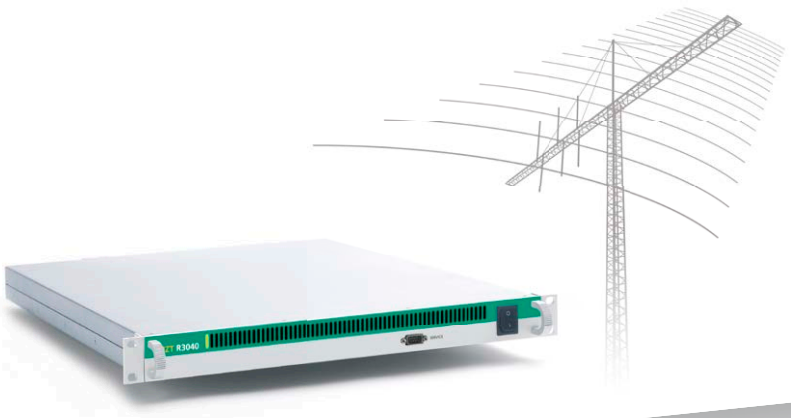
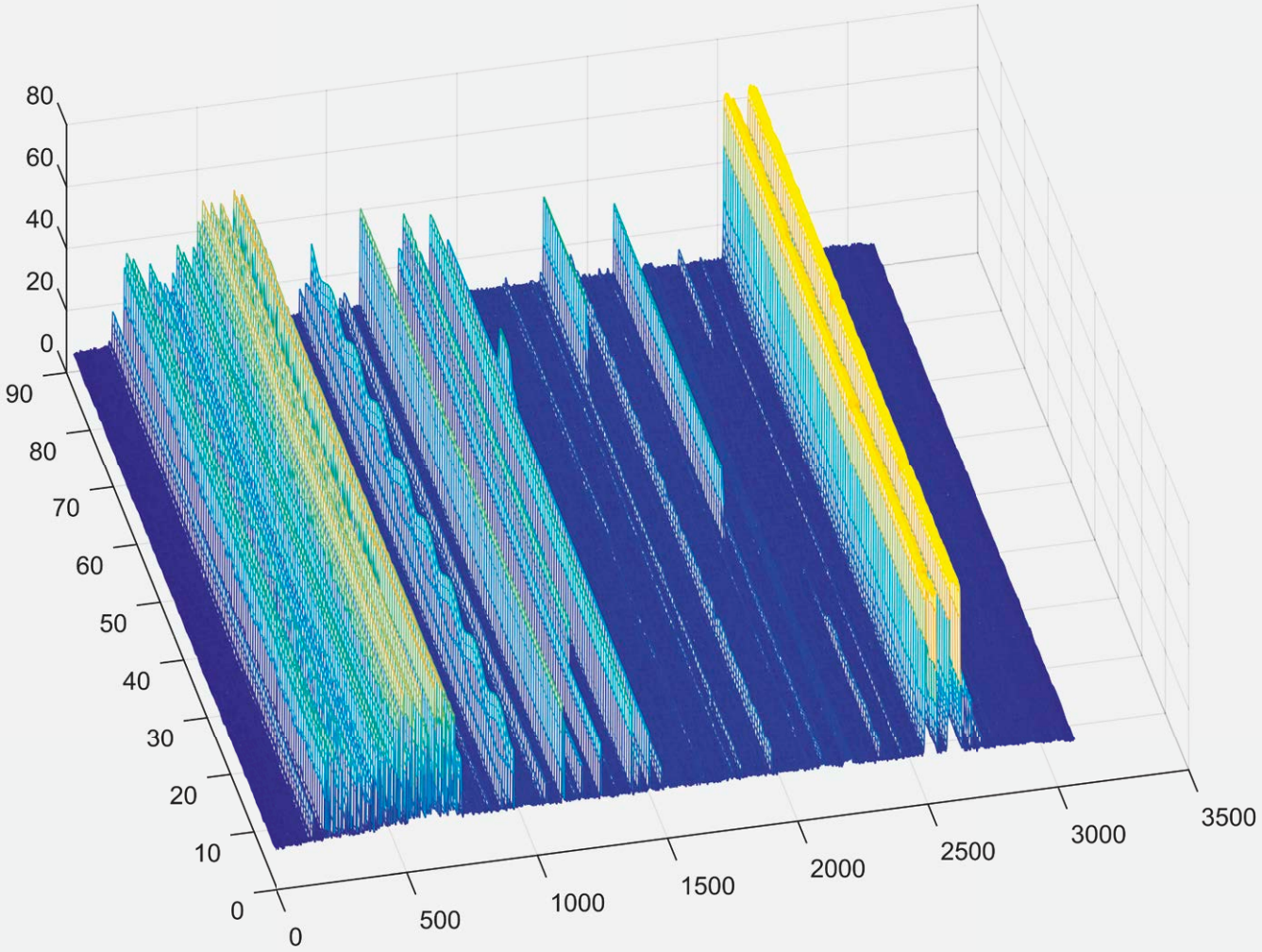
Application Note

IZT Signal Suite
Signal Archive



- Continuous buffering of received signals
- Time shift functionality
- Random access from multiple clients
- Efficient processing and storage



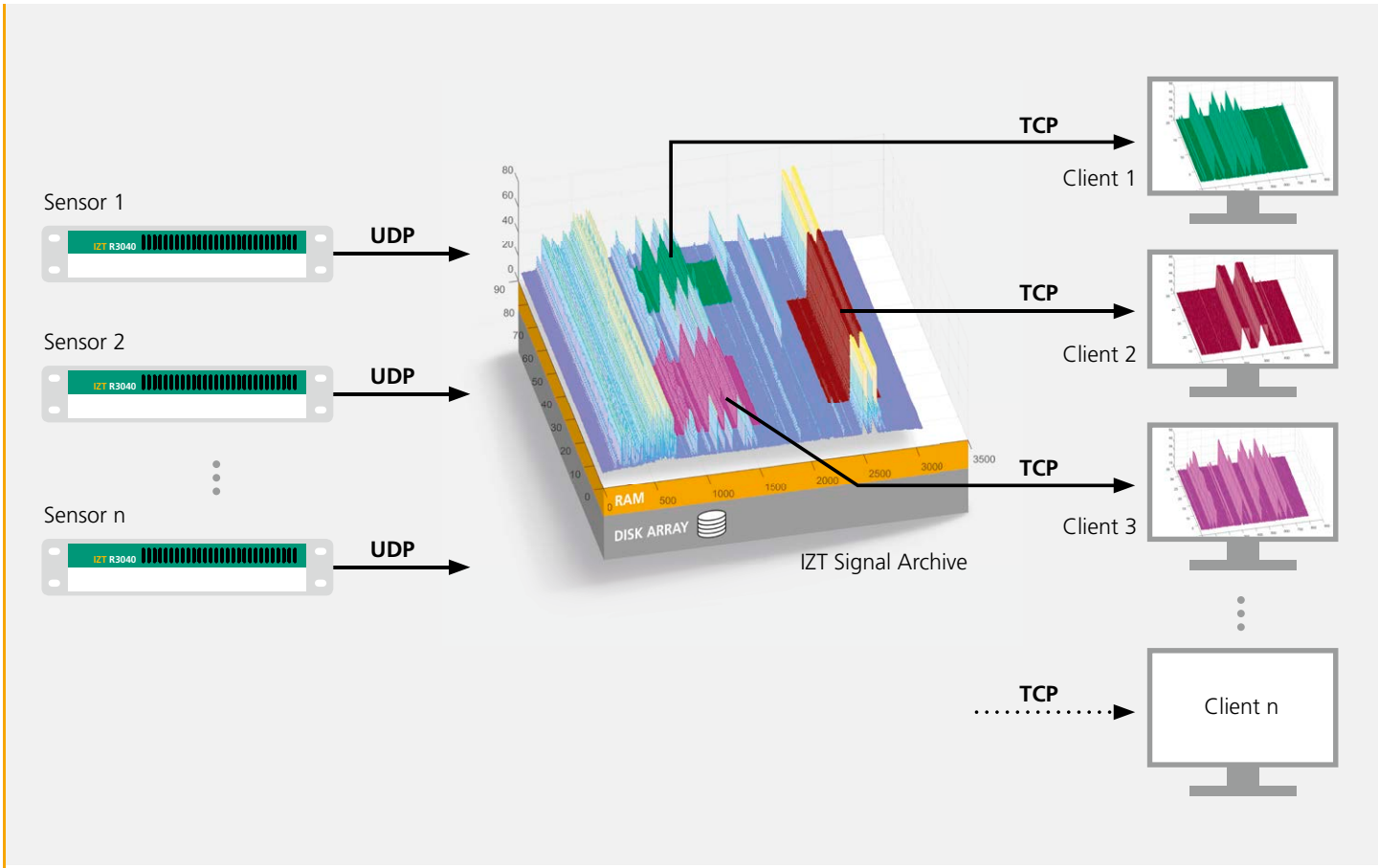


FIGURE 1: THE IZT SIGNAL ARCHIVE

OVERVIEW

The IZT Signal Archive is a software-defined extension to the IZT receiver family. It receives the data from the actual receiver and buffers it in the memory. It allows users to visualize and extract any signal in the entire memory depth without having to interrupt recording. All new data provided by the sensor is continuously recorded, even as users work with signals, which are minutes, hours or even days old.

Likewise, complex post-processing algorithms also benefit from the time shift feature. These algorithms are sometimes too slow to work in real-time, but the time shift function makes it easy to deploy them. The entire memory depth of the storage system acts as a buffer to slow down data access to the actual speed of the computation – while simultaneously recording all new incoming data.

The IZT Signal Archive facilitates sharing receiver hardware between multiple clients by adding an additional software layer between the clients and the actual receiver hardware.

One IZT Signal Archive can receive data from multiple receivers.

For standard applications, the IZT Signal Archive can reside on the customer's IT system. For more demanding requirements in terms of speed and number of clients, IZT will supply dedicated sensor controller hardware.

DATA RECEPTION, BUFFERING AND STORAGE

The IZT Signal Archive reliably receives all UDP data packets from the receiver and stores them in a large RAM buffer in the IZT Sensor Controller, acting as a large First-In-First-Out (FIFO) memory. It can store spectrum (PSD) and I/Q data from the receiver with variable depth from real-time to tens of seconds in RAM.

Disk arrays can be added to the sensor controller, further increasing buffer size and allowing for long-term storage of signals, either selectively or over the full instantaneous bandwidth of the receiver.

The transition from RAM to the disks and back ensues automatically without the need for user intervention.

The maximum amount of data that can be stored depends on the RAM and disk size of the mass storage attached to the IZT Sensor Controller. The total number and bandwidths of streams that can be extracted in real-time depends on the IZT Sensor Controller processing power. Different performance levels are available.

No matter whether the data is collected from a single or multiple sensors, the integrity of the time-of-arrival information from the sensors is preserved. This allows for post processing in direction-of-arrival or time-difference-of-arrival applications.

The table below lists approximate performance parameters. Whether HDDs or SSDs should be chosen depends on the expected application of the system. Please contact IZT for recommendations and storage space requirements.

ACCESSING STORED DATA

The IZT Signal Archive offers a large number of Digital Down Converters (DDCs) for the users to access individual signals in parallel. Center frequencies, bandwidths and start times are independent. A typical scenario may comprise a small number of broadband I/Q streams for automatic detection and modulation recognition listening at or near real-time. In parallel several ten or even hundreds of narrow band streams are recorded. This enables detailed analysis both on signals that have been recently received or stored at real-time.

The spectrum information can be accessed independently from the I/Q data and serves as an indication of signal activity.

The data stored in the IZT Signal Archive can be easily accessed and controlled by the customer from multiple clients via the IZT SDK (Software Development Kit).

The SDK supports multiple clients and offers different mechanisms to control and access the data:

- SCPI commands
- I/Q streams transmitted via TCP connections
- Microsoft COM Objects for C++, C#, Visual Basic, MATLAB
- Direct, file based access in the open IZT V4 file format specification

IZT Signal Archive configuration	approx. Memory depth (MHz*sec.) [1]	Recording throughput	Real-time streaming throughput	Total number of streams
Software version only [2]	RAM	N.A.	20 MHz	~32 [3] [4]
Standard IZT Sensor Controller	RAM: 1800 HDD: 1100000 SSD: 450000	36 MHz (per stream) 72 MHz (total)	36 MHz (per stream) 72 MHz (total)	~100 [4]
High performance IZT Sensor Controller	RAM: 70000 HDD: 5500000 SSD: 2200000	120 MHz (per stream) 160 MHz (total)	120 MHz (per stream) 160 MHz (total)	~500 [4]
Storage extension (High performance only)	HDD: contact IZT SSD: contact IZT			

[1] A MEMORY DEPTH OF 1 MHZ*SEC MEANS THAT ONE SECOND OF A SIGNAL WITH ONE MEGAHERTZ OF BANDWIDTH CAN BE STORED. IF THE SIGNAL HAD 10 MHZ, 100 MSEC OF IT COULD BE STORED.
[2] ASSUMES 16 GBYTE RAM
[3] CONSULT IZT FOR CPU REQUIREMENTS
[4] LIMITATIONS APPLY

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