

Token and Identifier Uniqueness

For this final iteration, we decided upon several key factors related to uniqueness and security with respect to tokens, and network, device and partition identifiers. We made the decision on this because we felt this would be a crucial feature in the finished product where more devices, networks and partitions can be used, and because of this, uniqueness would be a substantial underlying feature of any similar project. Due to the nature of this framework being that it is required to hold potentially billions of active users simultaneously, tokens and device, network and partition identifiers need to utilize a powerful identifier generation system at its core.

Starting with the token generation for a device, we set the length of a token to be 40 characters in length where each character is either a letter from the alphabet or a number from 0-9. For the finished product, our project can handle up to a whopping $4.513E63$ unique tokens. This implies there can be just as many devices active at the same time, which is a number far greater than the number of people currently on earth and for years in the future. Understanding the massive scale this project can operate and given proper server setups peered with a database designed to handle billions of entries, the finished product will serve useful to many customers and end users of the framework without the limitation on the number of active users.

For devices, networks and partitions, the same 40 character, uniquely-generated identifier method applies. Although users get the ability to name their networks, devices and partitions, these are differentiated by their ID when the server carries out operations. This is done to avoid potential pitfalls such as the situation where two separate simulations having equivalent user-set names and the incorrect simulation has an operation carried out. We wanted to document and fully explain ourselves after making the decision of token and identifier uniqueness, in particular, to show the enormous scale this project is capable of. Additionally, because our randomly-generated tokens are of 40 characters in length, account security gets an improvement whereby tokens are tremendously difficult to guess or reproduce.