SAVING TIME AND REDUCING COSTS THROUGH SIMULATION CONSOLIDATION

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Simulation is a technology that has sharply increased in recent years because of the many benefits it can bring to product designers. However, there are best practices that should be followed when implementing this technology. Multiple point solutions do not perform as well as an integrated simulation suite. Organizations must look for ways to consolidate, or reduce, the number of vendors that they use, to build an effective simulation platform and develop successful products.

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76%

Of respondents indicated that if their needs were not met by a simulation application they would purchase additional applications.

Simulation is Crucial for Product Development

New products are the backbone for most organizations these days, as over a third of a company's revenue can be earned from these products (37% of total revenue, based on recent Aberdeen research). However, bringing a new product to market is a challenging endeavor that introduces a lot of risk to a company if not properly managed. A great deal of success today hinges on an organization's ability to balance innovation, cost, time, and quality during product development. Many organizations are turning to virtual simulation applications to help their designers make the most effective product-based decisions.

In fact, 73% of respondents indicated that their top focus going forward is to use simulation earlier in the development process. However, it was shown in Aberdeen's Achieving Product Development Success through a Consolidated Simulation Platform report, that the traditional way to manage and implement these simulation applications has been to take a siloed approach – but this leads to gaps in visibility and inefficiencies across the simulation platform. There are many

benefits of consolidating the number of simulation vendors within a company, but it all comes back to savings in time and cost (see sidebar).

Identifying the Benefits

Clearly, turning to a simulation platform that relies on a limited amount of vendors brings many benefits to the business. There are two major areas where simulation consolidation is important: IT efficiency and data management. The IT group within a company is often kept out of the loop when simulation decisions are made, but that can no longer be the case. The ramifications toward IT efficiency cannot be overlooked (Table 1).

Table 1: Consolidation Improves IT Performance

Change in IT Efficiency	All Respondents
Less efficiency	6%
No change	19%
Some improved efficiency	38%
Significant efficiency improvements	22%

Source: Aberdeen Group, June 2014

There is a clear difference in IT performance when consolidation is undertaken. Indeed, over half of all respondents indicated that consolidation improved their IT operational efficiency, while only 25% said it did not have a positive impact. The main reason for these gains in performance can be traced back to the waste that accumulates from a siloed platform.

First, multiple simulation tools often require the IT group or engineering teams to glue workflows together with scripting or other software components. The time spent to glue these tools together and maintain them is a drain on resources. Diluting IT resources adds time to the preparation, set up, and processing time of analysis. This, in turn, limits the amount and breadth of

A Consolidated Simulation Platform

Aberdeen split respondents into two groups to exam differences in metric performance. Those who have made efforts to consolidate versus those who have not:

Product launch dates met
- 87% - Consolidation
- 70% - No Consolidation

Product cost targets hit
- 85% - Consolidation
- 65% - No Consolidation

Change in TCO (software) last 12 months
- 7% Decrease - Consolidation
- 3% Increase - No Consolidation

Change in the length of development time last 12 months
- 22% Decrease - Consolidation
- 13% Decrease - No Consolidation

Change in time to prepare models for analysis
- 17% Decrease - Consolidation
- 8% Decrease - No Consolidation

Change in time from set up to results analysis
- 17% Decrease - Consolidation
- 8% Decrease - No Consolidation

Change in computer processing time of analyses
- 11% Decrease - Consolidation
- 8% Decrease - No Consolidation

Computer Aided Engineering (CAE)

CAE is a broad term that is used to describe software tools that allow engineers to simulate physical phenomena for their parts and products in a virtual environment.

There are multiple fields and phases that make up CAE, which include: Computational Fluid Dynamics (CFD), Finite Element Analysis (FEA), Multibody Dynamics (MBD), etc.

Functional Mock-up Interface (FMI)

FMI is defined as a tool independent standard to support both model exchange and co-simulation of dynamic models using a combination of xml-files and compiled C-code.

For example: a HEV traction motor is modeled in one tool while the control software is developed in a second tool. A system simulation of the motor and software can be performed if both tools support FMI. With the FMI interface, the tools can perform a co-simulation of both models together, a Best-in-Class practice for systems engineering.
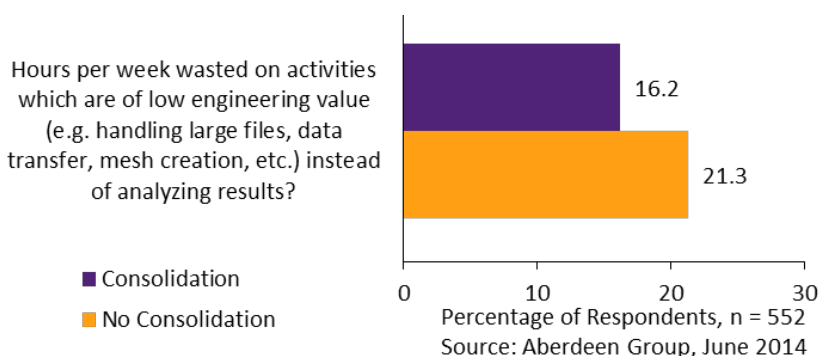
For more info:
https://www.fmi-standard.org/

simulation that can be conducted. Many companies have made IT groups more cost effective by centralizing or even outsourcing services to the Cloud. This same thinking can be applied to CAE tools to build a consolidated, cost effective simulation platform.

The second area where implementing multiple point solutions can cause inefficiencies is on the data management side of simulation. If the output of one simulation is input to another type of simulation tool, there is the transfer and manipulation of data that has to occur to get data between these tools. Time spent moving data from one system to the other, plus the expenses for tying these databases together combine to form a large chunk of "hidden" waste within a company. Further, with the growing complexity that is occurring within products, the ability to co-simulate models into a system model has become critical. Simulation solutions are moving toward open standards for communication (ex. FMI, see sidebar) to provide this interoperability across multiple tools. It is vital to be able to exchange models across different stages of development AND various simulation tools. These models can be computationally intensive, which means that the efficiency gains from a consolidated platform are a further aid.

What do these efficiency gains all come back to? Allowing a designer to spend more time on what brings value – analyzing results (Figure 1).

Figure 1: Spend Time Doing What Matters

Hours per week wasted on activities which are of low engineering value (e.g. handling large files, data transfer, mesh creation, etc.) instead of analyzing results?

Consolidation: 16.2
No Consolidation: 21.3

Percentage of Respondents, n = 552
Source: Aberdeen Group, June 2014

Over five hours per week of waste, or 31% more, is what's experienced, on average, for those without a consolidated simulation platform. This may not sound like a lot, but if looked at within the context of a 40 hour work week - that is more than half of a designer's time per week being spent on low-value activities. As simulation software evolves, there are many new capabilities and features to save a designer's time (drag and drop coupling technology, automatic meshing, etc.). Organizations are already stretched thin when it comes to engineering resources, so companies can't afford to waste valuable engineering time on the inefficiencies that a siloed simulation platform brings. Successful companies let their employees focus on what is important – designing innovative products – not managing multiple CAE tools.

Key Takeaway

With tightening NPI schedules, increasing complexity, and insufficient engineering resources, optimizing a design for multiple objectives (cost, time, quality, etc.) can be a daunting task. Effectively doing so requires organizations to possess an understanding of product behavior as quickly as possible. Simulation is a powerful tool for providing this insight into product performance. However, if simulation is not implemented in the correct manner, it can lead to large amounts of waste within a company. The numbers back it up; companies who have consolidated their simulation platform outperform their peers.

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