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| Project | **Specification of Digital Synchronization Framework between Cyber and Physical World**<<https://sagroups.ieee.org/2888/>3 **>** |
| Title | **Proposal for Complex Digital Objects of the Digital Twin Framework**  |
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| Re: |  |
| Abstract |  |
| Purpose | To discuss and define digital models’ structure for the framework of the standard  |
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# Introduction

A digital thing object is defined with various parameters and corresponding values, attributes and interfaces, etc. However, in order to describe a complicated physical thing target, digital objects may have to contain several digital objects as sub-elements as well as basic definition elements. A primitive digital object is a basic element of a digital twin that does not have sub-digital objects and has general definitions. We can also effectively compose digital twin objects using these multiple primitive digital objects without describing each device separately. In addition, it is possible to design the digital object including various combinations of conventional digital models, so you can easily generate new digital objects. For example, in a DSLR camera digital object, the zoom lens object and the image sensor object are independent. Therefore, various combinations are possible depending on which lens and image sensor is selected. Also, IoT devices with multiple sensors can be generated into the digital object easily by combining digital models of the selected sensors



**Fig. 1 The Data Structure of a Complex Digital Twin Object**

# Complex Digital Object

## Overview

* + 1. General

Describes attributes of the complex digital object, attributes of the corresponding complex physical object, authority to access the physical object, and types of sensing data.

# Conclusion

In this proposal, we describe the need for digital objects to describe physical objects (assets, devices, processes, etc.) with complex structures and proposed a type of “Complex Digital Thing Entity” that can be used in the advanced stage of CPS or DTS. Through this, not only can digital objects of various levels be described, but also existing digital thing entities can be reused, enabling rapid expansion of the virtual world.