**Classification of cryptographic keys**

At its simplest level, a cryptographic key is just a random string consisting of hundreds or thousands of ones and zeroes (i.e. binary digits, or “bits”). However, keys are always created for a specific function, and the associated key meta-data defines the properties of the key.

Firstly, and most importantly, there are two primary types of cryptographic keys: **symmetric and asymmetric**.

The difference between symmetric and asymmetric keys is best illustrated using the example of encrypting a message to protect its confidentiality. Symmetric key encryption algorithms use a single symmetric key for both encryption and decryption, whereas asymmetric key encryption algorithms (aka public key algorithms) use two different but related keys for encryption and decryption.

Advantage of symmetric algorithms is in that they are much faster than asymmetric algorithms.

**Static vs ephemeral keys and crypto-period**

Cryptographic keys may be either static (designed for long term usage) or ephemeral (designed to be used only for a single session or transaction). The [crypto-period](https://www.cryptomathic.com/news-events/blog/crypto-periods-for-cryptographic-keys) of static keys may vary from days to weeks, months or even years depending on what they are used for. In general, the more a key is used, the more susceptible it is to attack and the more data is at risk should it be revealed, so it is important to ensure keys are replaced when required (this process is called updating or cycling).

**Key length and algorithms**

The length of a key must align with the algorithm that will use it, although most [algorithms](https://www.google.com/url?q=https://www.cryptomathic.com/news-events/blog/differences-between-hash-functions-symmetric-asymmetric-algorithm) support a range of different key sizes. In general, the longer a key is, the better security it provides (assuming it is truly random).

**Common functions for cryptographic keys are data encryption key, authentication key, digital signature key, key encryption key, master key, root key.**