

February 16, 2021, Edmonton, Alberta

I am no longer an architect - I am part of a collective alliance now called VirtCons where there is no separation between ones who create intent, procure through the supply chain, provide ways/means for realization and the eventual operators of new infrastructure. In a way we have become (collectively) a new "Master Builder". Some days what I do seems blurred across all of these streams – but there is immense clarity. Looking back this change was significantly shaped by the emergence of a more engaging, efficient and productive infrastructure industry powered by the ToBIM tetralogy that brought back together what was lost over 200 years ago with the separation of designers of buildings and contractors who built them. The establishment of new contractual frameworks around the former notion of IPD and the development of VirtCon specific Lean Virtual-Construct Techniques could only be fully achieved and realized by the advances in BIM enabled technologies and the evolution of protocols and standards such as NBIMS. Today, I am involved in all levels of horizontal and vertical infrastructure – light and heavy. In 2013 10% of all buildings involved an architect – today that is different as VirtCons are involved in over 25% of all buildings (and that is growing rapidly I am told). We have proven that we are a better value proposition over time than the former traditional design-bid-build/drive to the bottom cost process that dogged the industry for decades before it was abolished globally between 2017 and 2019. Today we use VirtCon thinking to manage risk in extraordinary ways and finally we are fully incentivized as a shared pain/gain industry. What is staggering is that we now we can produce infrastructure at a fraction of the NPV cost compared to the figures that alarmed us all in the fall of 2013.

So how did we get there?

We clearly understood that it was frustrating trying to use and develop an appropriate NBIMS for new technologies, single purpose contractual frameworks and lean processes by trying to superimpose these on old processes. We came to understand that "object based modelled intent & realization" could not be aligned with "line based drawing design and construction" – once NBIMS moved away from that the standard evolved rapidly. Once we dispensed with trying to support drawing-centric approaches and put our efforts into data-centric methods a lot changed. NBIMS became a catalyst in this change by establishing protocols that helped designers think more like producers and producers think more like designers. Software became fully interoperable and the emergence of a single \*.\* extension gave VirtCons the ability to use a variety of software packages available on the VirtCon Cloud to undertake rapid prototyping of infrastructure. We could determine any design-procure-assemble-operate value proposition for the owner with almost 100% cost certainty through intent, realization and operation. We were able to accurately identify, assess & prioritize risks in the intent & realization of new infrastructure. We used BIM technologies along with an embedded NBIMS to coordinate an economic application of design & construction resources simultaneously that control risks. We now have procedures to minimize, monitor, & control risk while maximizing the realization of opportunities & rewards. As we can develop fully coordinated, consistent, complete and accurate (wow even to a 1/000<sup>th</sup> of an inch!) representations we can fabricate key parts of a building well ahead of hitting the ground. This eliminated the need shop drawings as each part of the VirtCon team was able to query and interrogate the BIM at all stages of development - NBIMS helped with that too. It also gave us the needed standards to embed in software giving VirtCon teams a common language to move rapidly by capitalizing large scale 3D fabricators using new material nanotechnology because material scientists are now part of our industry. NBIMS gave us working standards for F<sup>2</sup> (File 2 Field) and F<sup>3</sup> (File 2 Fabricator 2 Field) processed at the heart of what we VirtCons leverage (we got past integration very quickly) very well.

It is no wonder that the starchitects of the past simply look on in awe at what we have collectively accomplished. Oh, before I forget - us VirtCons indirectly contributed to having the cult of the architect become obsolete too.