2019 IBIS Touchstone Survey

Summary and Data

The IBIS Open Forum would like to thank the 88 people who took our IBIS Touchstone Survey in April and May of 2019. The purpose was to guide further development on the Touchstone file specification. A good combination of model makers, tool developers, and model users responded. About 88% of respondents had made Touchstone files, although only 49% reported making Touchstone 2.0 files. The good news is that the survey gathered results from people who seemed to have good familiarity with Touchstone, even the latest 2.0 version.

Key questions in the survey asked how people felt about current proposals for enhancements to the Touchstone 2.0 specification, and if they had any new proposals. Some themes were dominant.

Physical mapping

First, people wanted Touchstone files to formally identify the mapping of ports to the physical terminals they represented. Without that, users must check comments or documentation to ensure that ports are connected properly in simulation circuits. IBIS 7.0 offers relief for component package and die Touchstone model files, by providing those mappings in separate IBIS files. Users of extracted Touchstone files representing PCB channels, interposers and cables will still be on their own setting up simulations.

Size reduction

The sizes of Touchstone files are increasing as they are used for every larger and more complex interconnect, and as the required frequency range increases. Some proposed binary formats, while others pleaded to keep Touchstone files human readable. Other proposals were sparse matrix formats and reduced order representations such as pole-zero modeling.

Compatibility

Compatibility was important. Some people wanted any new Touchstone format to be readable by existing tools, even ones that can accept only Touchstone 1 files. That's a tall order, given that Touchstone 2.0 files already demand that new parsers look for content that might confuse older parsers. Nevertheless, new development efforts may be able to keep this in mind and maximize compatibility.

IEEE P370

The IEEE P370 "Electrical Characterization of High Speed Interconnect" working group was mentioned. That group has expressed an interest in enhancing Touchstone to include header keywords related to any IEEE P370 standard measurement methods used to produce the data. Another related survey response called for better quality Touchstone data, which is the purpose of IEEE P370.

Digging in deeper

The full survey results are found on the following pages. If you have questions or wish to offer your own feedback, please email touchstone@ibis.org.

# Q1 Please classify your primary use of Touchstone files:

Answered: 88   Skipped: 0
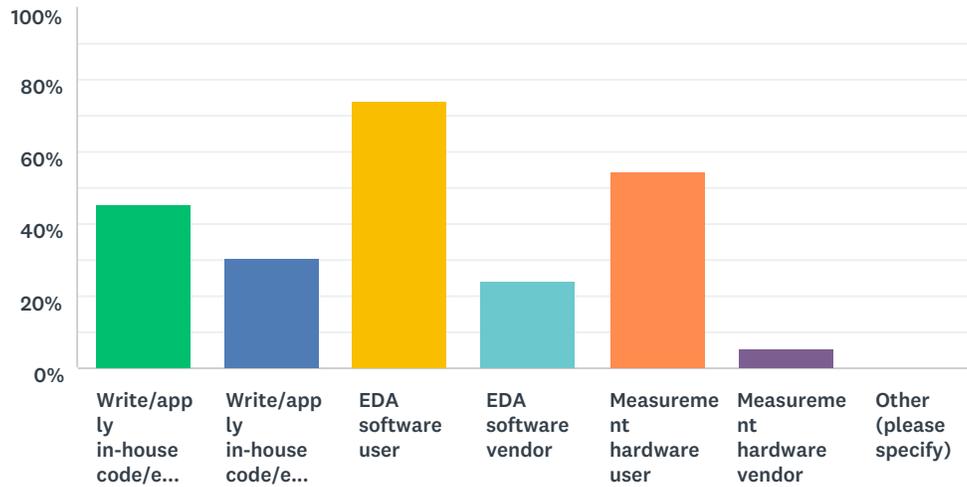
ANSWER CHOICES	RESPONSES	
Write/apply in-house code/executables to read Touchstone files	45.45%	40
Write/apply in-house code/executables to write Touchstone files	30.68%	27
EDA software user	73.86%	65
EDA software vendor	23.86%	21
Measurement hardware user	54.55%	48
Measurement hardware vendor	5.68%	5
Other (please specify)	0.00%	0
Total Respondents: 88		

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

Q2 Is your company an EDA vendor, model maker, model user (your *primary* business)?

Answered: 88   Skipped: 0
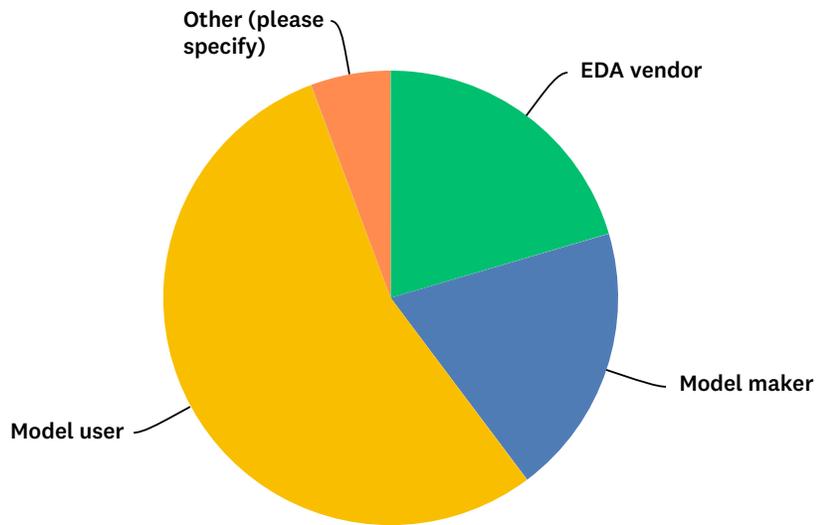
ANSWER CHOICES	RESPONSES	
EDA vendor	20.45%	18
Model maker	19.32%	17
Model user	54.55%	48
Other	0.00%	0
Other (please specify)	5.68%	5
TOTAL		88

#	OTHER (PLEASE SPECIFY)	DATE
1	Model maker + user	5/17/2019 10:44 AM
2	no	5/10/2019 4:59 AM
3	automation technology	4/29/2019 3:22 AM
4	nothing of the above	4/27/2019 9:16 AM
5	material supplier	4/26/2019 12:35 PM

Q3 Have you ever created Touchstone files?

Answered: 88   Skipped: 0
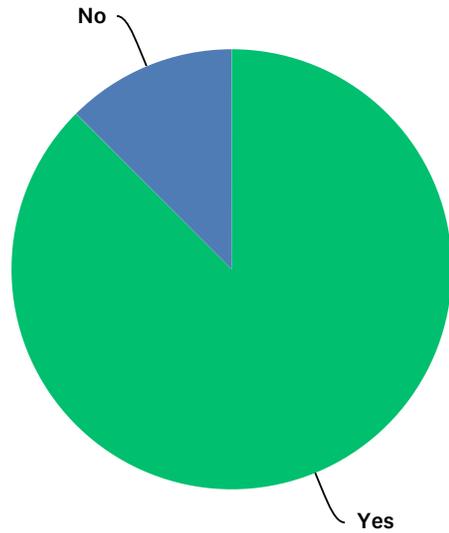
ANSWER CHOICES	RESPONSES	
Yes	87.50%	77
No	12.50%	11
TOTAL		88

Q4 Have you heard of Touchstone 2.0?

Answered: 88   Skipped: 0
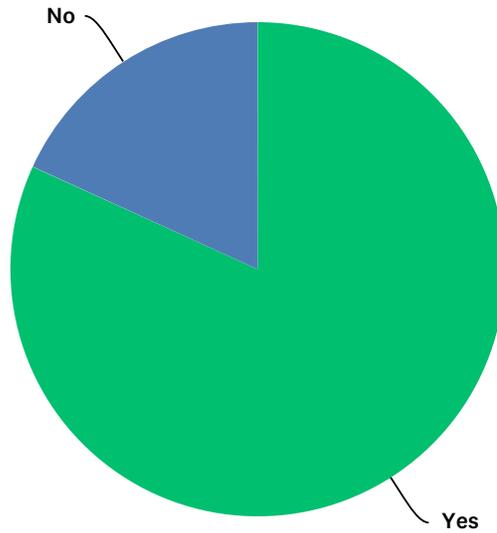
ANSWER CHOICES	RESPONSES	
Yes	81.82%	72
No	18.18%	16
TOTAL		88

Q5 Have you ever used Touchstone 2.0 files?

Answered: 69   Skipped: 19
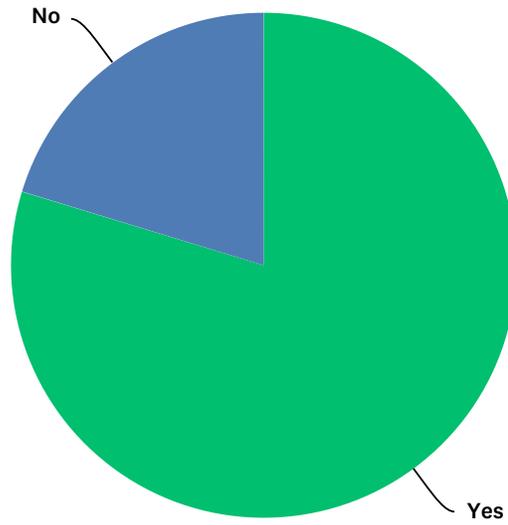
ANSWER CHOICES	RESPONSES	
Yes	79.71%	55
No	20.29%	14
TOTAL		69

Q6 Have you ever used the TSCHK2 parser?

Answered: 69   Skipped: 19
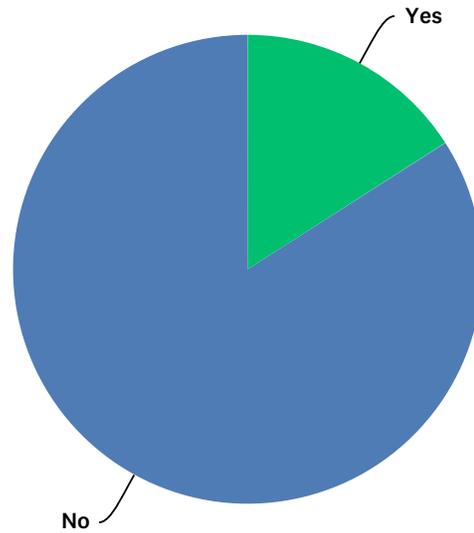
ANSWER CHOICES	RESPONSES	
Yes	15.94%	11
No	84.06%	58
TOTAL		69

# Q7 Do you have software that can read Touchstone 1.0 files but cannot read Touchstone 2.0 files?

Answered: 69   Skipped: 19
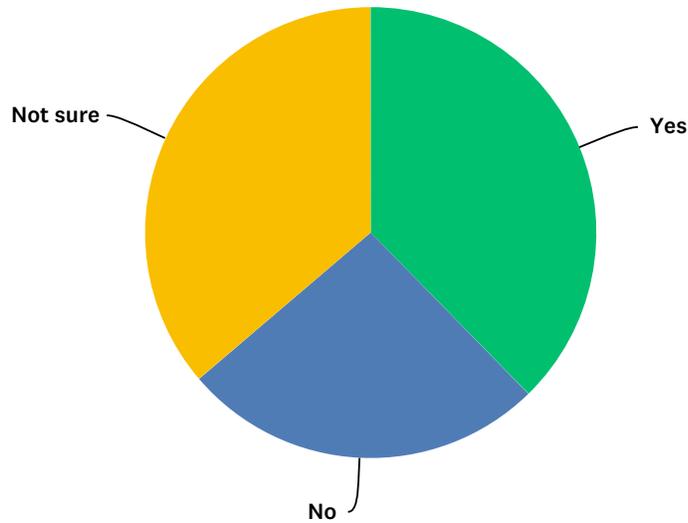
ANSWER CHOICES	RESPONSES	
Yes	37.68%	26
No	26.09%	18
Not sure	36.23%	25
TOTAL		69

Q8 Have you ever created Touchstone 2.0 files?

Answered: 69   Skipped: 19
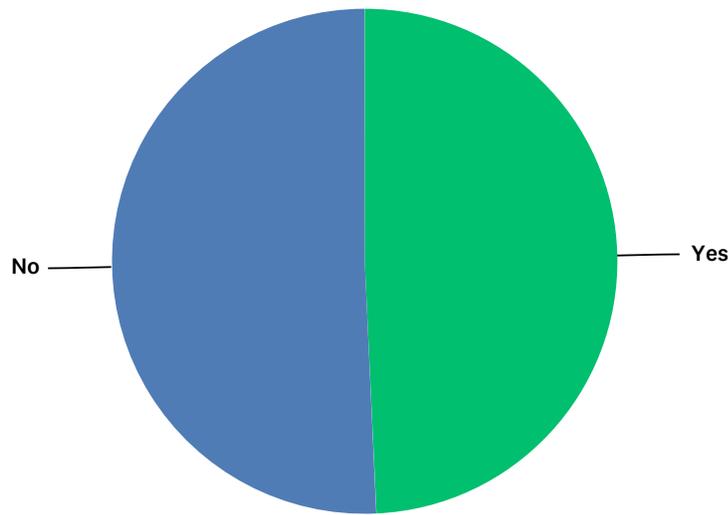
ANSWER CHOICES	RESPONSES	
Yes	49.28%	34
No	50.72%	35
TOTAL		69

Q9 Please rank, by dragging, these commonly discussed features you most want to see added to Touchstone, in order of priority (1 = highest priority):

Answered: 75   Skipped: 13
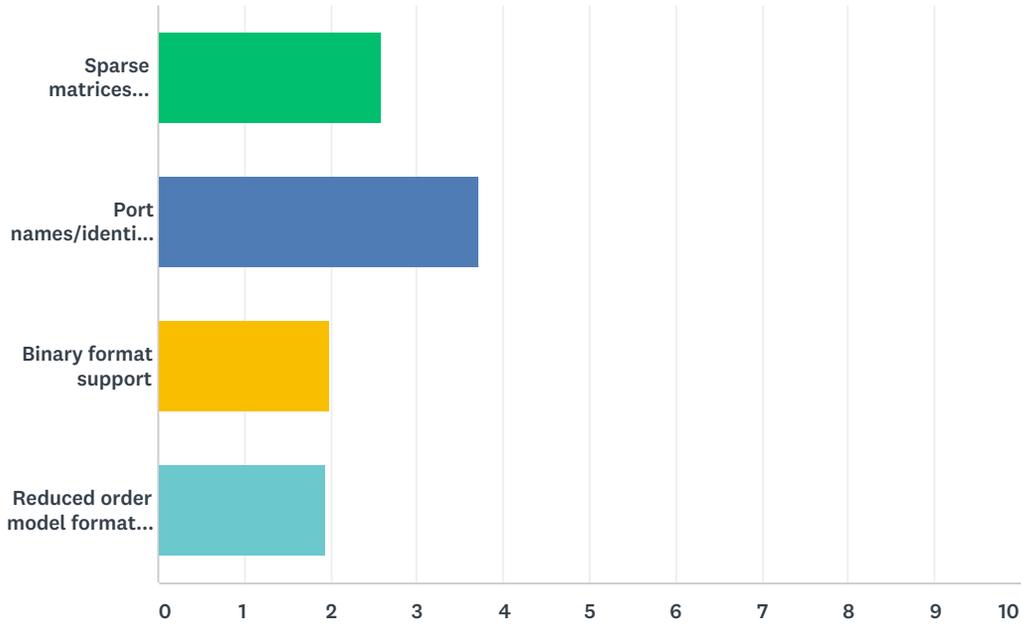
	1	2	3	4	N/A	TOTAL	SCORE
Sparse matrices support	14.67% 11	33.33% 25	21.33% 16	13.33% 10	17.33% 13	75	2.60
Port names/identification in the file	70.67% 53	17.33% 13	4.00% 3	0.00% 0	8.00% 6	75	3.72
Binary format support	6.67% 5	14.67% 11	29.33% 22	29.33% 22	20.00% 15	75	1.98
Reduced order model format such as pole-zero	2.67% 2	22.67% 17	26.67% 20	33.33% 25	14.67% 11	75	1.94

Q10 Any other comments (e.g., other features or capabilities you need in Touchstone)?

Answered: 14   Skipped: 74

#	RESPONSES	DATE
1	allowing users to make any port any impedance is dangerous. I think if offers more potential problems than benefits.	5/16/2019 5:50 AM
2	Any change must be compatible with existing Touchstone or be treated as a brand new specification	5/11/2019 7:32 PM
3	IEEE P370 keyword support	5/10/2019 7:01 AM
4	Please consider releasing a reference parser/writer in a common programming language and a test suite with different file formats/contents under an open source/permissive license. This will help in speeding up the adoption of any new Touchstone format..	5/10/2019 5:06 AM
5	Optimization for file size: connector vendor 3x3 matrix of diff pairs extracted to 40GHz is a 300MB file. Evaluating multiple connectors becomes a Gigabytes-with an S- project.	5/1/2019 4:18 PM
6	1. regarding port names/identificaiton in the file: currently we include this information in the header (comments). If this becomes as a part of standard, it can increase complexity of the file. 2. regarding binary format support: I do not recognize the importance of the binary format support. ASCII code format only allowance was not good. It created unnecessary errors. if binary format support can resolve the issue, it would be great. 3. regarding the reduced order model format, the format would simplify the data definitely. but not sure if that's consistent with the common usage of the touchstone file... if there is no ohter format to macro model the data which is portable to various EDA tools, then this would be a good idea.	4/30/2019 12:08 PM
7	this is in line with the port name, but it is most important that the paired differential ports are identified.	4/30/2019 11:15 AM
8	the format should remain readable for humans	4/29/2019 3:34 AM
9	experimental binary format similar to touchstone: cf. lydite-Format at https://github.com/fuesika/fortran-lydite	4/29/2019 3:02 AM
10	drop v.2, consider xml for v.3, add time domain support	4/27/2019 9:24 AM
11	No comments	4/27/2019 1:44 AM
12	The biggest problem I have with Touchstone files is lack of documentation on physical port mapping.	4/26/2019 2:04 PM
13	Quality of Touchstone files is a big problem. Especially large ones. Would be good to have some sort of quality metrics and put them as comments in the header. Passivity, Causality, Reciprocity, max phase delta are some that come to mind.	4/26/2019 10:53 AM
14	Touchstone 1 parsers should be able to read Toucshtone X files if they do not use features beyond Toucshtone 1 (Walter Katz/SiSoft)	4/26/2019 10:05 AM