Buying for tomorrow: HPC procurement matters

Ingrid Barcena
KU Leuven
My first HPC system purchase!
Who am I

My first HPC system procurement!

600k
Who am I

UNIVERSITAT DE BARCELONA
GRANT AT THE SYSTEMS AND DEVELOPMENT DEPARTMENT
Barcelona, Catalonia

UNIVERSITY OF BARCELONA
POSTGRADUATE RESEARCH IN COMPUTATIONAL CHEMISTRY
Barcelona, Catalonia, Spain

UNIVERSITY OF BARCELONA
MASTER IN CHEMISTRY
Barcelona, Catalonia, Spain

CESCA
SCIENTIFIC SOFTWARE EXPERT
LEADER EXPERT IN SUPERCOMPUTING AND DRUG DESIGN

CESCA
HPC STORAGE AND E-ADMINISTRATION MANAGER
Barcelona, Catalonia

KU LEUVEN
HPC EXPERT
Leuven, Belgium

KU LEUVEN
TIER-I PROJECT LEADER
Leuven, Belgium

90 91 92 93 94 95 96 97 98 99 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16

600k 500k 600k 300k 400k 100k 600k

SW

100k 2 M

100k 600k

5,5 M
Who am I

UNIVERSITY OF BARCELONA
POSTGRADUATE RESEARCH IN COMPUTATIONAL CHEMISTRY
Barcelona, Catalonia, Spain

UNIVERSITAT DE BARCELONA
GRANT AT THE SYSTEMS AND DEVELOPMENT DEPARTMENT

CESCA
SCIENTIFIC SOFTWARE EXPERT
LEADER EXPERT IN SUPERCOMPUTING AND DRUG DESIGN

CESCA
HPC, STORAGE AND E-ADMINISTRATION MANAGER
Barcelona, Catalonia

KU LEUVEN
HPC EXPERT
Leuven, Belgium

KU LEUVEN
TIER-1 PROJECT LEADER
Leuven, Belgium

2 M
100k
12

600k
500k
600k
300k
400k
100k
600k
SW
100k
SW
600k
2 M
5,5 M

KU LEUVEN
Disclaimer

All information contained on this presentation is based in

All opinions expressed during this presentation are

The information contained on this talk is provided as it is.
I will not be liable if when using it you end buying
Let’s start with the basics ..... 

Most important goal when buying a supercomputer/HPC system ?

A. Buy the system I like the most

B. Buy the coolest and newest HPC system in the market

C. Buy the cheapest system possible

D. Buy the fastest system possible

E. None of the above
The answer!

Buying

the best system for the users

at the best price
The answer!

Buying

the best system for the users

at the best price
Buying HPC systems is easy
Buying HPC systems is “not that” easy

Step 1 to 4:
- 1-2 years
- 4-5 years
Buying HPC systems is complex

- Need people
- Need Time
- Need Money
- Cost money
- Have unknowns
- Have risk
And there is no “one fits all”

- Different needs
- Different legislation
- Different cultures

Every system is different!
Buying HPC systems is even more complex
People

- The Director
- THE users
- YOU (PM)
- The technical team
- The suppliers
- Purchase department
- Colleagues from other centers
Buying HPC systems is “not that” easy
That's the most important step: take your time!
Requirements

- Market Survey (RFI)
- End User’s Needs
- Search for references
Requirements

Market Survey (RFI)

- Talk with the suppliers (RFI)
  - Tell them your ideas/wishes
  - Listen to their feedback
- Make it officially (part of the procurement)
- Understand what is possible with your budget
- Be aware about the products roadmaps
Requirements

End User’s Needs

• Look at the current system usage
• Gather user’s needs:
  • Survey your user base
  • Extended interview with key users
• Use your expertise to anticipate needs
Requirements

• Look what others are buying (or NOT buying)

• Ask peer institutions
  • RFP
  • System references
  • Vendor references
Requirements

- Space
  - Do not underestimate (10% budget)
  - Is it ready?
  - Is it enough?
  - Does it need to be included in the RFP?

- Power
  - Is it enough?

- Budget
Requirements

OS

- Do not underestimate (5-10% budget)
- Does it need to be included in the RFP?
- Think about features more than brands
- Are they commercial licenses involved?

Cluster Management

Monitoring and reporting
Requirements

Hardware
- Do not underestimate (10% budget)
- Which type of Storage do you need?
  - Local (SSD)
  - Shared (GPFS/Lustre)
- Does it need to be included in the RFP?
- Who is going to do the integration? (if any)
- Set performance targets

Integration

Performance
Requirements

Installation

• Do not underestimate (10% budget)
• Does it need to be included in the RFP?

Maintenance

• Be specific about the requirements:
  • Maintenance: Level/response time
  • Training: content/hours/people
  • Consulting: content/hours

Training and consulting
Requirements

Benchmarks

• Benchmarks take time (you and suppliers)
  • Adapt them to the system budget

• Which ones:
  • Real workload (User cases)
  • Real workload (Standard cases)
  • Standard benchmarks
  • Synthetic benchmarks
    • CPU
    • Memory
    • Network
    • Storage
Requirements

Benchmarks

- Benchmarks take time (you and suppliers)
  - Adapt them to the system budget

- Which ones:
  - Real workload (User cases)
  - Real workload (Standard cases)
  - Standard benchmarks
  - Synthetic benchmarks
    - CPU
    - Memory
    - Network
    - Storage

Understand what are you doing
Requirements

- Ask suppliers to commit to results
  - Minimum performance
  - Accepted error vs committed
- Use the ready to production system
- Be prepared for the worse
Procurement

- Write the RFP
- Ask suppliers to bid
- Evaluate
- Announce
Procurement Requirements

• Make it simple, clear and if possible short
• Ensure there is enough time to answer
• If you do not need/care – DO NOT ASK!
• Check you don’t leave anyone behind
• Let the suppliers help you:
  • Mandatory vs Target requirements
  • Innovation

Do not rush!
Procurement

• Set up the rules clearly:
  • Quality
  • Performance
  • Total Cost of Ownership
• Check it is robust: what if simulations

• Use “observed” specs rather than theoretical
  • Define the values (absolute/relative)
  • Define how they will be evaluated

• Give them the opportunity to explain
Procurement Fairness

- Learn your legal framework
- Stop any one-to-one communication
- Treat all them equally
- Written Q&A:
  - Keep record of it
  - Distributed to everyone
  - Refer to the RFP when possible

You can change your mind!
Procurement

Fairness

• Learn your legal framework
• Treat all them equally
• Ensure it is:
  • Consistent
  • Robust
  • Justifiable
Procurement

Stackholders

• Explain your decision
  • Make sure they see the value
  • Listen if they disagree and reconsider
  • Make sure they support the decision
Procurement

- Explain your decision to the loosers
  - Offer debriefing
  - Ensure they understand the decision
  - Avoid complains

Suppliers

You want them next time!
Installation

Customer side

• Select the right person
• Request the supplier to provide a PM
• Problems will appear
  • Manage them appropriately
  • Have a plan B
  • Plan time to recover from them
  • Transfer the risk (when possible)

Supplier side

Installation

Define it clearly

• Only ask for what you can
• Be part of the process
• Help the supplier (if needed)
• Some issues can be transferred to maintenance
Installation

Test, test, test

- Find the issues before production
- Involve your users
- Plan your resources to work on solutions
- If possible make it part of the acceptance

Users will try things you can not even imagine!
Do not forget the most important Lessons Learned
My 5 B’s of advice

- B organized
- B fair
- B flexible
- B open
- B reasonable
Thank you!

Ingrid Barcena

Ingrid.barcenaroig@kuleuven.be