

## **Building on the European Exascale Approach: SC13 BOF Summary**

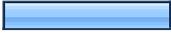
Led by Europe's three complementary exascale research projects, CRESTA, DEEP and Mont-Blanc, the aim of this BOF was to explore different exascale strategies and looking to build the project's exascale community beyond Europe. The BOF was well attended, with an estimated 90-100 people. Chaired by Dr.-Ing. Bernd Mohr, key representatives from the three projects answered questions and contributed to a lively discussion.

The BOF began with the representatives giving a short overview of their projects. CRESTA highlighted their software co-design approach, which they couple with a mix of incremental and disruptive strategies. DEEP described their architecture, which provides a bridge between a highly scalable architecture and a low-medium scalable architecture (general purpose). Mont-Blanc described their use of European skills in embedded computing and their use of low-power mobile technologies.

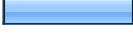
This was followed by an interactive question and answer session, discussing questions such as whether the European approach, which utilises a very large number of codes, has an advantage over e.g. the three US co-design centres. There was a series of specific questions about the project's hardware and hardware assumptions. IO and Big Data issues were raised, as were the mechanisms used for addressing dynamic scaling issues within the applications. The BOF finished with an interesting discussion on the legacy of each of the projects.

Associated with the BOF, the project's prepared an on-line questionnaire. This was publicised at the BOF and via email and made available on the European Exascale Booth. 54 people responded, of these 17 attended the BOF. This asked questions about the European approach to achieving exascale as well as questions about the approach of other countries and continents. A summary of these results is enclosed.

**1. How confident are you that the European approach to solving the exascale challenge will result in an exascale system?**

		Response Percent	Response Count
Very confident		20.8%	11
<b>Confident</b>		<b>35.8%</b>	<b>19</b>
Moderately confident		26.4%	14
Unsure		13.2%	7
Not confident		3.8%	2
<b>answered question</b>			<b>53</b>
<b>skipped question</b>			<b>1</b>

**2. How confident are you that the European approach to solving the exascale challenge will result in exascale enabled European applications and software?**

		Response Percent	Response Count
Very confident		25.9%	14
<b>Confident</b>		<b>44.4%</b>	<b>24</b>
Moderately confident		20.4%	11
Unsure		9.3%	5
Not confident		0.0%	0
<b>answered question</b>			<b>54</b>
<b>skipped question</b>			<b>0</b>

### 3. Are you aware of the research and development funds available from the European Commission to achieve Exascale?

		Response Percent	Response Count
Yes		94.4%	51
No		5.6%	3
<b>answered question</b>			<b>54</b>
<b>skipped question</b>			<b>0</b>

### 4. Do you believe the scale of European investment is appropriate in order to achieve Exascale?

		Response Percent	Response Count
More investment is needed		77.8%	42
Current investment is sufficient		9.3%	5
Unsure		13.0%	7
<b>answered question</b>			<b>54</b>
<b>skipped question</b>			<b>0</b>

### 5. Do you think Europe has laid out a credible plan to achieve Exascale?

		Response Percent	Response Count
Yes		18.5%	10
<b>Probably</b>		<b>38.9%</b>	<b>21</b>
Maybe		27.8%	15
Unlikely		13.0%	7
Definitely not		1.9%	1
Unsure		0.0%	0
<b>answered question</b>			<b>54</b>
<b>skipped question</b>			<b>0</b>

### 6. Are you aware of the following European HPC and Exascale projects and initiatives? (You may select more than one option)

		Response Percent	Response Count
<b>PRACE</b>		<b>100.0%</b>	<b>54</b>
EESI and EESI-2		51.9%	28
HPC Planet		16.7%	9
ETP4HPC		64.8%	35
<b>answered question</b>			<b>54</b>
<b>skipped question</b>			<b>0</b>

### 7. Do you think further investment is needed in developing European software and applications for exascale?

		Response Percent	Response Count
Yes, significant investment		61.1%	33
Yes, some investment		33.3%	18
No		1.9%	1
Unsure		3.7%	2
answered question			54
skipped question			0

### 8. Do you think further investment is needed in developing European hardware for exascale?

		Response Percent	Response Count
Yes, significant investment		55.6%	30
Yes, some investment		24.1%	13
No		7.4%	4
Unsure		13.0%	7
answered question			54
skipped question			0

### 9. How significant is the power problem for future exascale platforms?

		Response Percent	Response Count
Unsolvable		0.0%	0
<b>Only solvable with revolutionary technology</b>		<b>59.3%</b>	<b>32</b>
Solvable with evolution of current technology		40.7%	22
Easily solvable		0.0%	0
<b>answered question</b>			<b>54</b>
<b>skipped question</b>			<b>0</b>

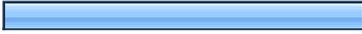
### 10. How significant is the resiliency problem for future exascale platforms?

		Response Percent	Response Count
Unsolvable		0.0%	0
Only solvable with revolutionary technology		41.5%	22
<b>Solvable with evolution of current technology</b>		<b>58.5%</b>	<b>31</b>
Easily solvable		0.0%	0
<b>answered question</b>			<b>53</b>
<b>skipped question</b>			<b>1</b>

## 11. How significant is I/O for future exascale platforms?

		Response Percent	Response Count
Unsolvable		0.0%	0
Only solvable with revolutionary technology		40.4%	21
<b>Solvable with evolution of current technology</b>		<b>59.6%</b>	<b>31</b>
Easily solvable		0.0%	0
<b>answered question</b>			<b>52</b>
<b>skipped question</b>			<b>2</b>

## 12. What level of co-design is required to develop exascale hardware, software and applications using a co-design approach?

		Response Percent	Response Count
Full integration across the whole hardware/ software/ application stack		30.8%	16
<b>Integration across key layers of the hardware/ software /application stack</b>		<b>57.7%</b>	<b>30</b>
Some integration		11.5%	6
No integration		0.0%	0
<b>answered question</b>			<b>52</b>
<b>skipped question</b>			<b>2</b>

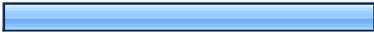
### 13. What application areas do you think will be able to exploit exascale technology?

	Response Count
	22
answered question	22
skipped question	32

### 14. Which country or continent do you think will build the first exascale computer?

		Response Percent	Response Count
US		35.8%	19
Japan		3.8%	2
Europe		13.2%	7
<b>China</b>		<b>47.2%</b>	<b>25</b>
None		0.0%	0
	Other (please specify)		0
	answered question		53
	skipped question		1

**15. Which country or continent do you think Europe should look to collaborate with over exascale developments (you may choose more than one option)?**

		Response Percent	Response Count
US		81.5%	44
Japan		59.3%	32
Europe		53.7%	29
China		33.3%	18
Other		5.6%	3
None		3.7%	2

Provide further details of potential collaborations and the associated countries 2

answered question 54

skipped question 0

**16. Did you attend any of the following events? (you may choose more than one option)**

		Response Percent	Response Count
SC13		96.0%	24
The SC13 European Exascale BOF		68.0%	17

answered question 25

skipped question 29