Cloud speech at SimTecT 2015 - Wednesday 19th August 10.30am

Not to exceed 8 minutes

Ladies and Gentlemen, Good Morning.

In the next few minutes I'd like to outline one of the major shifts underlying computing for simulation and explain how that makes it a suitable candidate workload for Cloud Computing.

Traditionally, simulators can be regarded as part-task trainers. The computing power was dedicated to a particular simulator in tracking position against terrain, responding to the control movements by the operator and making the externally visible environment as realistic as permitted by the limited computing power available.

As we transition into enterprise wide simulation constructs, the individual simulators will become part of a larger scale exercise. In a military example, a unit may practise "live" with other military elements represented in the synthetic or "virtual" landscape.

There is increasing demand for better, more realistic representation of the environment including realistic vegetation on the terrain and realistic weather. This demand for higher fidelity comes at the cost of more computing power to maintain realistic imagery in near real time as the virtual elements move around the synthetic landscape.

So where does it make sense to do all this extra computing? Is it necessary for every simulator to calculate the effects of weather on their small part of the terrain, and to keep that updated as the element moves across the landscape? It makes more sense to do that once at the enterprise level, and that is where the flexibility and scalability of Cloud computing makes for a sensible alternative.

Consider this image of a snow scene, one obvious effect of weather on terrain. That visual representation can be computed once and provided to each simulator as it moves across the landscape.

Consider the viewpoint of a simulated aircraft as being in the centre of a 3 x 3 grid. The simulator can load the calculated landscape for the centre grid while the enterprise computing (in the Cloud) can calculate the detailed view of the terrain for the adjoining grids, based on the direction of travel across the landscape. As the next grid square transitions into view the simulator can load that grid square without having to make detailed computations to represent the snow covered terrain. Particularly with multiple simulators controlling various virtual elements, this can represent a significant saving in overall computing requirements.

A medical example might be in the analytics around taking the blood pressure of a mannequin; the trainee might have knowledge of an average person's blood pressure, say 120 over 80. However, consider the added realism if the simulator had access to analytics based on that person being a 40 year old male and the average pressure statistics could reflect that precise demographic, giving a much more realistic training environment.

Analytics are a good candidate workload for Cloud computing. The answer can be calculated using massive parallel processing (MPP) that briefly uses significant computing resources; more than would be available to a local simulator's computing power. As an illustration, you may remember that IBM built a computer called "Watson" back in 2011 that eventually challenged and won against the two best human players. However this question-answering ability using Natural Language Processing comes at a cost in computing terms. The original single computer took over two hours to correctly answer the question. To bring that down to a game winning time of under 3 seconds, ended up involving 2,880 processors in parallel to work on various pieces of the puzzle. The point being that a simulator can have access to significant computing resources if it delegates those analytical questions to run in the elastic computing resources of the Cloud.

We see the future simulation landscape in computing terms being one where simulation companies can make their simulation services available in the cloud computing construct. This can be made available in the public cloud or a hybrid where necessary services run 'on premise' in secure classified facilities.

So in summary, Cloud computing at the enterprise level will help future simulation be more realistic, have access to better analytics and be open to the complete eco-system of developers.