyzed the data, and drawn the essential conclusions.

Please, do not forget to click the Submit button below.

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