







**And if We Did it All Again...?**

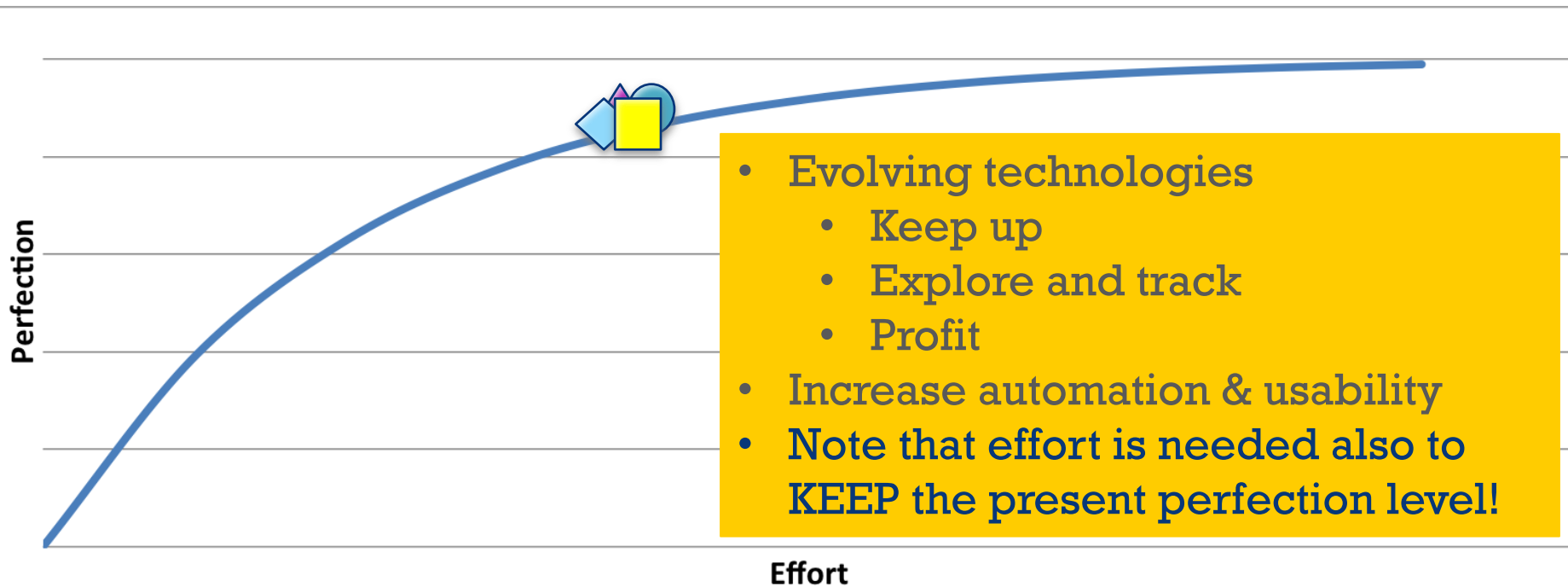
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# + DAQ@LHC: What did I learn?

- We've been extremely successful at solving the same problems in 4++ different ways
- For data-flow architectures one may still argue that differences were driven by
  - Different experiment requirements
  - Different risk assessment/perception of experts
- For online software (control, configuration, monitoring) it is really difficult to find a technical explanation
  - Different people naturally chose different options

# + Today's Online Systems

- 4 well performing systems    
- still improving/evolving



# + How Did We Get Here?

- A challenging set of problems
- The lack of early existing solutions caused research work to start independently, in parallel (even within experiments)
- Initially plenty of human resources (read eager experts) organized in separate communities
  - R&D is what we love!
  - No expert would willingly give up his solution
- Forcing convergence seemed counterproductive

# + DCS Took a Different Path

- Long initial discussions to agree on a (third party) solution
  - Customized to experiments' needs
  - Integrated with in-house developed components
- Coordinated outside individual experiments (JCOP)
- We have working detector control systems for all experiments  
=> also this seems a valid approach

# + What if We Did It All Again Today?

- Still a challenging set of problems
- R&D is still what we love
- We are organized in separate communities
- Except if there was a strong managerial decision...

$(\text{manpower } \beta) \ddot{\Delta} (\text{experience } \acute{Y}) \ddot{\Delta} (\text{technology } \acute{Y}) = n_{\text{systems}}, n > 1$

# + But...

- We should keep in mind that we are working on an experiment lifetime of 20 – 30 more years
  - We are not even half way through
  - With how many (4 \* re-implementations) should we count?
- Will we maintain a similar level of resources in the long term?
  - Investment from institutes
  - Interest of new people
- Therefore, it is not completely academic to ask ourselves...

# + Where Do We Go from Here?

## ■ Possible options:

- a) Continue as today
- b) Pick up the best from each system / service / component and “merge” into a common solution
- c) Evaluate a new, common approach



## + a) Continue as Today

- After all.... nobody would expect religions to merge after an ecumenical gathering
- It may be simplest to continue improving our own systems
- Now that we know better what the other experiments are doing
  - We may ask for expert opinions before embarking onto the next software evolution
  - We may decide to pick up some of the ideas that were presented for other experiments and implement them in our system
  - We may choose to use common technologies in specific areas
  - We may even launch some common projects at the periphery of our systems

## + b) Select & Merge

- May seem a viable approach, but...
- We'd face the problem of fitting a square peg into a round hole...
- A patched solution to nobody's satisfaction





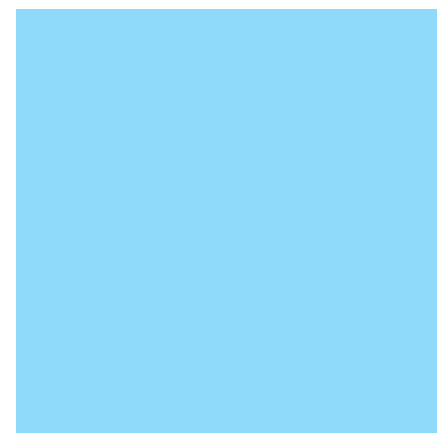
## c) Go for a Common Approach

- A major effort in social engineering/team building
- If we want to have a chance of success
  - Take time to look at how other environments have tackled the problem
    - Computer centers
    - Distributed/networked control systems
  - Don't exclude a priori to go the SCADA/OPC UA way
- At the very least, agree on and choose a common middleware
  - The only way to keep the door open to “merging” later on



# + Summary

- So far we have been very successful with our independent solutions
- The long experiment lifetime demands that we ask ourselves how to proceed
- We will re-design & re-implement our systems a few more times
- This workshop has offered the possibility to establish communication channels
- Up to us to decide to what extent it's better to work independently or together



## A Big Thanks

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