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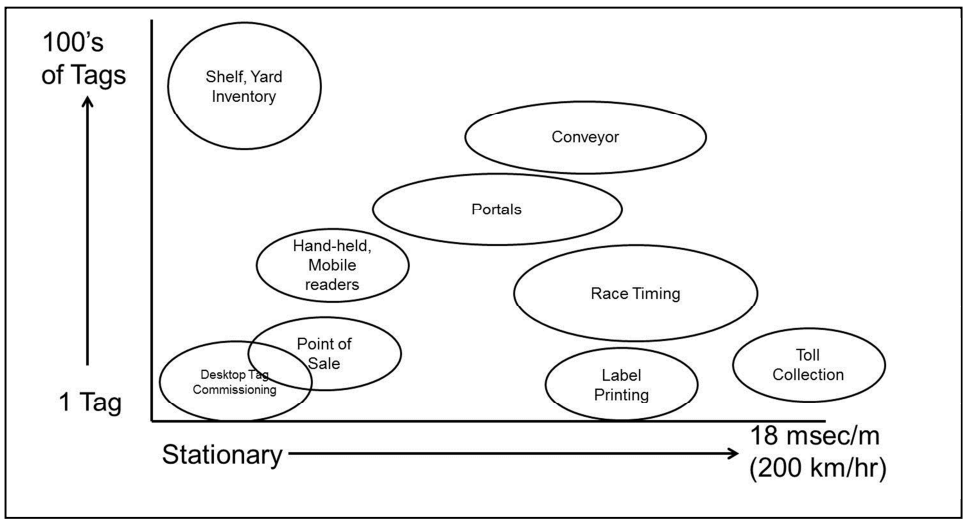
Performance Optimization for Diverse RFID Tag Populations

Measures of RFID reader performance such as tag reads per second and read range are important to many applications, but they are not the only (and may not be the most critical) data points to evaluate when determining which reader is best for your solution. Consider a simple comparison to a car speedometer. While the speedometer may go up to 140 miles per hour, it is unlikely one would ever travel at that speed. In most cases, getting from point A to point B efficiently has less to do with top speed and more to do with preparation, the route taken and adjustments made along the way.

The performance of an RFID reader is similar. The ability to read over 1,000 tags per second may have value for some applications, but most do not require that threshold be met. The efficiency of a solution depends largely on the interaction between RFID readers and tags, the environment the tags are being read in, and the application they are being used for. Important aspects of this interaction include:

- Size of the tag population
- Speed the tags are moving
- How much tag information must be obtained when the tag is read
- Is data being written to the tags
- Any custom tag functions being used such as sensor tags, control tags, EAS alarms, etc

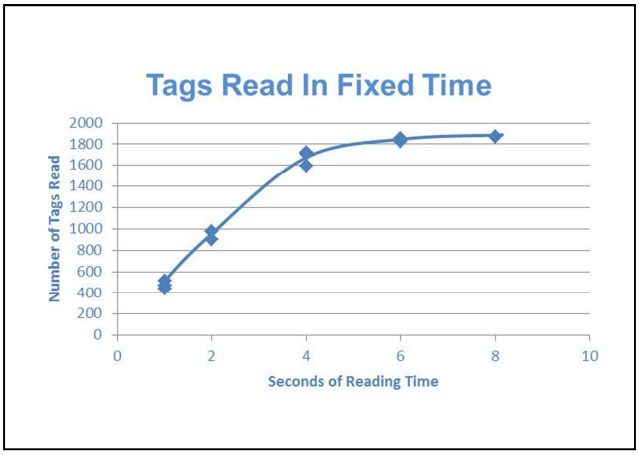


For example, in order to perform optimally, each of the applications identified in the chart above benefit from specific and often unique tag/reader interactions. As one would expect, applications where a reader is interacting with a single or small number of stationary tags are significantly different than when reading many tags on a high-speed conveyer or a single tag on a car moving at 200 kilometers an hour.

Consider the following examples of ThingMagic RFID reader performance and the features available to "tune" reader performance in scenarios when many tags are in the field, when few tags must be read repeatedly, or when tag population changes radically over time.

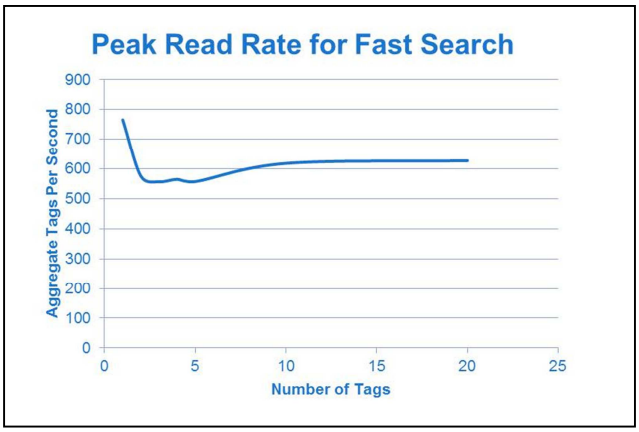
Read Rate

A high read rate is of benefit whenever large populations of tags are moving through a read point such as conveyor and portal applications. High read rate for low populations of tags supports applications such as toll collection, but is most beneficial whenever tags are moving at a high rate of speed and there is potential for stray tag reads. ThingMagic M6e based products support these varying requirements by achieving a tag read rate up to 600 tags per second for large populations of tags and of over 1,800 tags in less than 5 seconds.



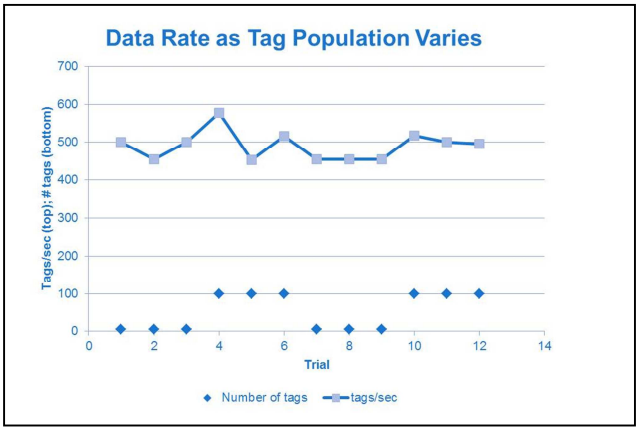
ThingMagic 'Fast Search'

ThingMagic's 'Fast Search' mode forces tags to respond quickly and often and is ideal for applications with fast moving tag populations such as toll collection and race timing. This feature works with Gen2 and ISO 18K-6B tags and is operational at 200 km/hour. As shown, with Fast Search a single tag can be read 750 times per second and the read rate for a small numbers of tags is over 600 tags per second.



Adaptation to Changing Tag Populations

The ability for an RFID reader to adapt to rapidly changing tag populations is critical for many applications such as conveyor or portal processes. In this test, the population of tags changed from 5 to 100 repeatedly. Test data illustrates the ThingMagic Mercury6 RFID reader is able to maintain a relatively consistent read rate regardless of tag population.



The advanced functionality and application-specific features described above enhance the ability for ThingMagic M6e-based products to read RFID tags in varied environments and on more items. The resulting performance advantages allow customers to develop and deploy high-performance RFID-enabled solutions for a greater range of innovative applications.