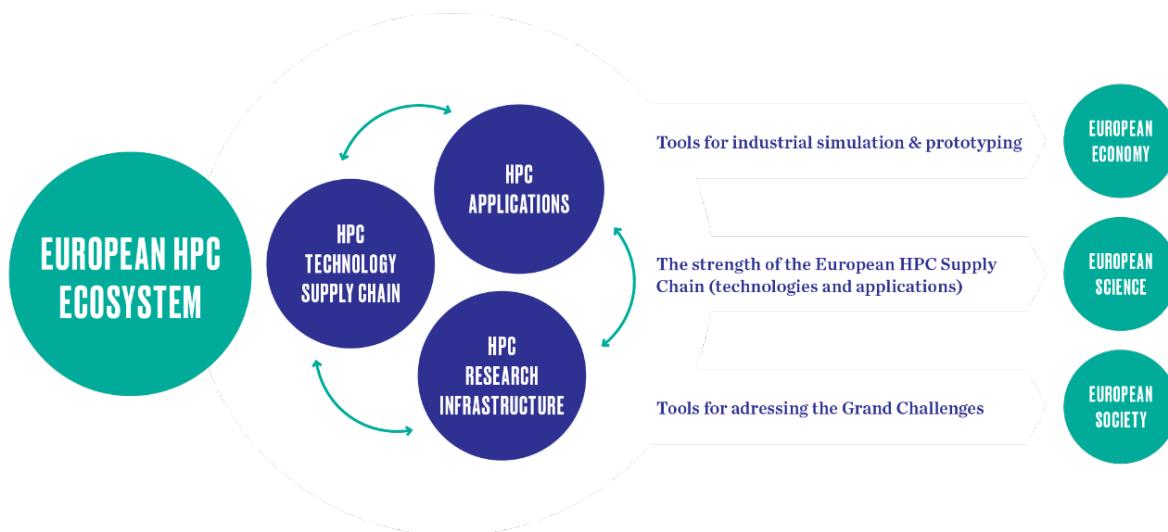




# A short summary of the development of European HPC 2017

What follows below is a **short summary of the development of European HPC**. There is a list of documents and links at the end of this page which can be used as references (also several links are included in the text).

1. European HPC is based on three pillars: Research Infrastructure ([PRACE](#) - Partnership for Advanced Computing in Europe), HPC Technology (represented by [ETP4HPC](#)) and Application Expertise (developed through the [Centres of Excellence in Computing Applications](#) (CoEs)). PRACE is the European HPC infrastructure for science - it runs calls for academic projects to be executed in its network of supercomputing resources across Europe. It also runs a HPC programme for SMEs called [SHAPE](#) - SME HPC Adoption Programme in Europe. ETP4HPC is a HPC industry-led think tank. The CoEs are projects that consolidate the European HPC applications expertise.



2. The development of European HPC is based on an EC strategy paper from 2012 - [Communication "High Performance Computing \(HPC\): Europe's place in a global race"](#). This document stipulates the operation of the three pillars above.

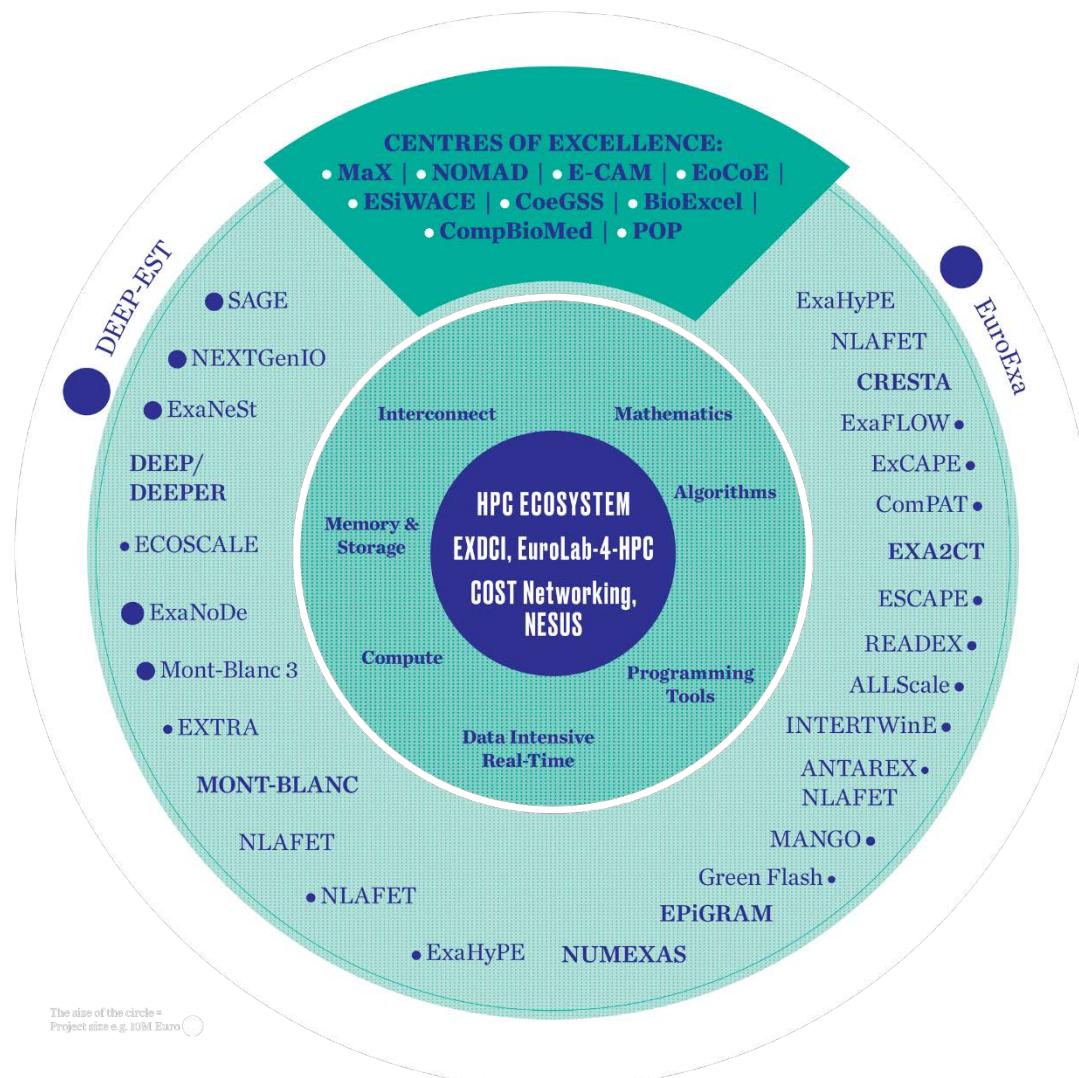
3. The Technology and the Applications pillar of the ecosystem form a contractual [Public-Private Partnership](#) (cPPP) with the European Commission. The objective of the cPPP is the development of European HPC technology and applications. The cPPP monitors the implementation of the European HPC strategy and its board meets twice a year. It serves as a forum in which the stakeholders involved have an opportunity to discuss this process with the EC and exchange mutual commitments.

4. The European HPC strategy also provisions the establishment of a European HPC Technology Platform, which is now ETP4HPC (our association). At the moment, EU industry provides about 5% of HPC resources worldwide, but consumes one third of them and our objective is to increase the market share of the European technology vendors. Our main deliverable is the European HPC Technology Roadmap - Strategic Research Agenda ([SRA](#)). ETP4HPC is led by European HPC technology vendors and it also includes research centres and users.

5. The strategy above was 'upgraded' in 2016 - Europe has now ambitious plans within its [European Cloud Initiative](#). One objective of the European Cloud initiative is to have a supercomputer based on EU technology amongst the world top three by 2022.

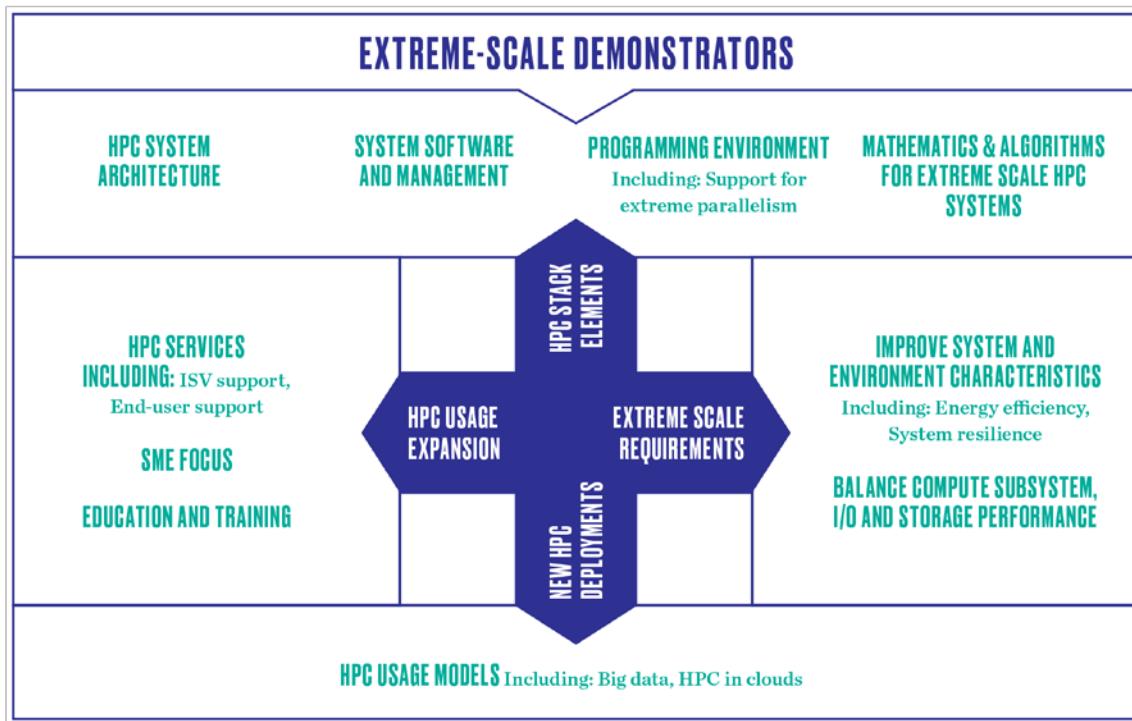
6. The European HPC ecosystem is coordinated by the [EXDCI](#) project (European eXtreme Data and Computing Initiative - coordinating the European HPC Strategy). EXDCI organises an annual event called the 'European HPC Summit Week'.

7. The European Commission runs 'calls' for proposals for projects in the area of technology and application. A total of €700m has been committed to the development of HPC technology and applications within the EC Horizon 2020 programme. A summary of the FP7-funded (the previous programme) technology projects can be found [here](#) whilst a list of all Horizon 2020 FETHPC (Future and Emerging Technologies - HPC) funded projects is [here](#). EXDCI has a web page (<https://exdci.eu> - click on 'Collaboration') dedicated to summaries of all the European Projects. The current (as of Aug 2017) open HPC technology call can be found [here](#). Below is the current landscape of European HPC projects (the size of the dots indicating the project funding – e.g. Mont-Blanc 3 = 8M Euro).



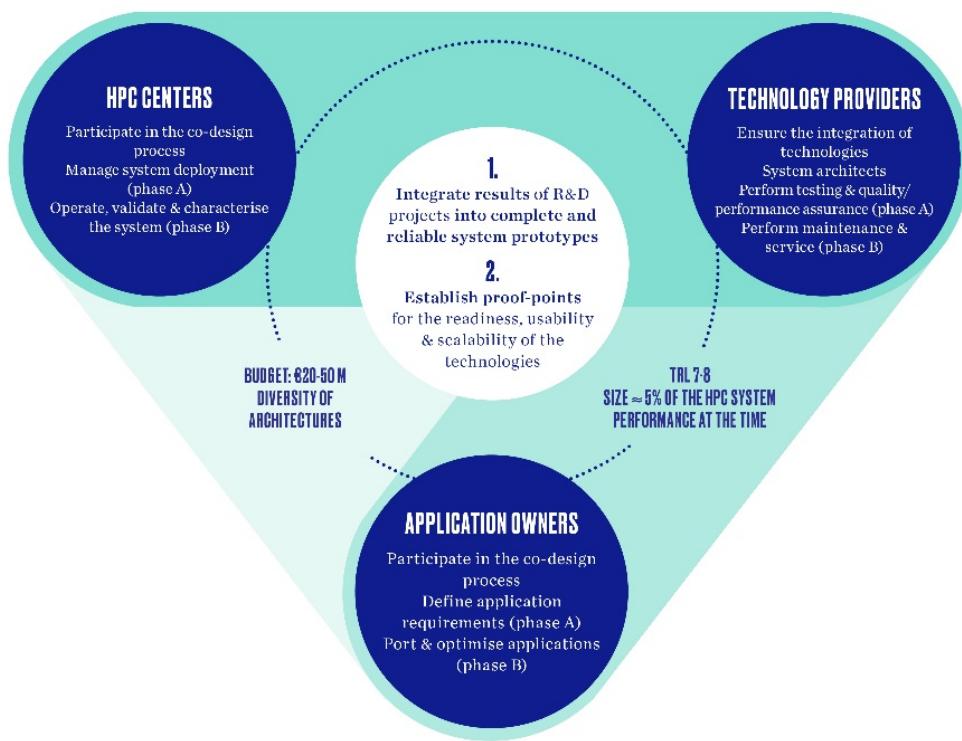
8. The EC HPC Technology (and other - e.g. application) calls are based on the [Strategic Research Agenda](#) (SRA) by ETP4HPC. The SRA is the European Roadmap towards Exascale and it is the work of ETP4HPC experts. As we speak (Aug 2017), we are working on its third

issue (a second full version), which should cover the period until the end of Horizon 2020 programme. Each project submitted within this programme should address challenges identified in the SRA. The model on which we build our SRA upon is:



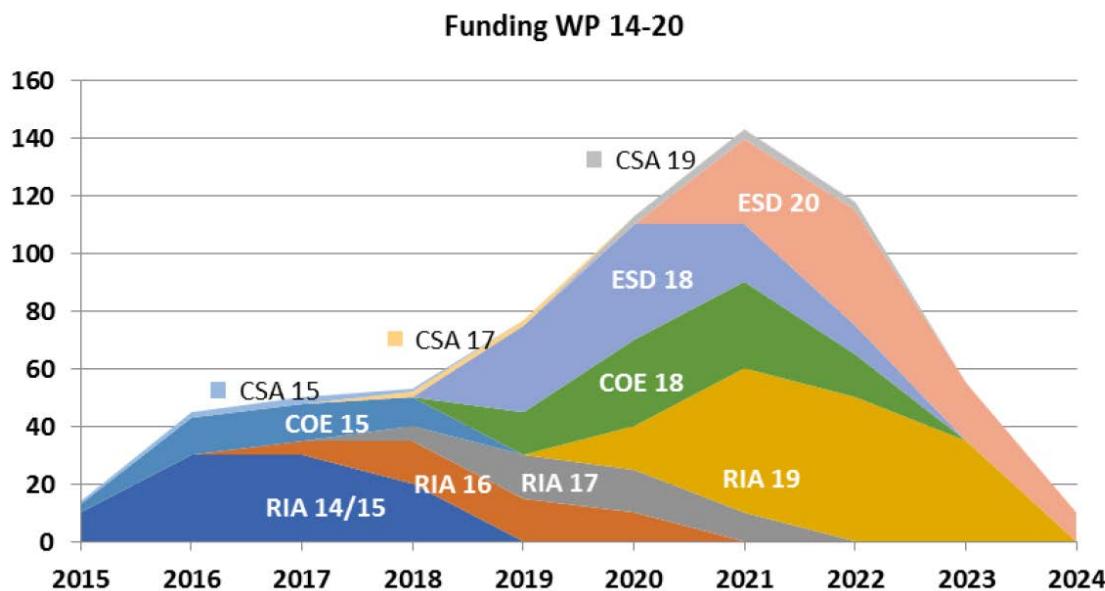
9. The current SRA work has two priorities (apart from addressing the technological areas of HPC development): 1-Extreme-scale Demonstrators (EsDs) and 2-Big Data. The [EsDs](#) are the prototypes of the future European exascale machines and we have developed their specifications and requirements, to be included in the SRA and implemented via an EC call. [Our dialogue with the European Big Data Community \(BDVA - Big Data Value Association\)](#) aims at synchronising the efforts of the two communities. Some sections of our SRA and the BDVA Roadmap will reflect this work. The image below explains the role of the EsDs.

## EXTREME-SCALE DEMONSTRATORS



10. It is expected that there will be at least one call for EsDs (prototypes) and a new call for CoEs (application expertise) until the end of the Horizon 2020 programme. The details of the remaining part of the programme will be communicated in Q4 2017. If our suggestions are accepted, the total Horizon 2020 funding will look like this:

## H2020 HPC WORK PROGRAMME – DURATION/VALUES (EURO Ms)

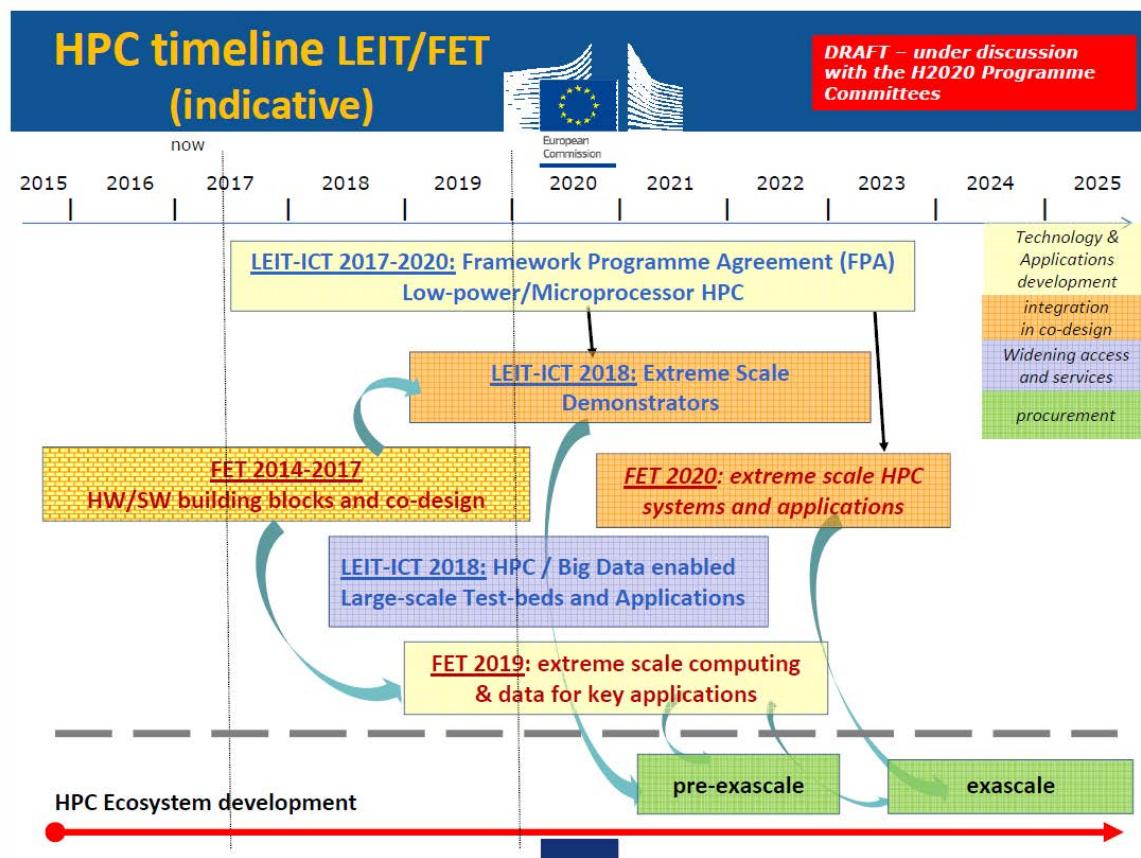
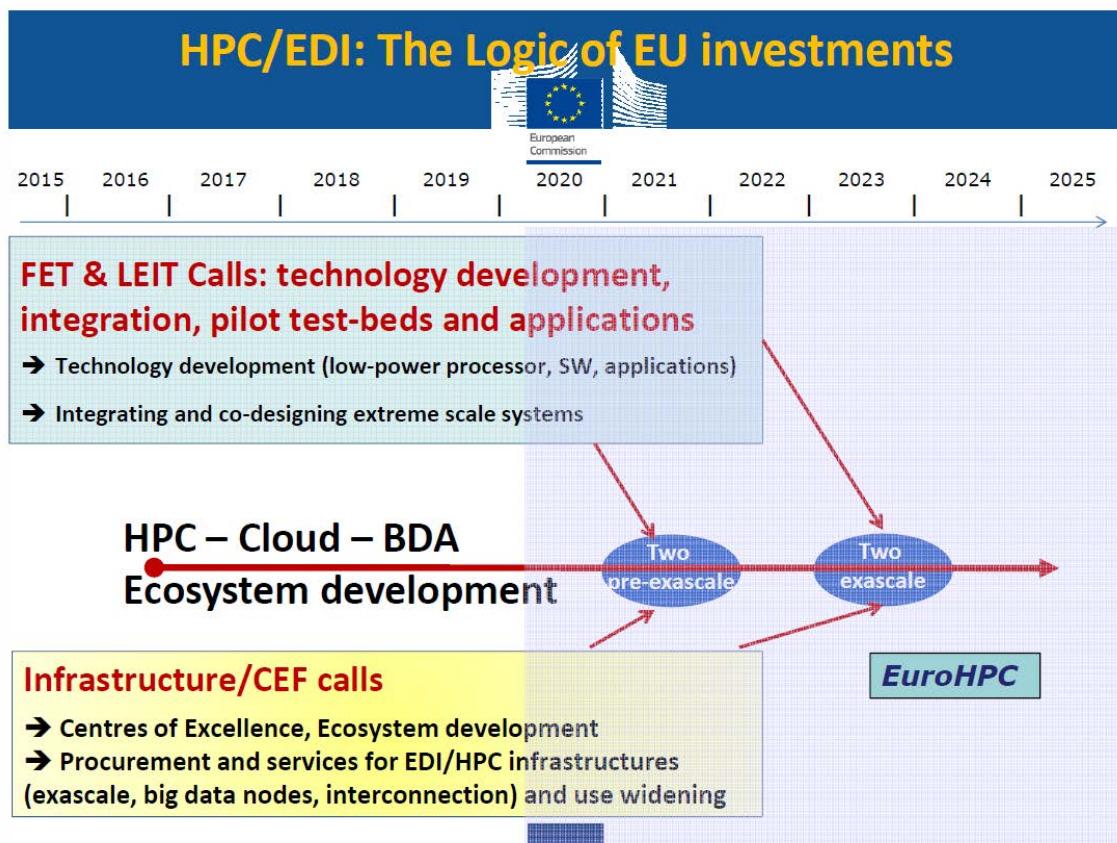


11. [EuroHPC](#) is an initiative signed by seven European countries committing to the delivery of European world-class HPC systems. The target is to have at least two pre-exascale computers by 2020 and reach full exascale performance by 2023. The objective is also to define test-beds for HPC and big data applications that make use of these supercomputers for scientific, public administration and industrial purposes.

12. There is also a [call](#) for the development of European low-power processor technology. It is expected that these project will interact with the other parts of the eco-system and the results of this work will feed into the delivery of the Extreme-scale Demonstrators and also the European pre-exascale and exascale systems.

13. There is also an Important Project of Common European Interest ([IPCEI](#)) on HPC and Big Data Enabled Applications, which serves as a financing mechanism for the European exascale ambitions.

**14. The logic around the EU investments (as described above - i.e. the FET and CoE calls, EsDs, EuroHPC, low-power processor, etc.) and their time-line is shown below (courtesy of the European Commission). /FET = Future and Emerging Technologies, LEIT = Leadership in Enabling and Industrial Technologies, ICT = Information and Communication Technologies, CEF = Connecting European Facility/**



15. ETP4HPC has issued a [Position paper](#) (2015) to define its international collaboration strategy. ETP4HPC helps the European Exascale projects develop international

collaboration relationships. This work is being carried out within the [EXDCI](#) project, which its objective is in coordinating the entire European HPC strategy.

**References:**

[EU site on European HPC Strategy](#)

[PRACE](#) - Partnership for Advanced Computing in Europe

[SHAPE](#) - SME HPC Adoption Programme in Europe

[cPPP](#) - contractual Public-Private Partnership

[Digital Single Market](#)

[European Cloud Initiative](#)

[EXDCI](#) - European eXtreme Data and Computing Initiative - the European HPC strategy coordination project

[SRA](#) - ETP4HPC Strategic Research Agenda

[BDVA](#) - the European Big Data Value Association

[EuroHPC](#)

[IPCEI](#) - Important Project of Common European Interest on HPC and Big Data Enabled Applications

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