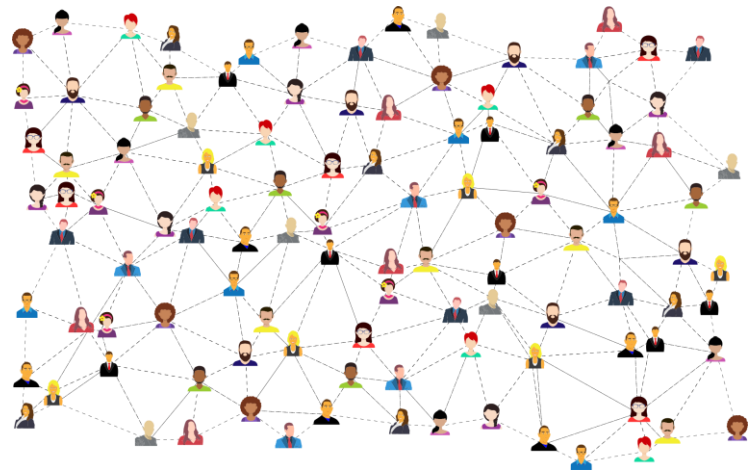
1

2

3

Systems Engineering is a lot about Communication



Communication between team member, suppliers, stakeholders, and so forth.

oose.

4

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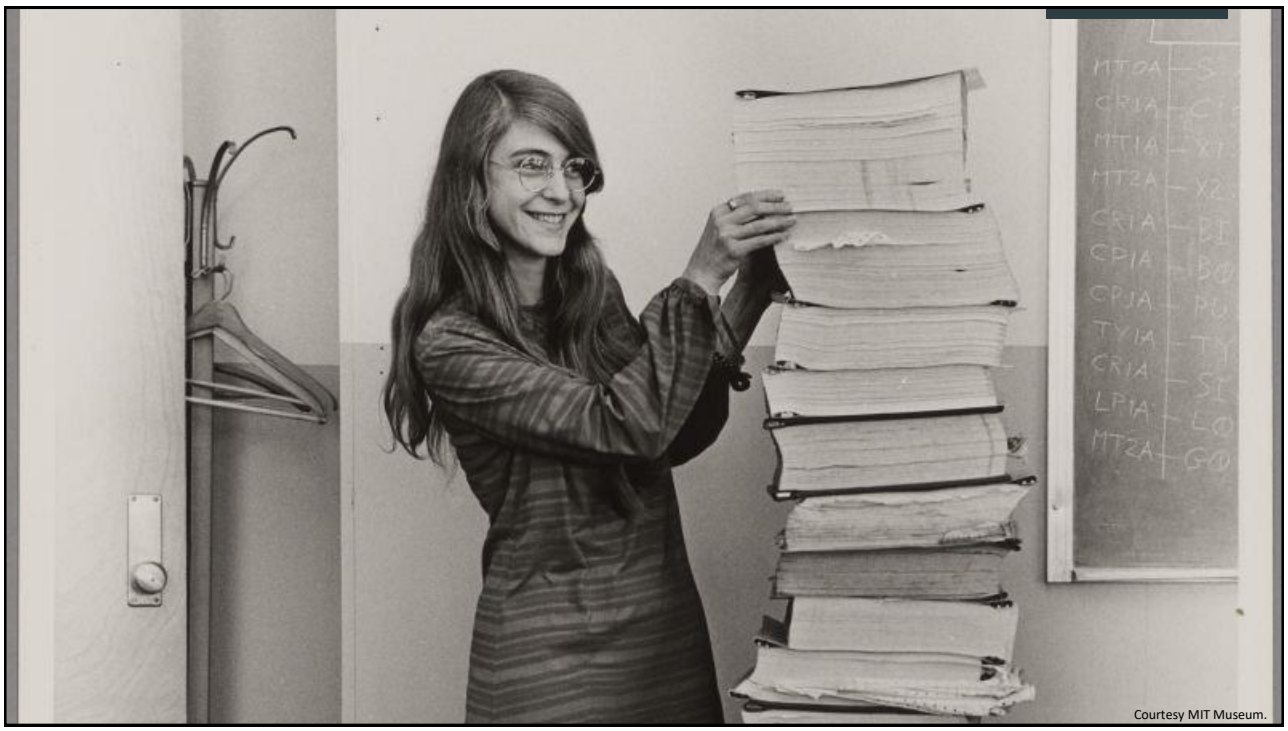

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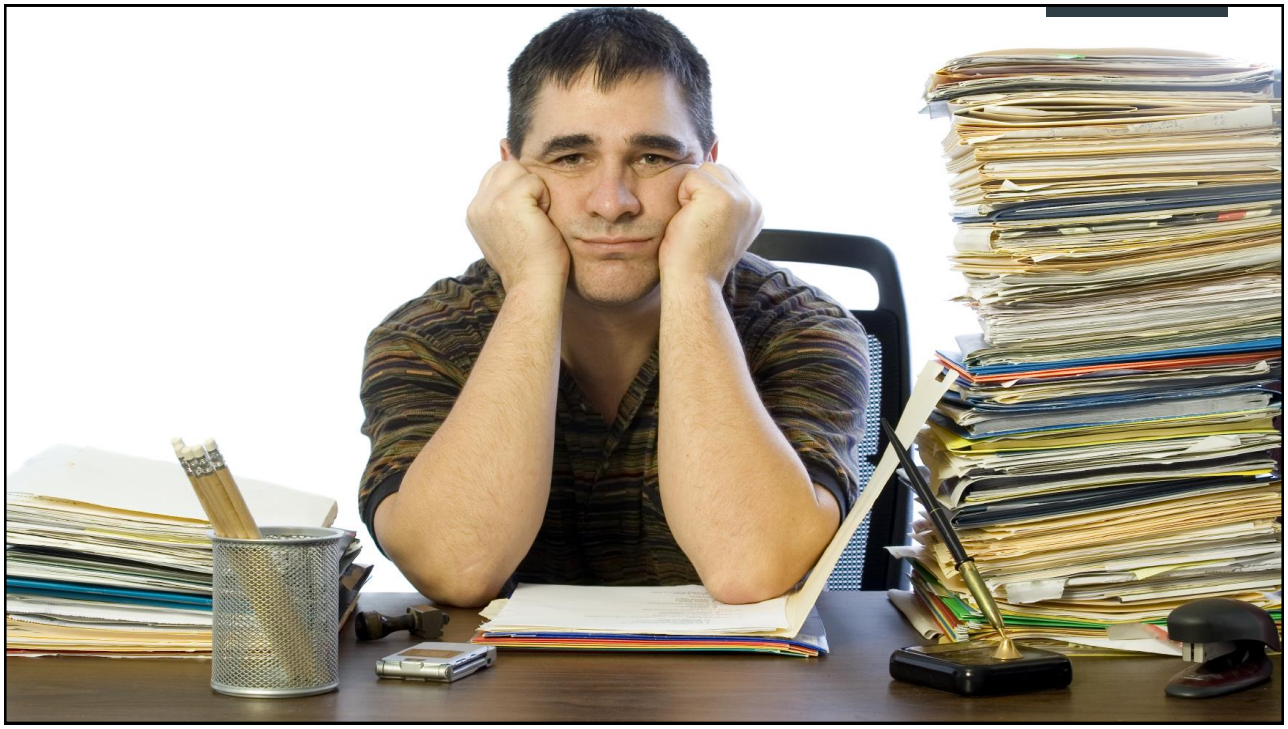

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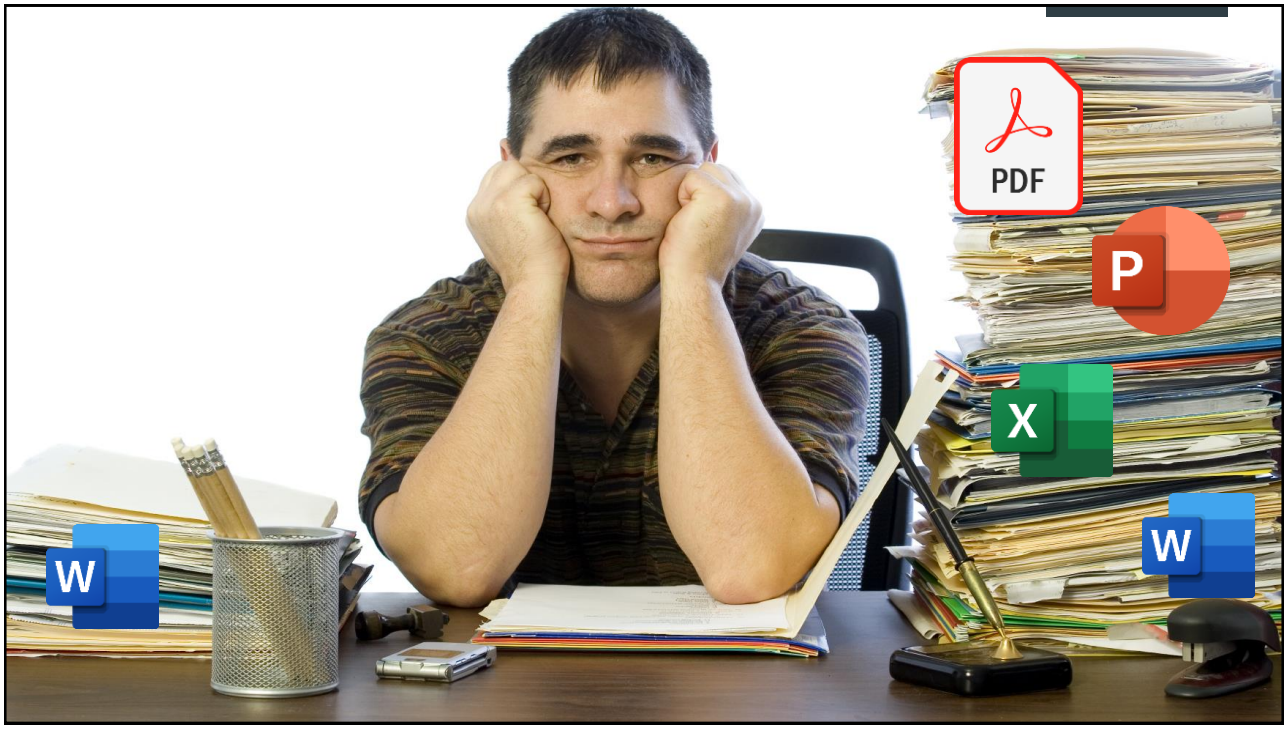

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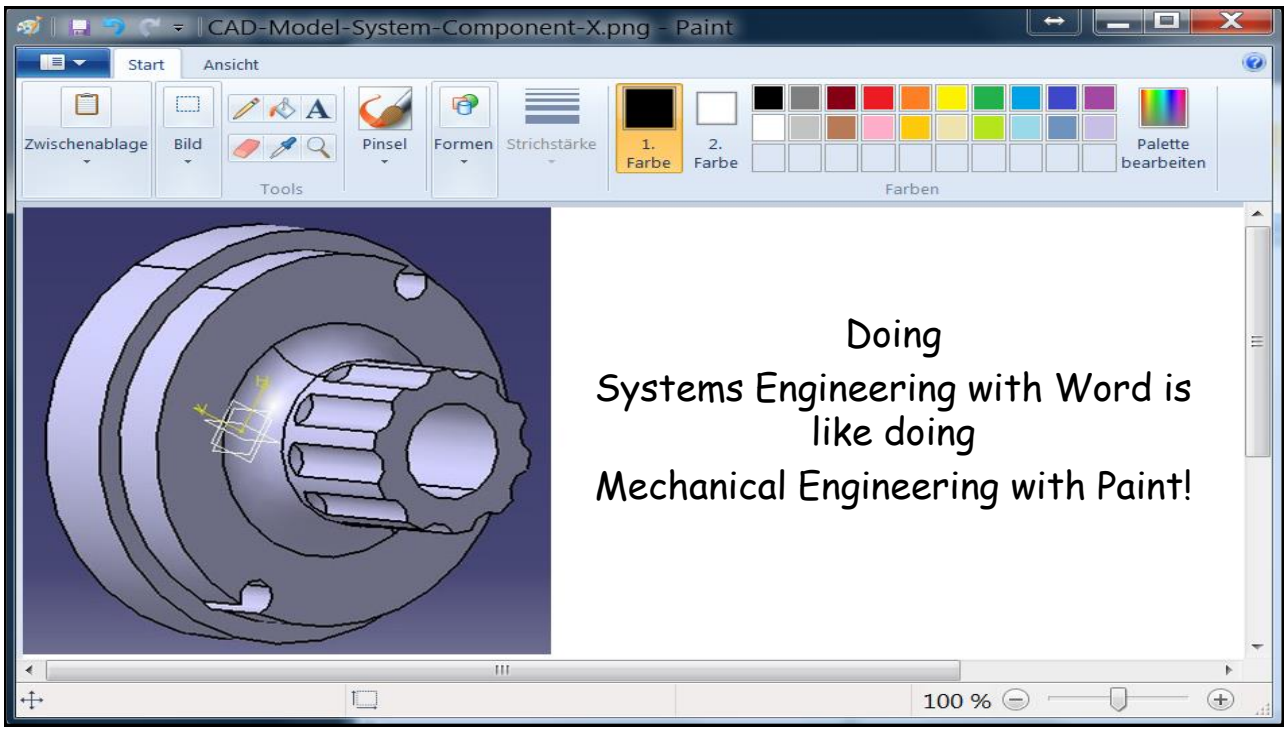
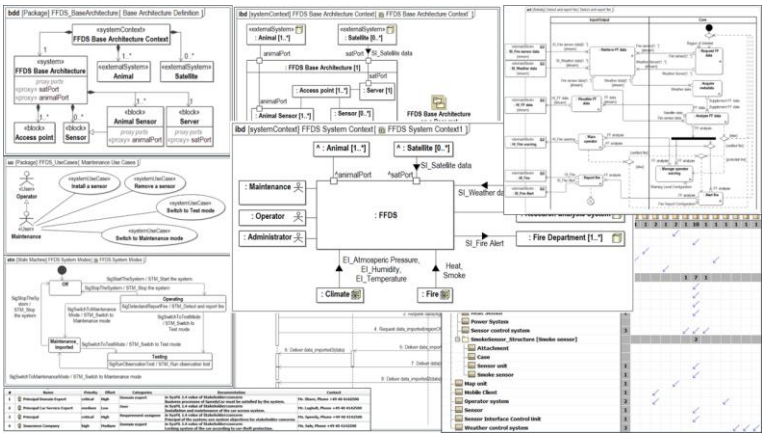


12

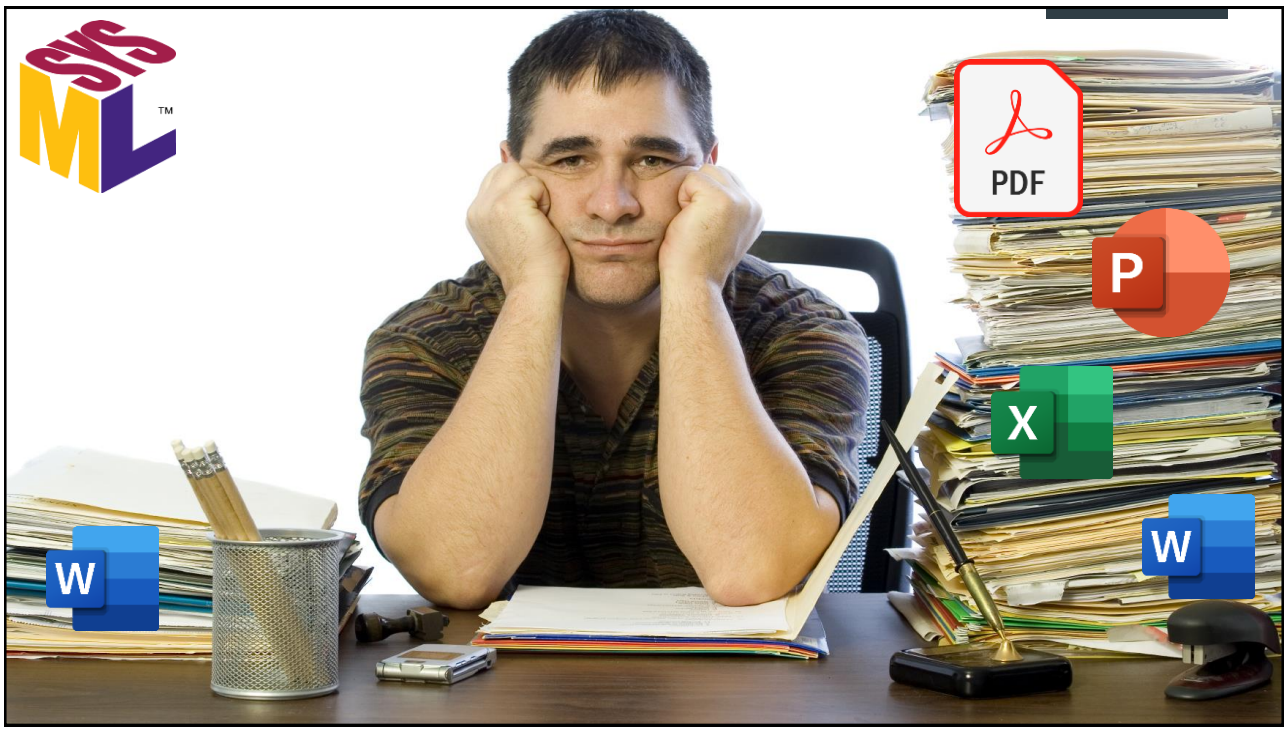
From DBSE to MBSE – Now it gets much better(?)



SysML™

oose.

13



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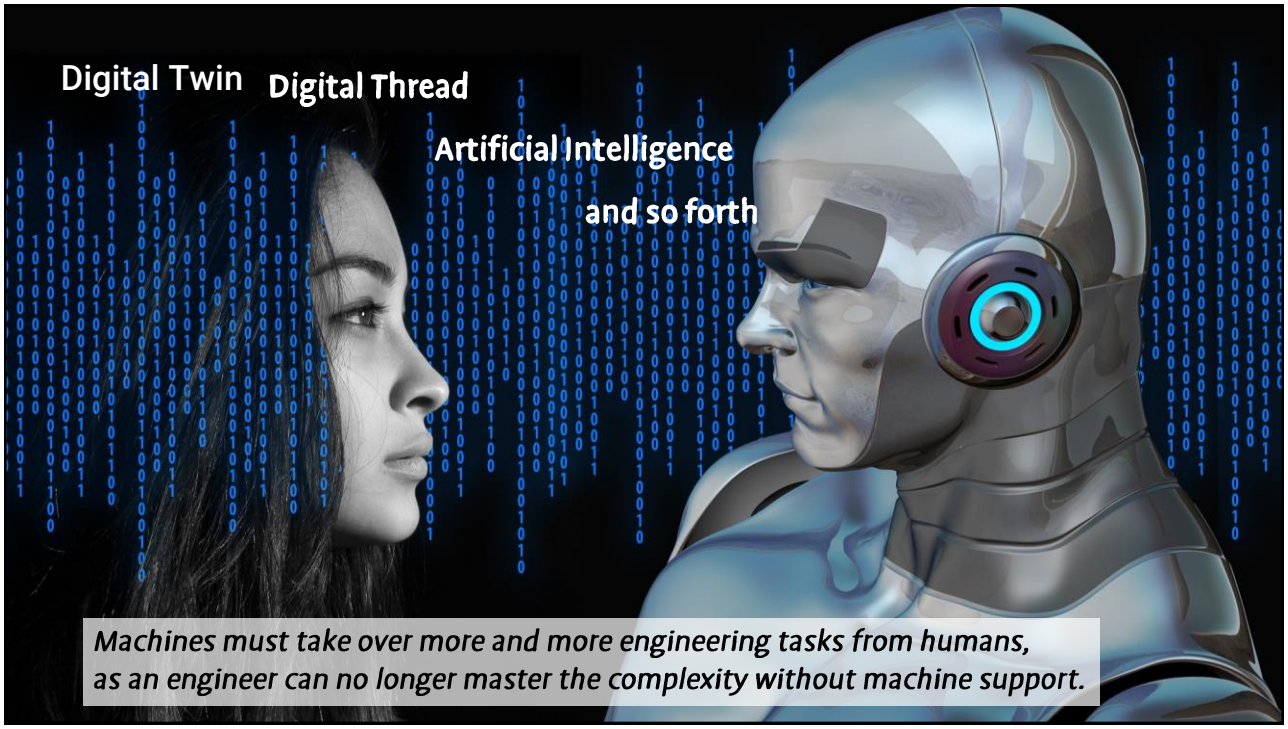

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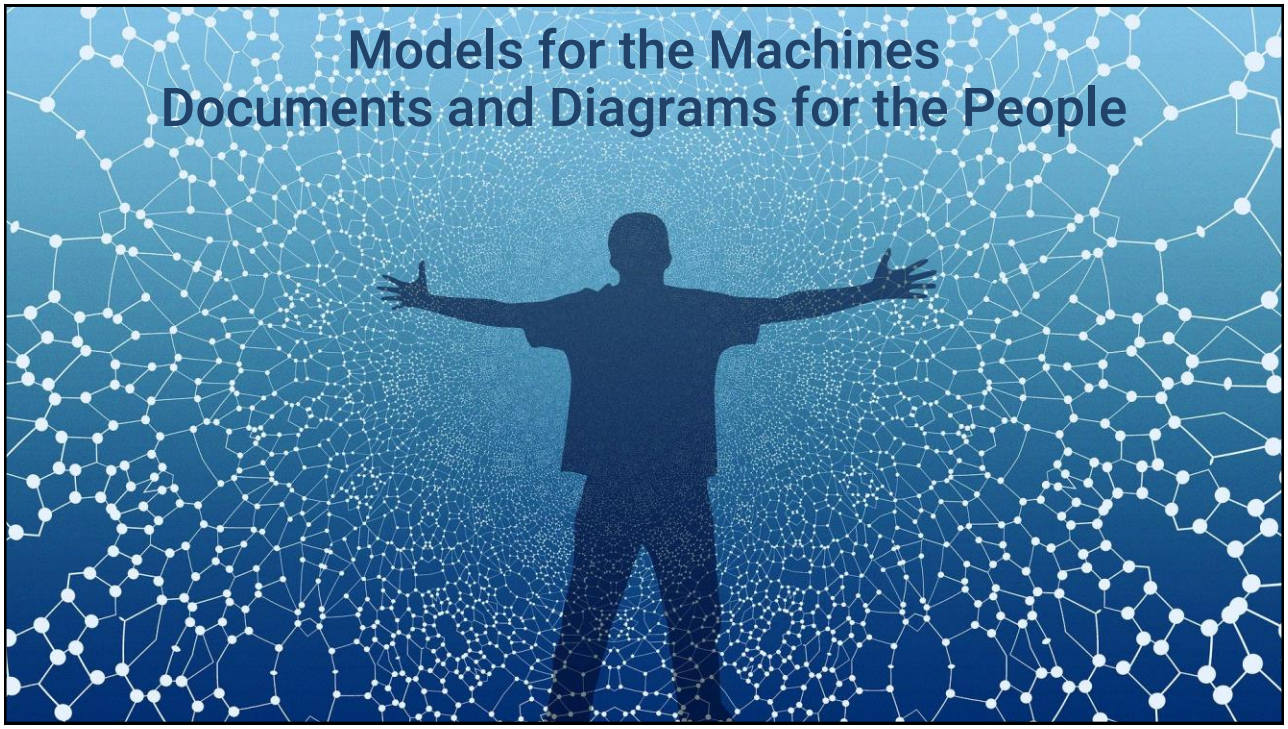


17

42

Without a context this is just a number

18

Office tools provide context for Humans

42

Subsystem	Part	CBE Mass (kg)
SYS1	P1	42,00
SYS1	P2	1,20
SYS1	P3	7,30
Total SYS1		50,50

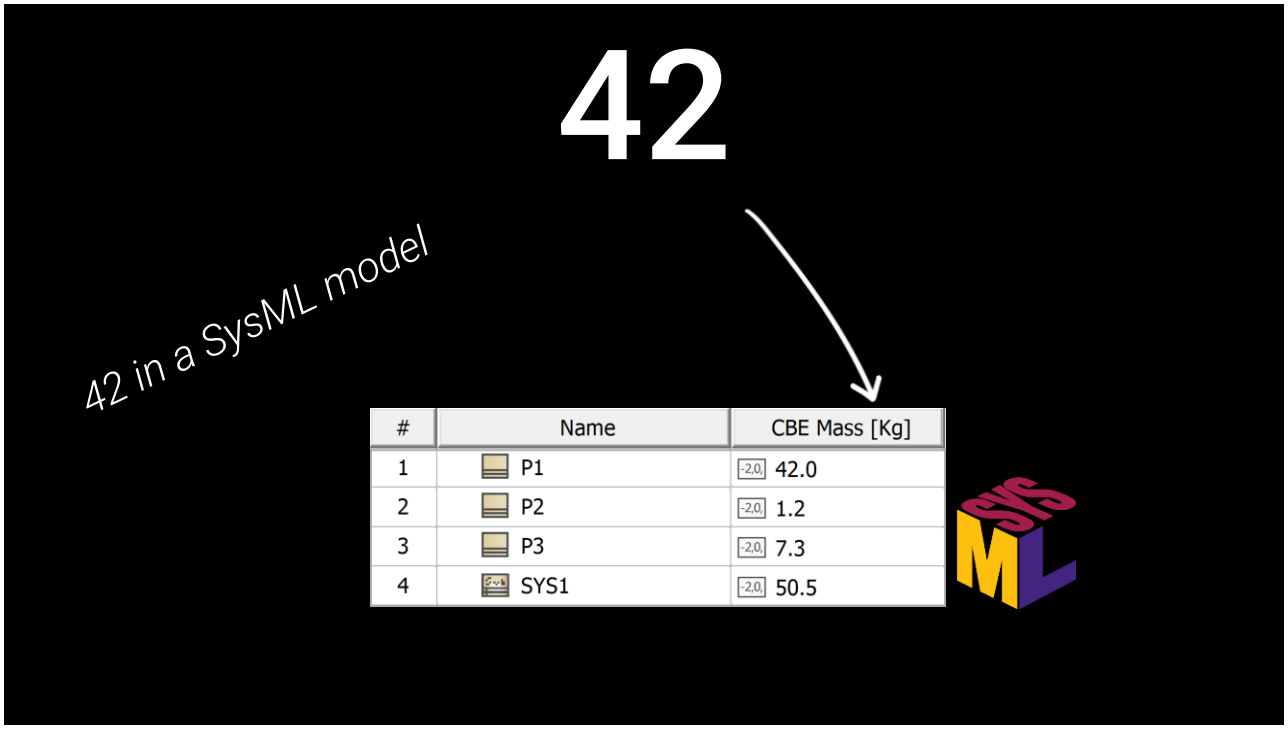
19

For a Machine 42 is a value in the 2nd row, 3rd column

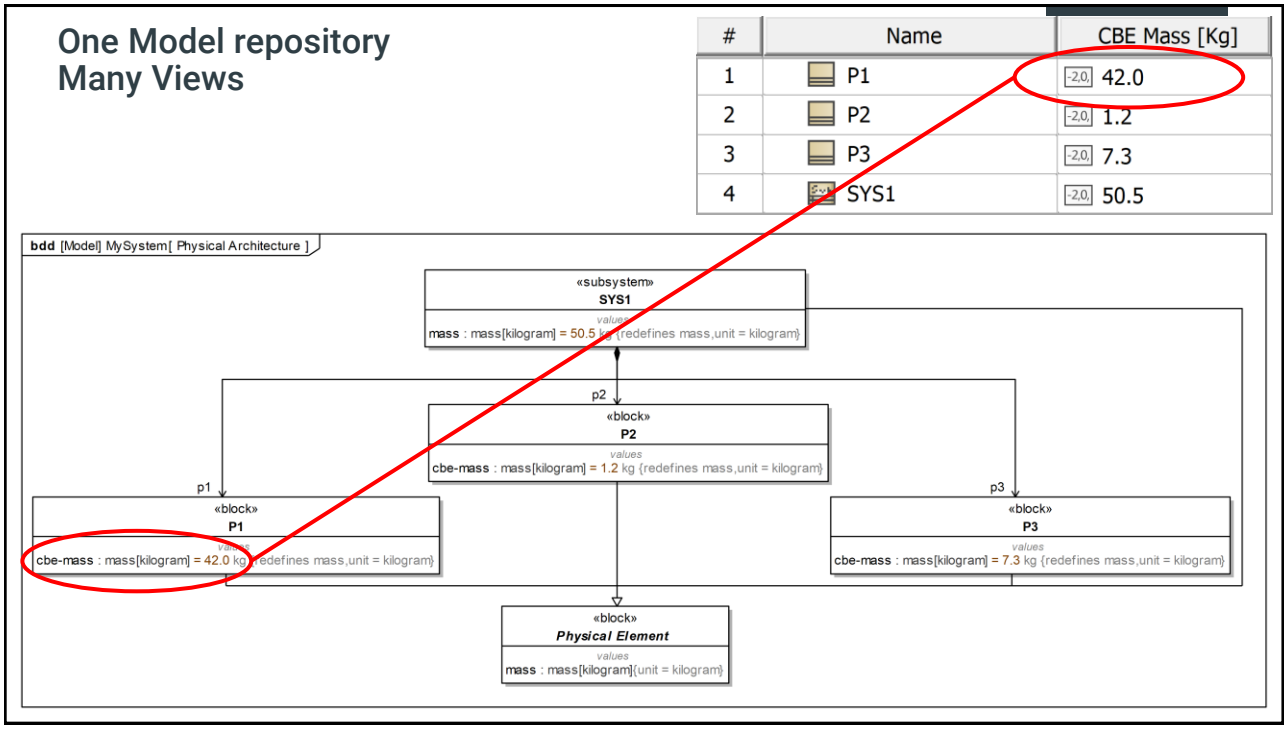
42

Subsystem	Part	CBE Mass (kg)
SYS1	P1	42,00
SYS1	P2	1,20
SYS1	P3	7,30
Total SYS1		50,50

20



21



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Machine readable Semantics

#	Name	CBE Mass [Kg]
1	P1	42.0
2	P2	1.2
3	P3	7.3
4	SYS1	50.5

«block»
P1
values
cbe-mass : mass[kilogram] = 42.0 kg {redefines mass,unit = kilogram}

- Value property cbe-mass
- Owner block P1
- Value type mass[kilogram]
- Unit kilogram
- Quantity kind mass
- …

SysML makes common systems engineering concepts accessible for machines.

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The Model makes the Difference

Subsystem	Part	CBE Mass (kg)
SYS1	P1	42,00
SYS1	P2	1,20
SYS1	P3	7,30
Total SYS1		50,50

#	Name	CBE Mass [Kg]
1	P1	42.0
2	P2	1.2
3	P3	7.3
4	SYS1	50.5

24

The Model makes the Difference

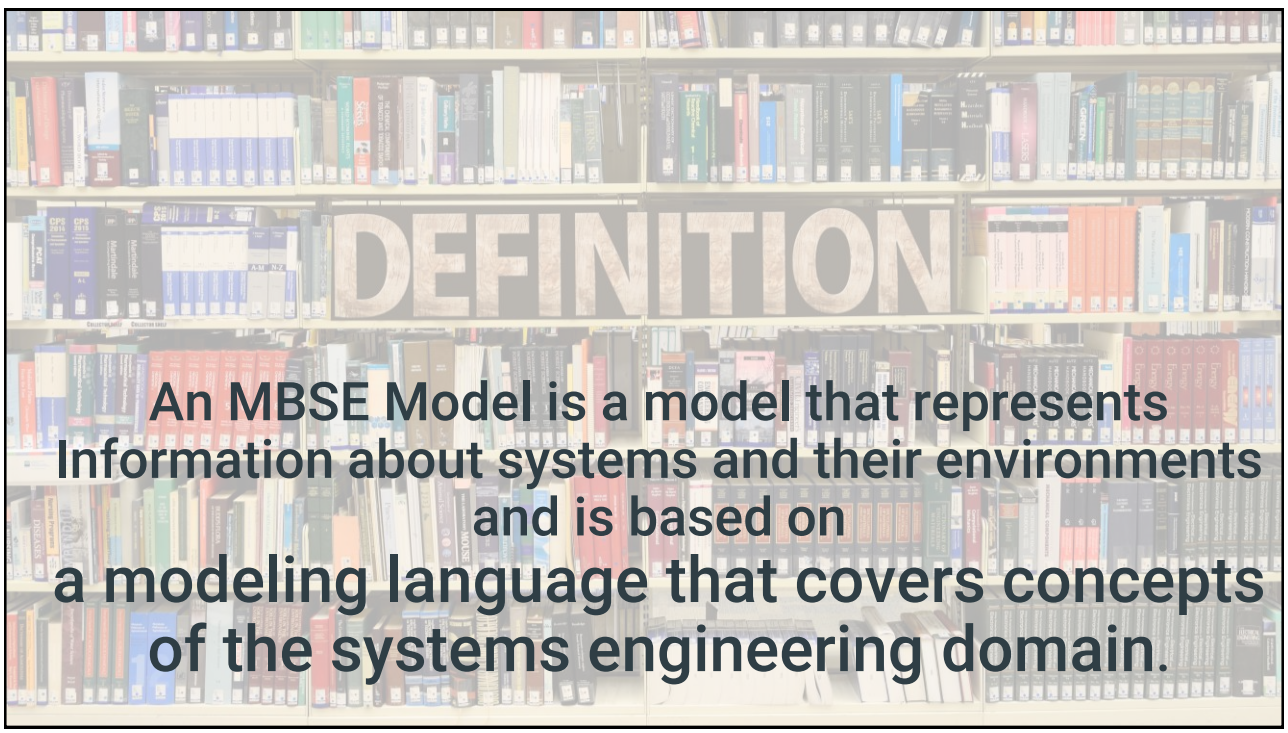
Model

No Model?

Subsystem	Part	CBE Mass (kg)
SYS1	P1	42,00
SYS1	P2	1,20
SYS1	P3	7,30
Total SYS1		50,50

#	Name	CBE Mass [Kg]
1	P1	42.0
2	P2	1.2
3	P3	7.3
4	SYS1	50.5

25



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The Kind of Model is Crucial

„Worksheet Modeling Language"

Machines get information about cells, data formats, etc.

Subsystem	Part	CBE Mass (kg)
SYS1	P1	42,00
SYS1	P2	1,20
SYS1	P3	7,30
Total SYS1		50,50

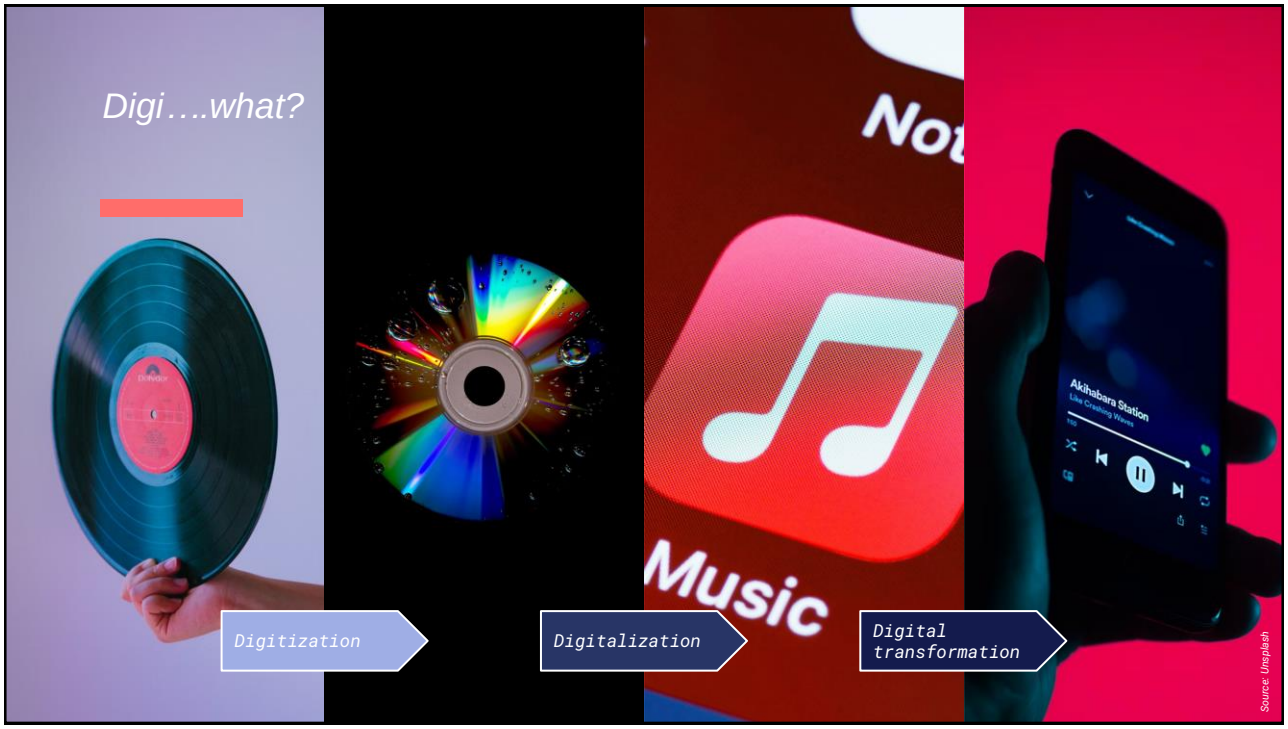
Systems Modeling Language

Machines get information about systems engineering concepts

#	Name	CBE Mass [Kg]
1	P1	42.0
2	P2	1.2
3	P3	7.3
4	SYS1	50.5

27

28



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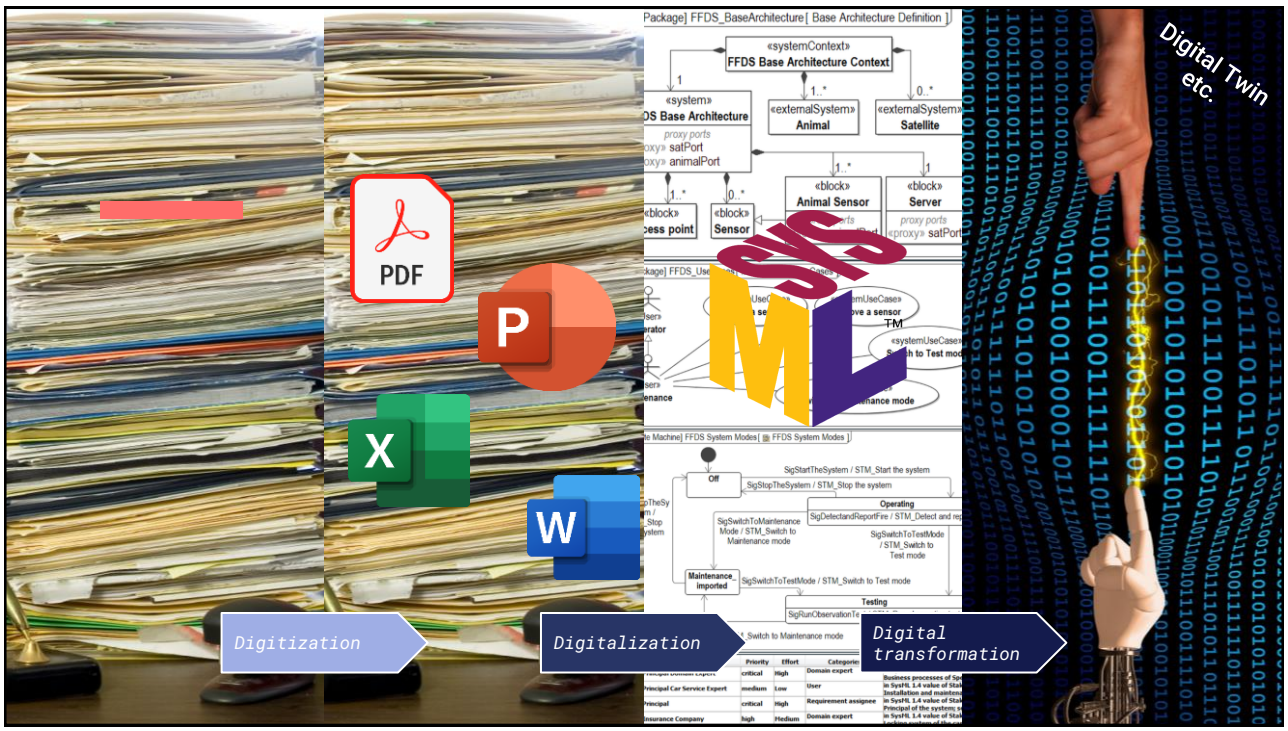

30

Modeling is not Drawing

„A picture is worth a thousand words…

…and a model is worth a thousand pictures." (Andreas Willert)

31

Let's talk machine!
The Digital Transformation of Systems Engineering

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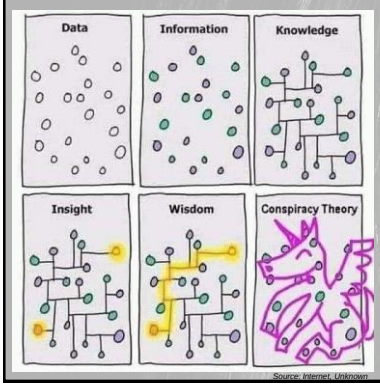
INCOSE Symposium 2023



Source: Internet, Unknown

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