Discrete 3D surfaces of revolution

Final presentation

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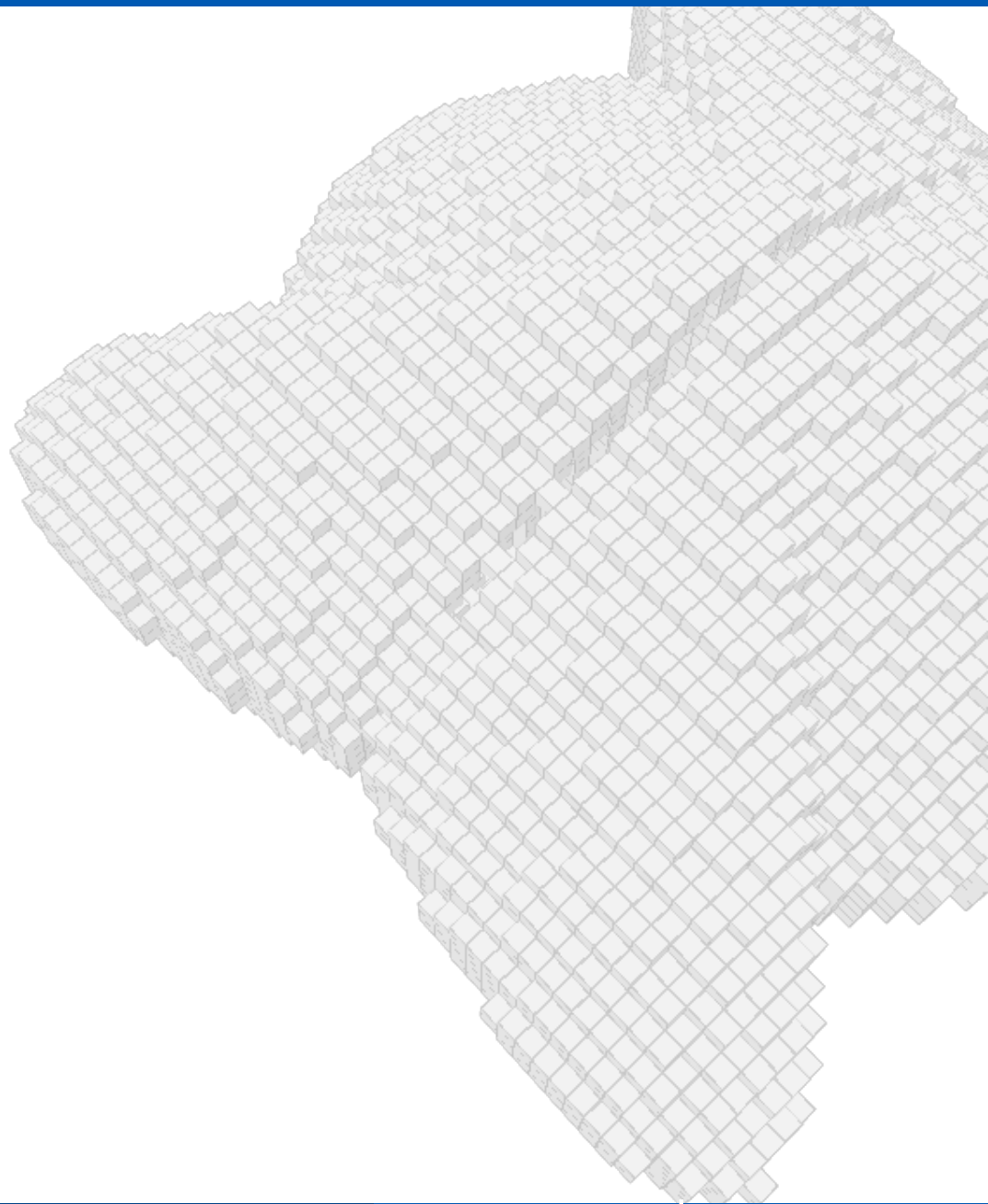
March 2nd, 2016

Outline

1. Introduction
2. Work achieved
3. Project management
4. Conclusion

Outline

1. Introduction
   - Collaborators and clients
   - Roles
   - Context
   - Objectives
2. Work achieved
3. Project management
4. Conclusion



Collaborators and clients

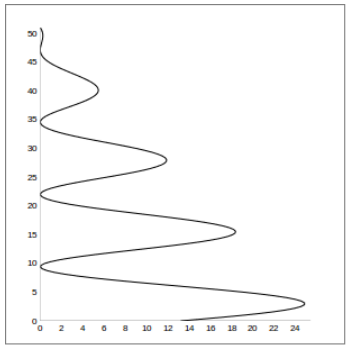
- Clients :
  - Éric ANDRES (Professor and former director of XLIM-SIC department)
  - Gaëlle LARGETEAU-SKAPIN (University lecturer, Discrete geometry)
- Exemple of final user :
  - Aurélie MOURIER (Artist)
- Pedagogic Supervisor :
  - Philippe MESEURE (Professor, Computer Graphics)

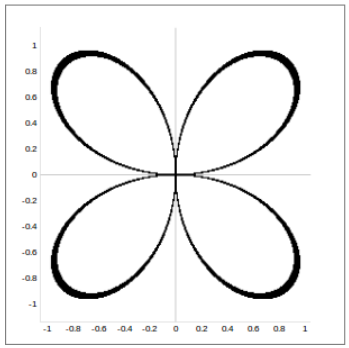
Roles

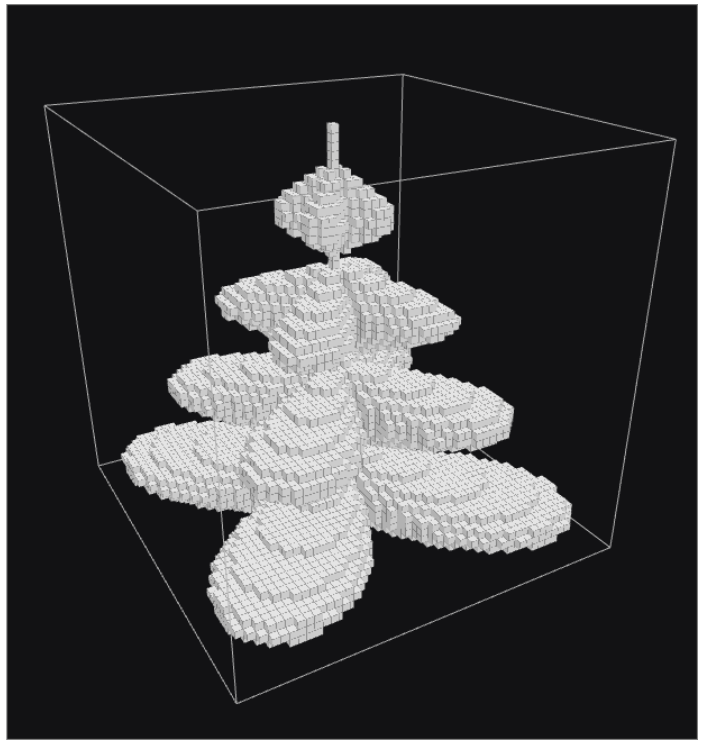
- Team composition :
  - Thomas BENOIST - Project manager
  - Zied BEN OTHMANE - Quality manager
  - Adrien BISUTTI - Risks manager
  - Lydie RICHAUME - Tasks manager

Context

- Éric Andres and Gaëlle Largeteau-Skapin developed a new algorithm to model discrete surfaces of revolution.
- Display the result with Mathematica







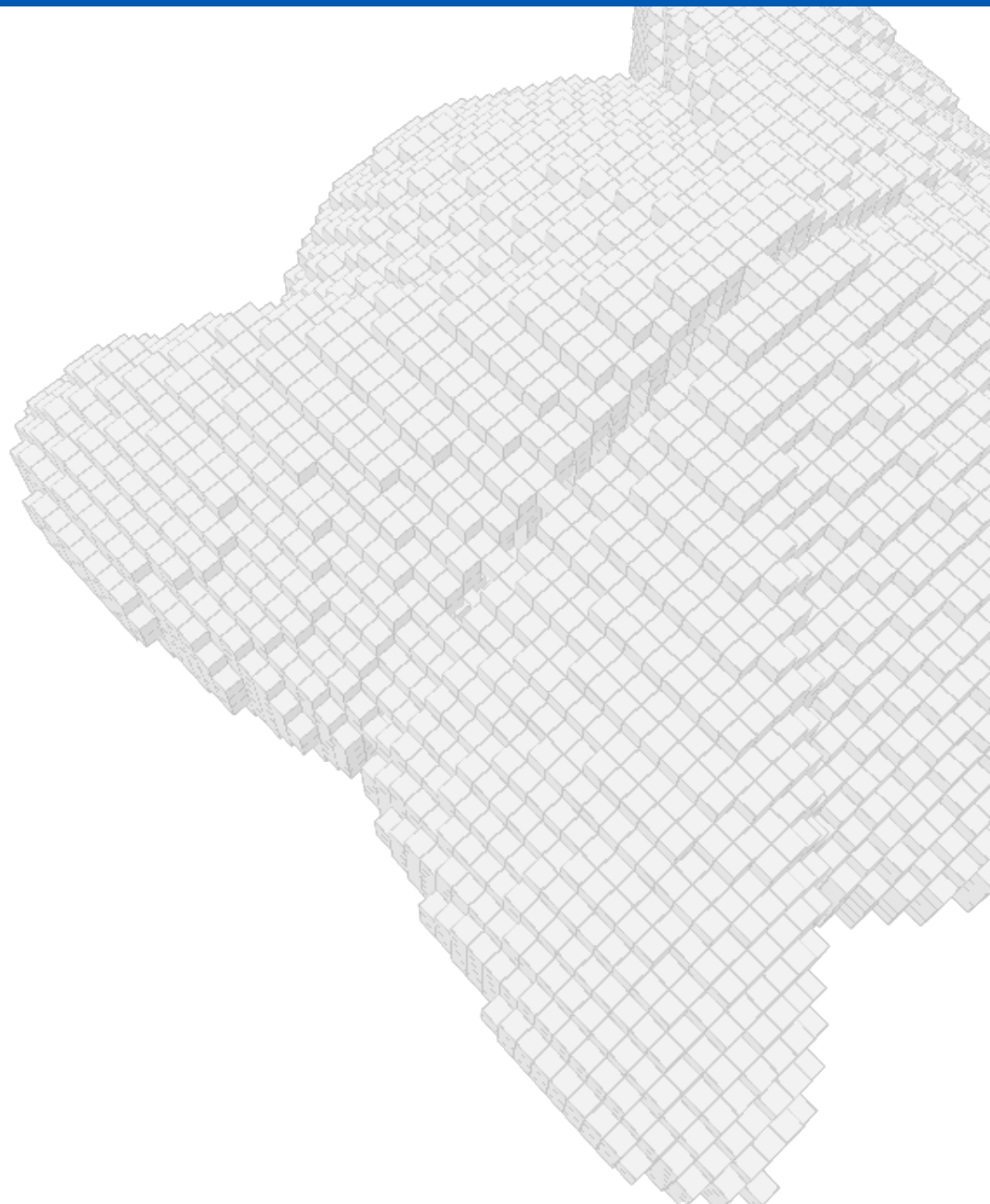
- Need of a tool usable by everyone and everywhere

Objectives

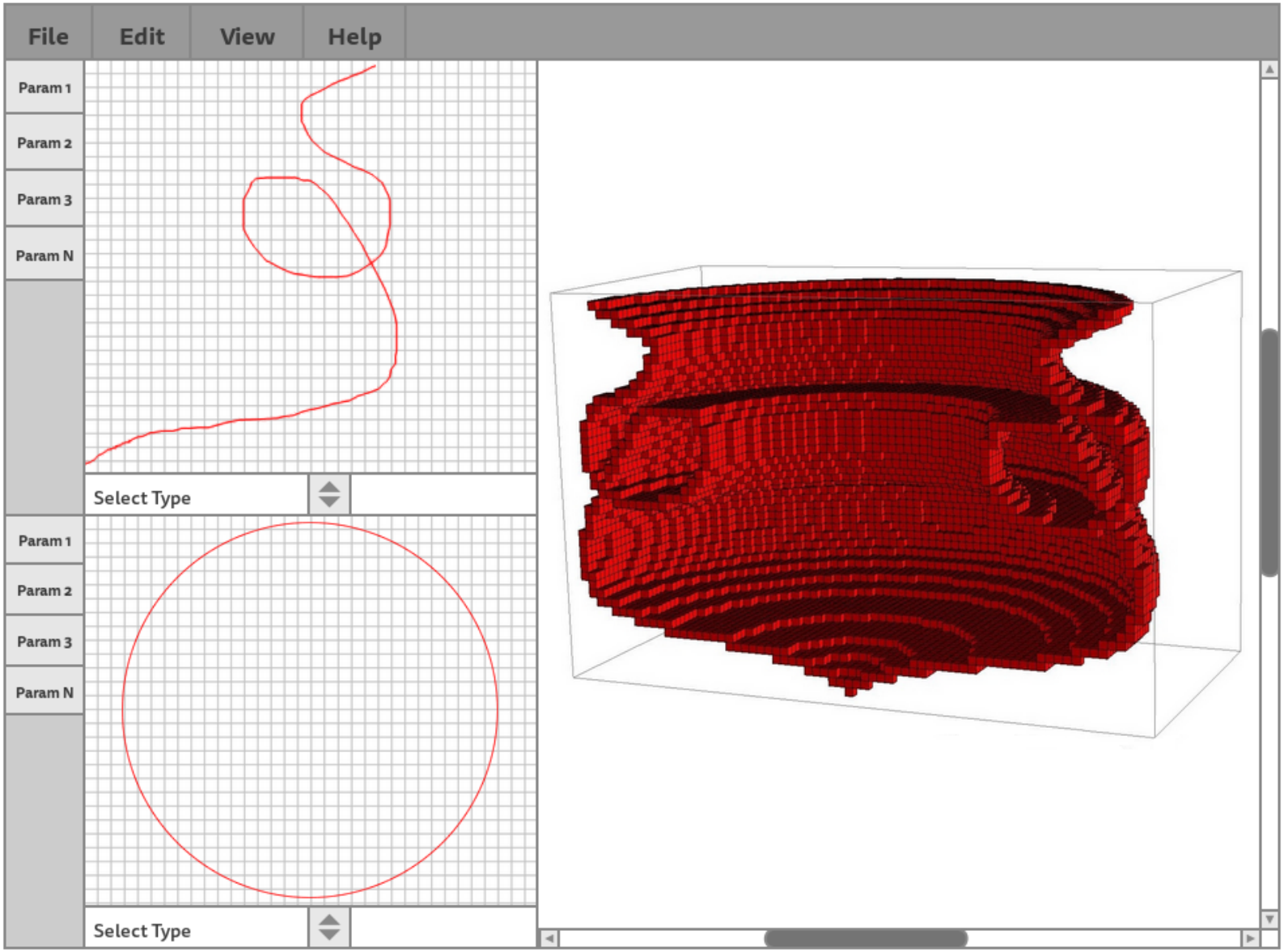
- Surfaces visualization tool
  - 3D, slices visualization
  - Choose the generatrix and directrix
  - Export the results
- Algorithm to generate surfaces of revolution
  - Provided by the customers
  - Possible evolution of the algorithm

Outline

1. Introduction
2. Work achieved
   - Prototype
   - Demonstration
   - Technical aspect
3. Project management
4. Conclusion



Prototype


File
Edit
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Param 1
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Param 3
Param N
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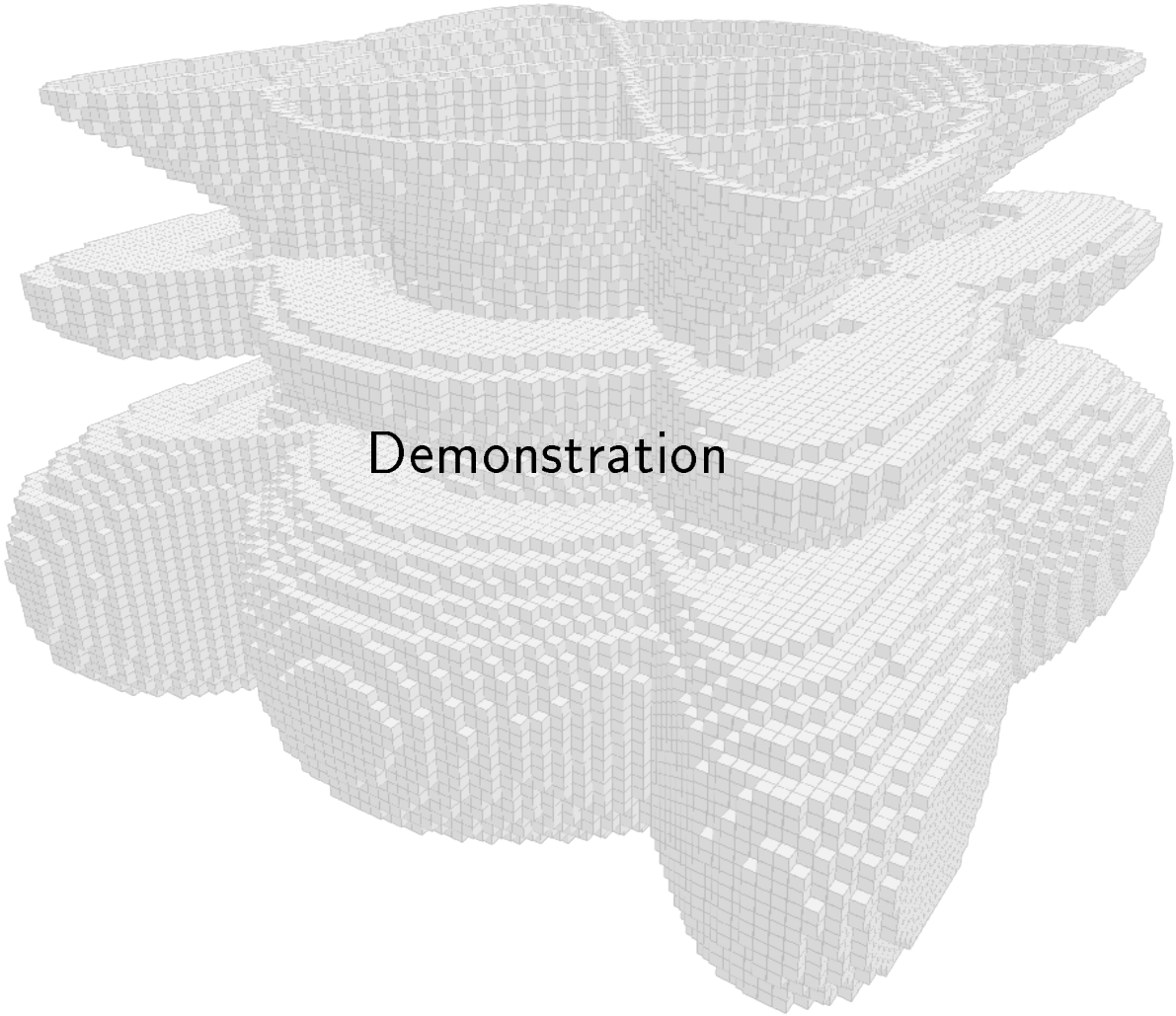
Param 1
Param 2
Param 3
Param N
Select Type

Demonstration

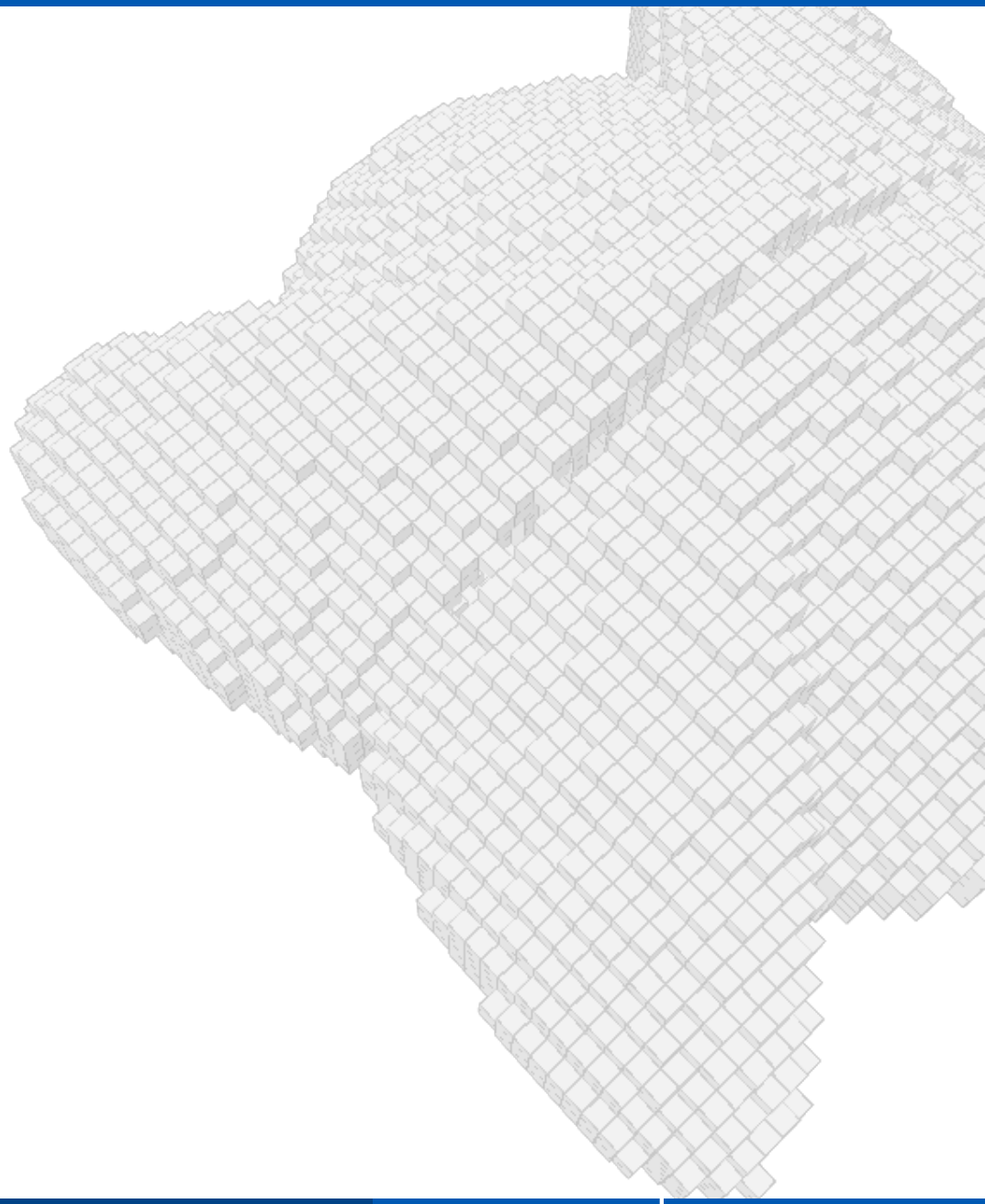


Difficulties

- Generation
  - Just what you want
  - All in one pass
- Rendering
  - Computing only for rendering
  - Pre-computing during generation
  - Ignored $\rightarrow$ let the computation to the GPU
- Implicit curve display
  - Discretisation of the curve
  - Use a library

Outline

1. Introduction
2. Work achieved
3. Project management
   - Task list
   - Gantt diagram
   - Progress
   - Deliverables
   - Risks
   - Risk evolution
   - Quality insurance plan
   - Costs
4. Conclusion



Task list

1 - Documentation, test and users help			V
2 - Design			V
3 - Functional kernel	V	4 - Minimal interface	V
6 - Functionnalities adding	V	5 - Interface enhancement Curve choice	V
8 - Free hand generatrix	V	7 - Interface enhancement Parameters	V
9 - Data management	V	10 - Interface enhancement Formula input	V
11 - User's curve			X
12 - Technical report			V

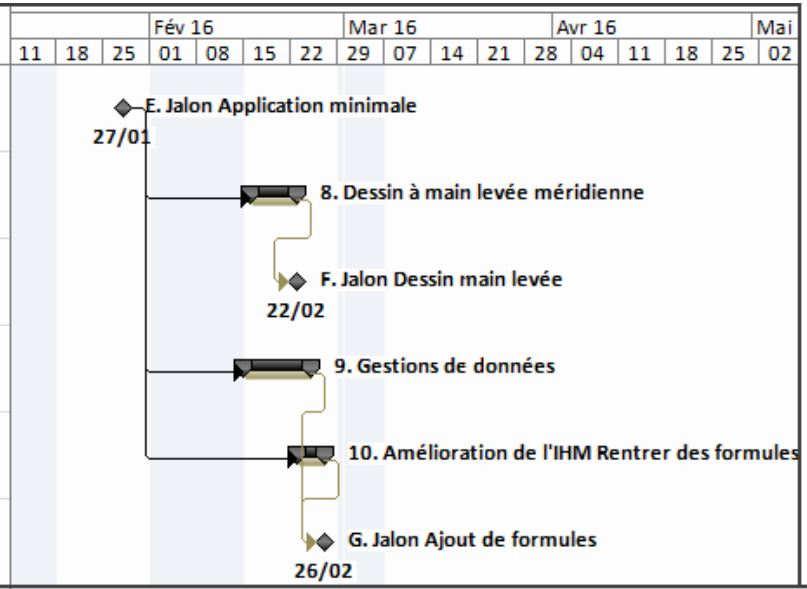
Gantt diagram

Planned diagram

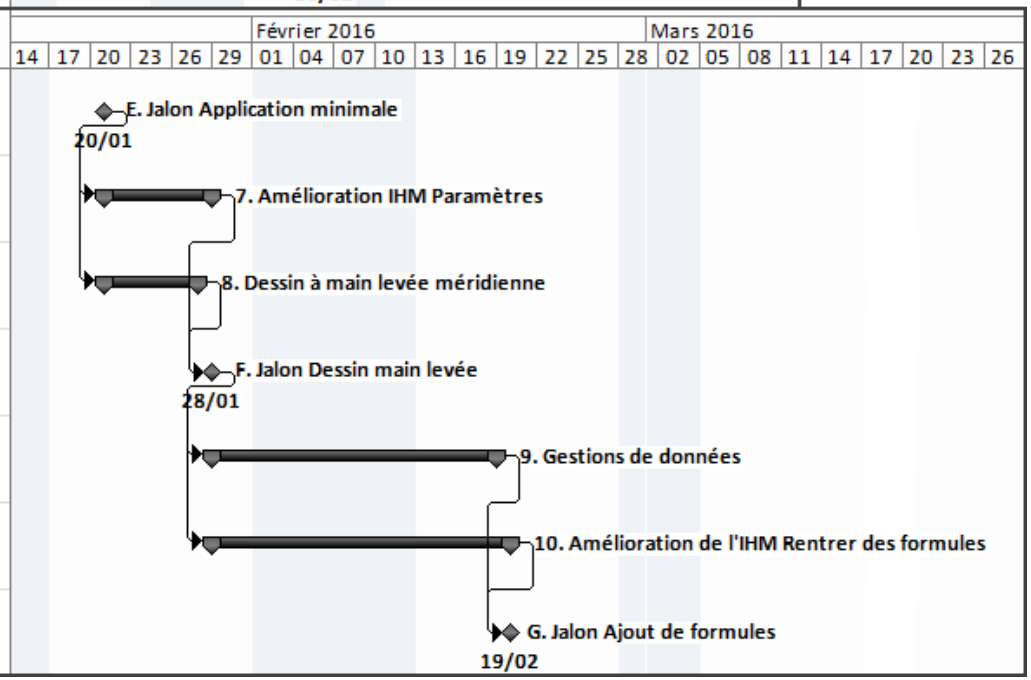
Revised diagram

Gantt diagram

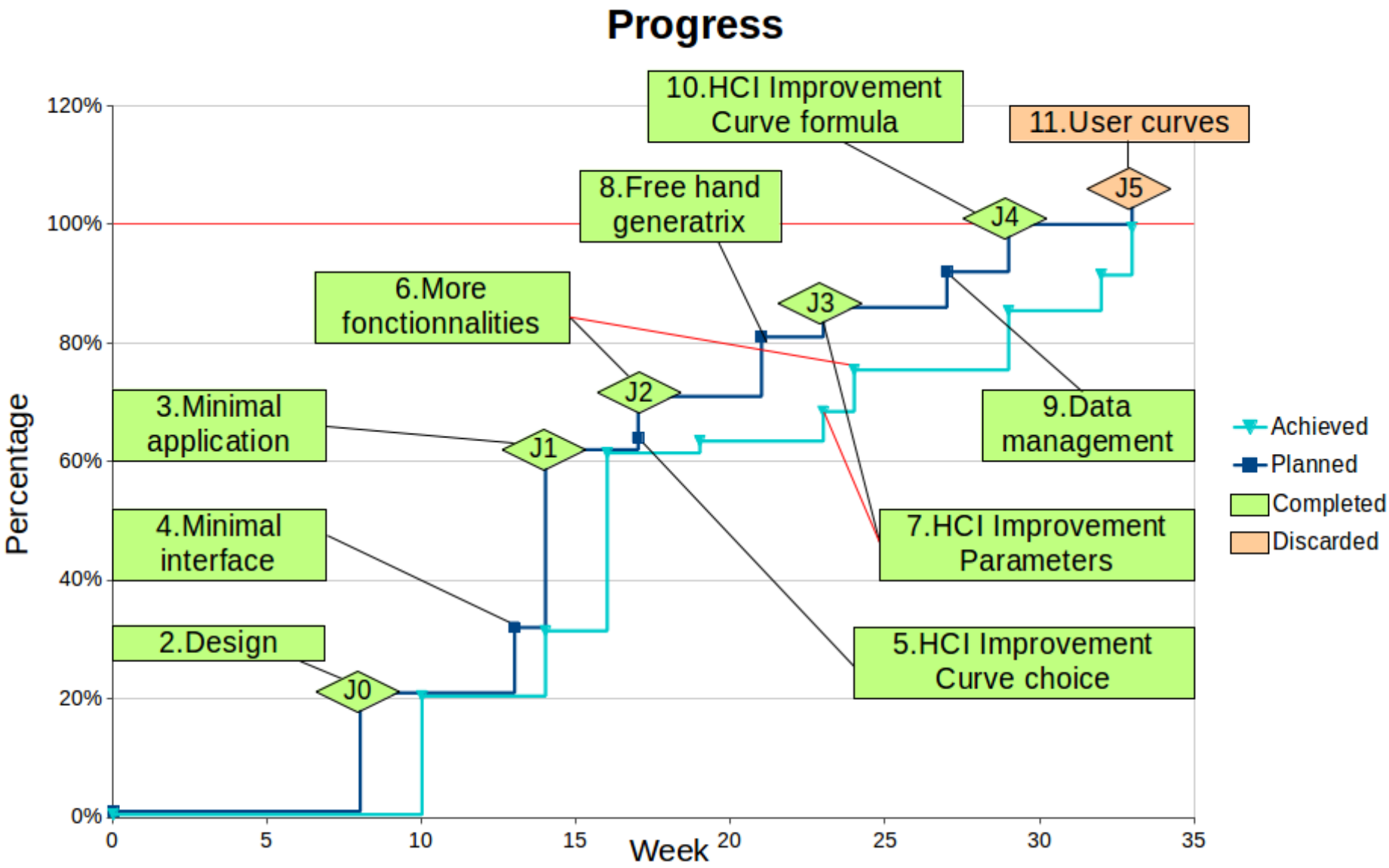
N°	Nom de la tâche	Durée
28	E. Jalon Application minimale	0 jour
32	**8. Dessin à main levée méridienne**	**5 jours**
37	F. Jalon Dessin main levée	0 jour
38	**9. Gestions de données**	**8 jours**
42	**10. Amélioration de l'IHM Rentrer des formules**	**4 jours**
46	G. Jalon Ajout de formules	0 jour



N°	Nom de la tâche	Durée
28	E. Jalon Application minimale	0 jour
29	**7. Amélioration IHM Paramètres**	**6 jours**
32	**8. Dessin à main levée méridienne**	**5 jours**
37	F. Jalon Dessin main levée	0 jour
38	**9. Gestions de données**	**5 jours**
42	**10. Amélioration de l'IHM Rentrer des formules**	**6 jours**
46	G. Jalon Ajout de formules	0 jour



Progress


Progress
10.HCI Improvement Curve formula
11.User curves
8.Free hand generatrix
6.More fonctionnalities
3.Minimal application
4.Minimal interface
2.Design
9.Data management
7.HCI Improvement Parameters
5.HCI Improvement Curve choice
J0
J1
J2
J3
J4
J5
120%
100%
80%
60%
40%
20%
0%
Percentage
0
5
10
15
20
25
30
35
Week
Achieved
Planned
Completed
Discarded

Deliverables

N°	Deliverable	Tasks	Planned date	Actual date
1	Interface and algorithm result	2, 3, 4	Dec. 23rd	Jan. 18th
2	Minimal application	5, 6	Jan. 21st	Jan. 25th
2bis	Multi-slice and parameters	7	—	Jan. 29th
3	Free hand drawing and curves with editable parameters	7, 8	Jan. 29th	Feb. 24th
4	Equations and export	9, 10	Feb. 19th	Feb. 24th
5	Final application ~~and documentation~~	1 to 11	Mar. 2nd	Mar. 2nd
5bis	Final documentation	1	Mar. 11th	Mar. 14th

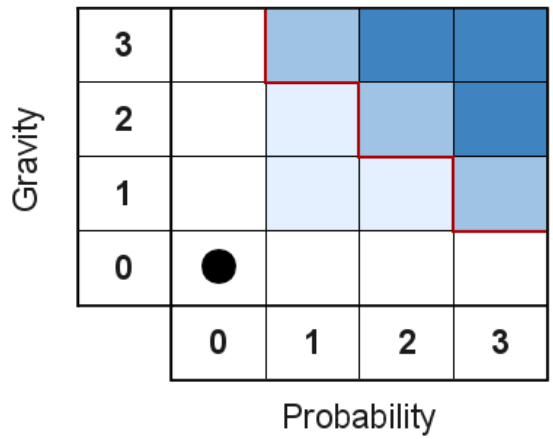
List of risks

Risk	Gravity	Probability	Criticity	
Server linked problems	1	0	0	*
Equipment/device dysfunction	1	1	1	+!
New clients	1	2	1	*!
Validation reveals serious technical probleme	2	1	1	*
3D rendering needs too much ressources	2	1	1	*!
Evolution of the generation algorithm	1	3	2	*

Risk evolution

- Server linked problems

Gravity	0	1	2	3
Delay	●			
Costs	●			
Receipts	●			
Performance	●			
Other				
Global	●			

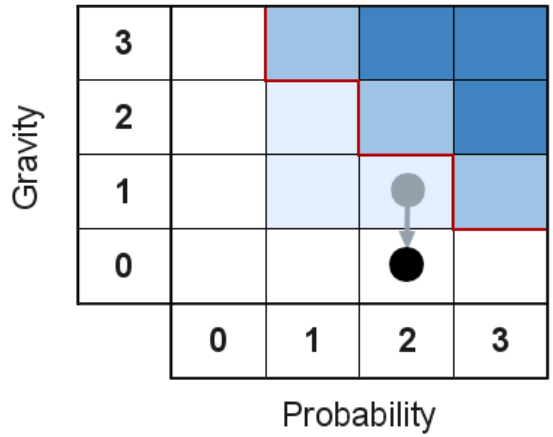


Level	Gravity	Probability	Criticity
0	None	$< 1\%$	No critical
1	Low (marges)	de 1% à 5%	
2	Important	de 5% à 20 %	Critical
3	Dangerous	$> 20\%$	

Risk evolution

- New clients

Gravity	0	1	2	3
Delay	●	●		
Costs	●			
Receipts	●			
Performance	●	●		
Other				
Global	●	●		

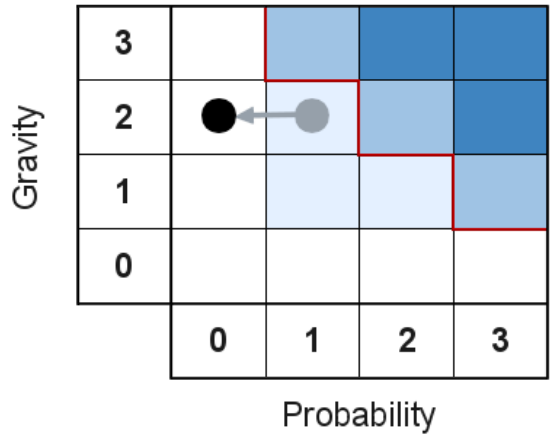


Level	Gravity	Probability	Criticity
0	None	$< 1\%$	No critical
1	Low (marges)	de 1% à 5%	
2	Important	de 5% à 20 %	Critical
3	Dangerous	$> 20\%$	

Risk evolution

- Slow rendering

Gravity	0	1	2	3
Delay			●	
Costs	●			
Receipts	●			
Performance			●	
Other				
Global			●	



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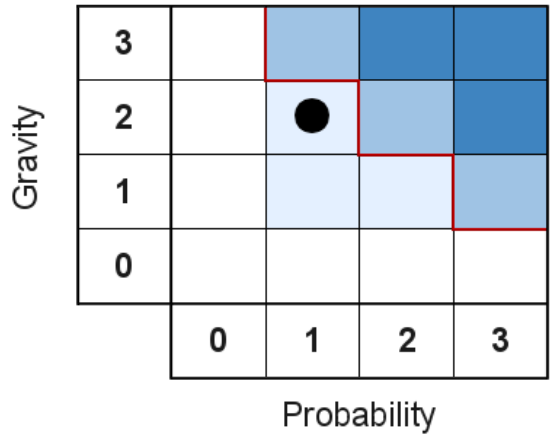
0	None	$< 1\%$	No critical
1	Low (marges)	de 1% à 5%	
2	Important	de 5% à 20 %	Critical
3	Dangerous	$> 20\%$	

Risk evolution

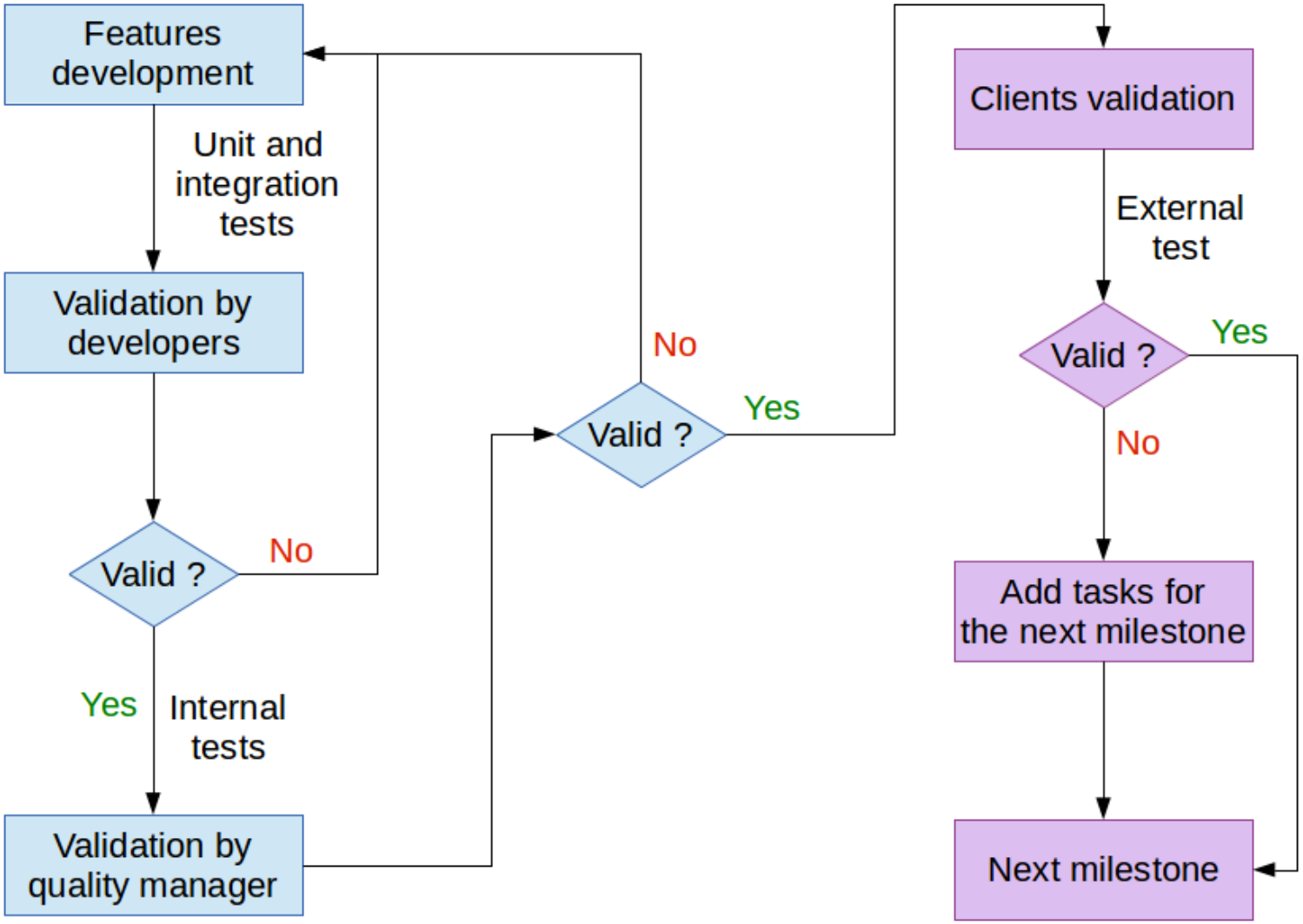
- Evolution of the generation algorithm

Gravity	0	1	2	3
Delay	●			
Costs	●			
Receipts	●			
Performance			●	
Other				
Global			●	

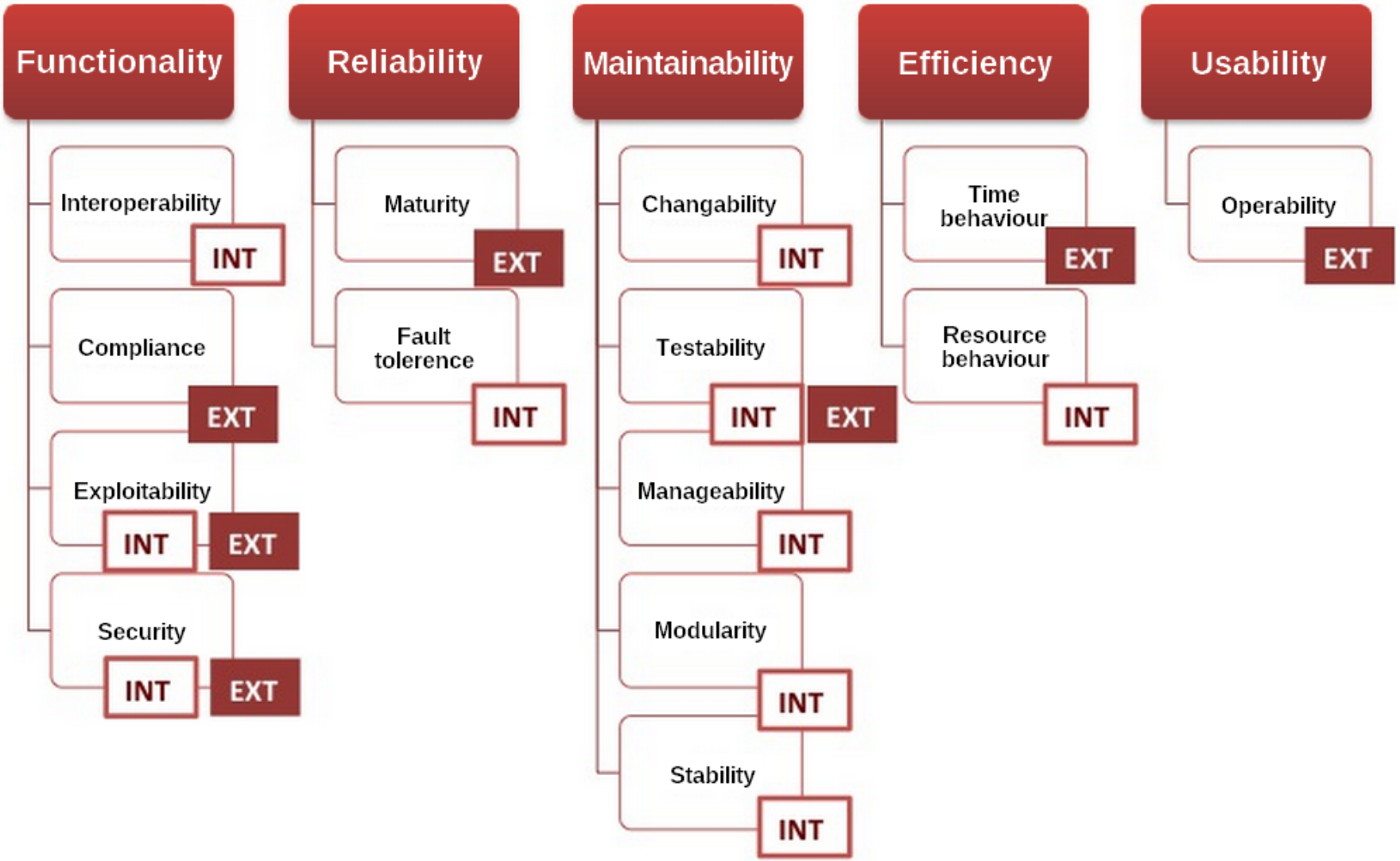


Level	Gravity	Probability	Criticity
0	None	$< 1\%$	No critical
1	Low (marges)	de 1% à 5%	
2	Important	de 5% à 20 %	Critical
3	Dangerous	$> 20\%$	

Quality insurance plan



ISO 9126


Functionality
Interoperability
INT
Compliance
EXT
Exploitability
INT
EXT
Security
INT
EXT
Reliability
Maturity
EXT
Fault tolerence
INT
Maintainability
Changability
INT
Testability
INT
EXT
Manageability
INT
Modularity
INT
Stability
INT
Efficiency
Time behaviour
EXT
Resource behaviour
INT
Usability
Operability
EXT

Software quality measurment

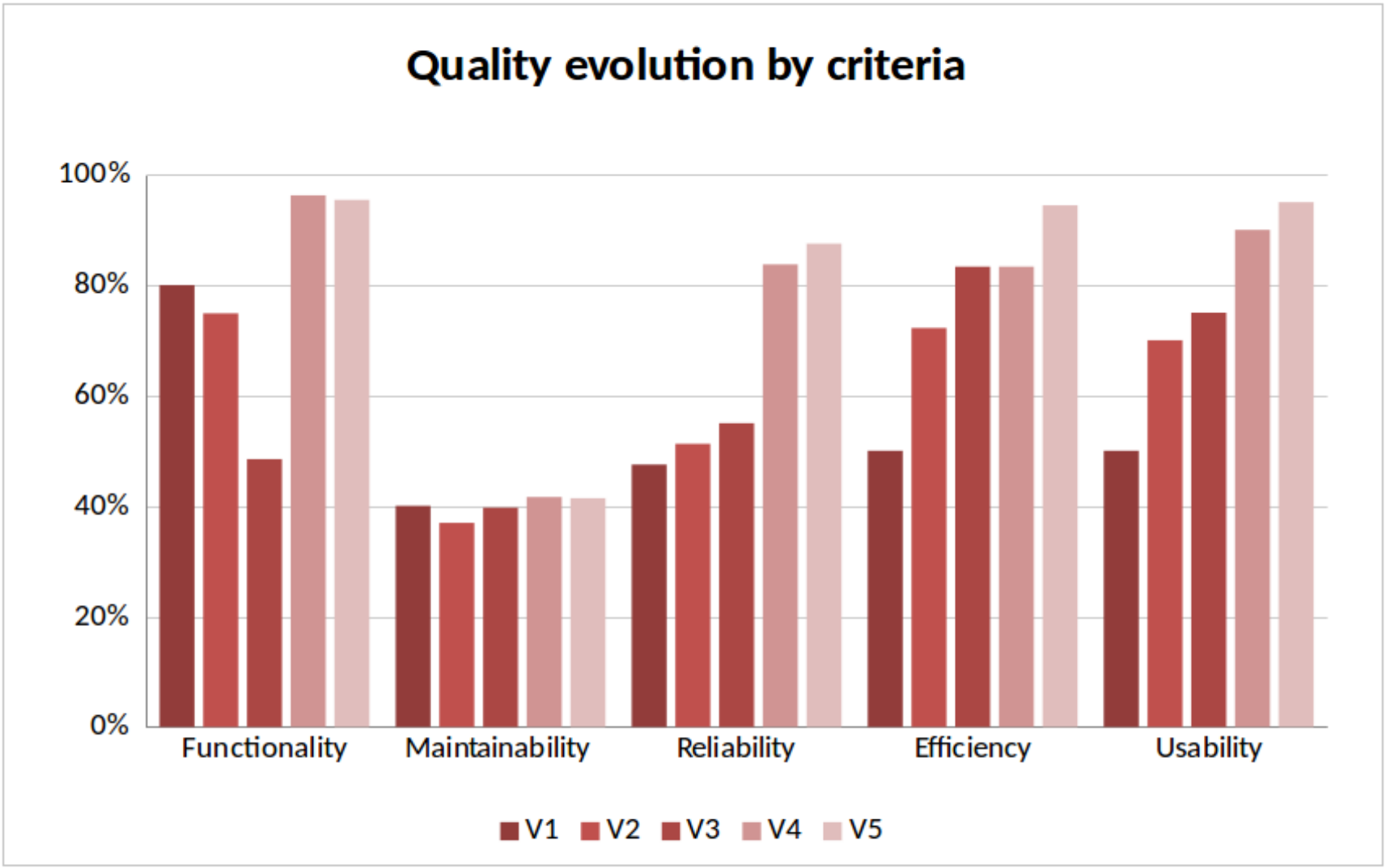
1	Question	Version 1	Version 2	Version 3	Version 4	Version 5
1	Overall vision	1	1	0.5	1	1
2	The ease to find the information	0.5	0.5	0.5	0.5	1
3	Response speed	0.5	0.5	0.5	1	1
4	Utility of the information	0	0.5	0.5	1	1
5	The choice of title and heading and their meanings	0.5	1	1	1	1
6	The completeness of the information found against the need	1	0.5	1	1	1
7	Rapidité d'exécution	0	0.5	1	1	1
8	Errors rate	0.5	0.5	0.5	1	1
9	Handling the use	1	1	1	0.5	0.5
10	The reliability of the application	0	1	1	1	1
	Total	50%	70%	75%	90%	95%

1	Functionality	Level 1		Level 2		Level 3		Level 4		Level 5	
		INT	EXT	INT	EXT	INT	Ext	INT	Ext	INT	Ext
1	Interoperability										
Goal	Ability to interact with one or more systems										
Question	Is the application uses norms and technical standards?										
Evaluation		90%		75%		85%		100%		95.83%	
1	Adequacy										
Goal	Checking the adequacy of spots against the needs										
Question	Does each function is adequate to the customer need?										
Evaluation			100%		80%		25%		85%		90%
0.5	Operability										
Goal	The ability to properly use the software system										
Question	At what level the software is usable?										
Evaluation		25 %	25 %		32.14%	35.71%	35.71%		100%		100%
	Note I/E	76.66 %	83.33%	75%	74.76%	60.35%	30.35%	100%	92.5%	95.83%	95%
	Fonctionnalité	79.99 %		74.88 %		45.35 %		96.25%		95.41%	

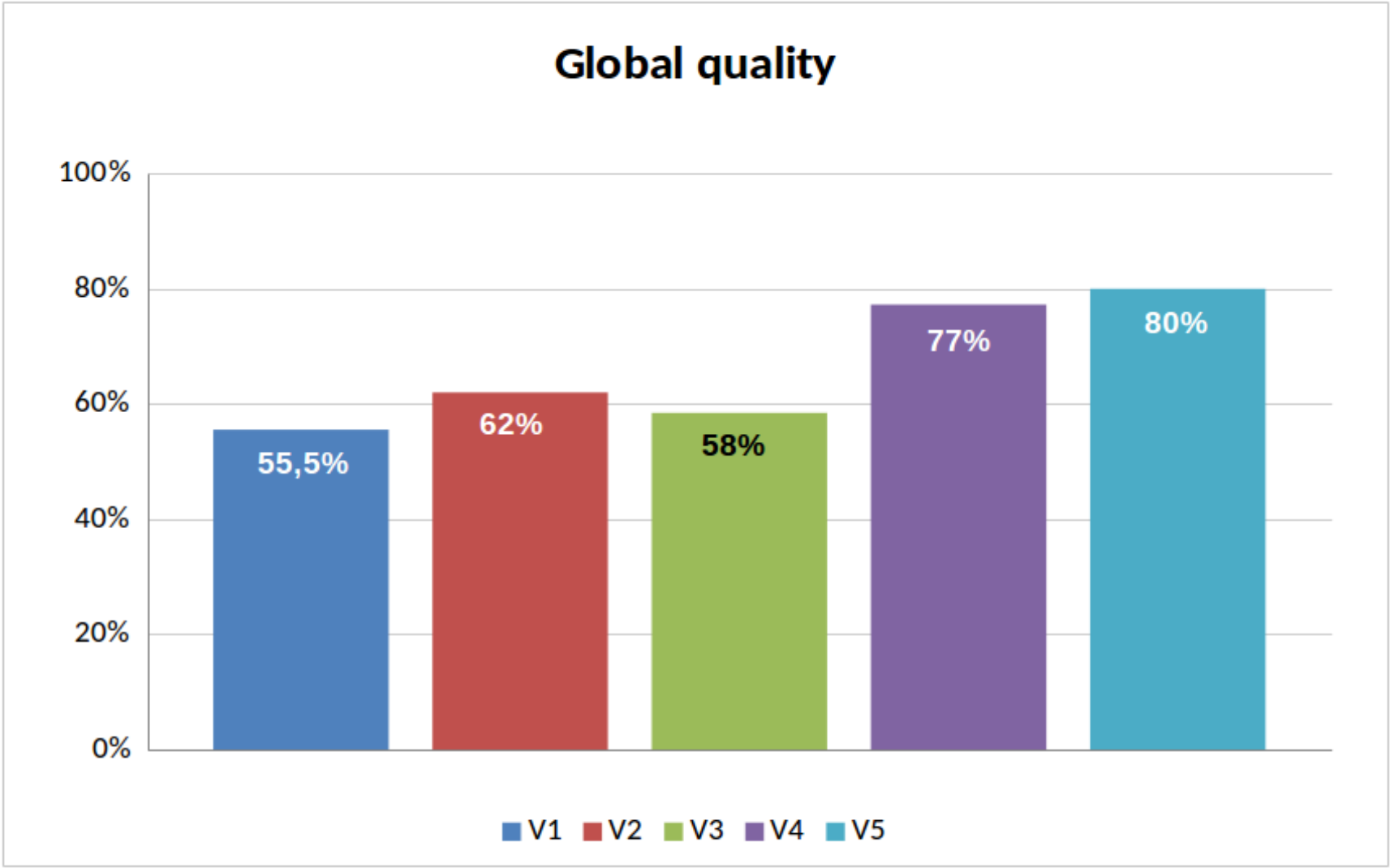
Standard divisions

1. Quality model
2. External metrics
3. Internal metrics
4. Quality in use metrics

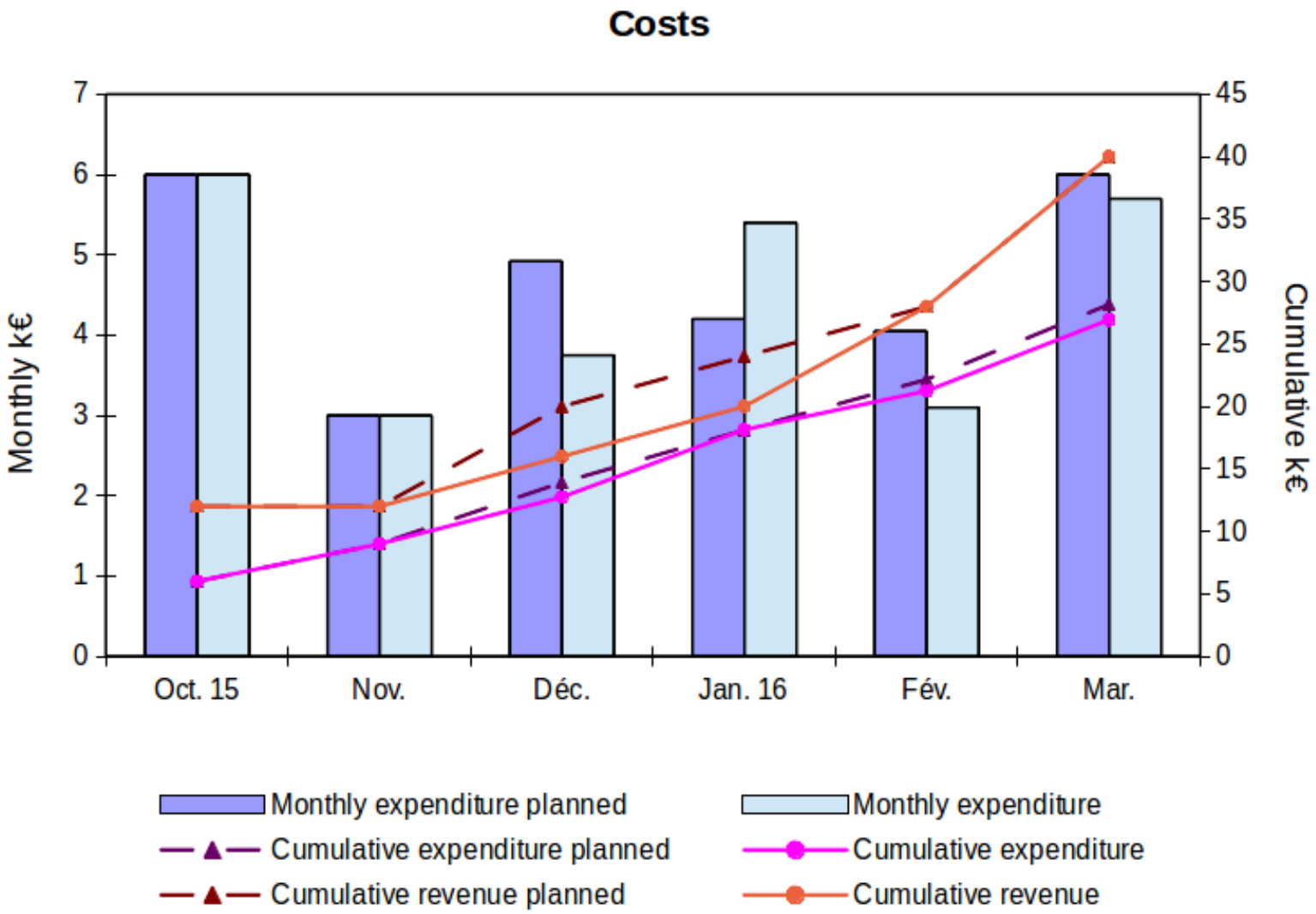
Software quality evaluation



Software quality evaluation



Costs


Costs
Monthly k€
Cumulative k€
0
1
2
3
4
5
6
7
0
5
10
15
20
25
30
35
40
45
Oct. 15
Nov.
Déc.
Jan. 16
Fév.
Mar.
Monthly expenditure planned
Monthly expenditure
Cumulative expenditure planned
Cumulative expenditure
Cumulative revenue planned
Cumulative revenue

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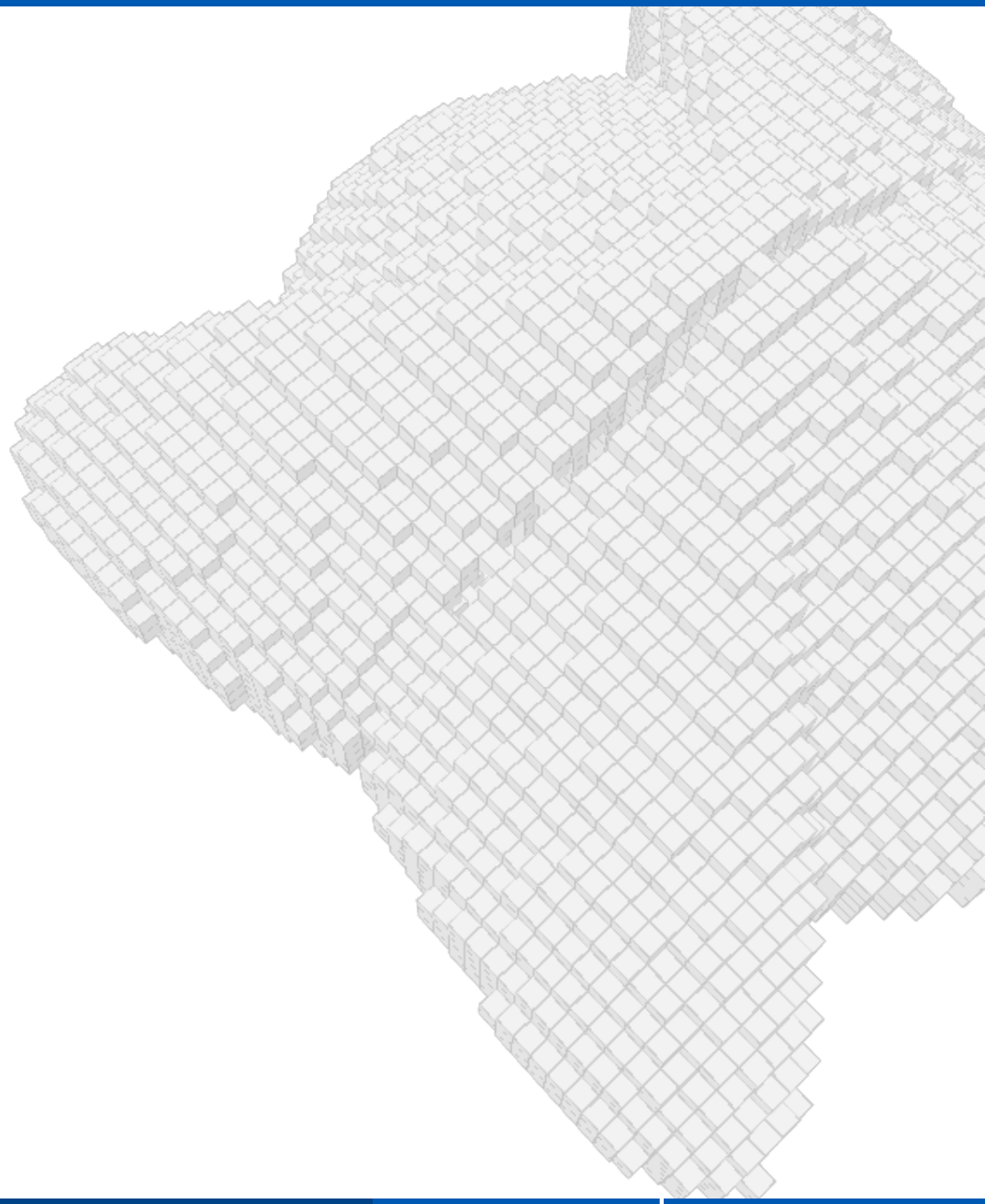

Conclusion

- Technical Javascript improvement (classes, worker, blob, webgl, etc.)
- Final delivrable in two step
- Perspectives
  - Réutilisation dans quelques semaines
  - Ajout de nouveau(x) algo

Conclusion

- Javascript improvement (classes, worker, blob, etc.)
- WebGl improvement
- Résolution de problème mathématique (matrice de changement de repère, tracer de courbe implicite)

Discrete 3D surfaces of revolution

Final presentation

Thanks for your attention.

Are there any questions ?