Hierarchical Cluster Engine
Distributed Remote Command Execution
(DRCE)

v1.1 general description
and architecture basics

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DRCE subsystem

The DCRE functionality represent the way of distributed data processing that includes the algorithms code populated to the target low level nodes for execution.

Any kind of supported by target node OS and platform executable binary, byte or source code can be used. Each request represents task that can be scheduled different way for parallel execution in load-balancing or shard mode.

Depends on cluster structural schema the shard or replica manager node will handle the request task to one or to several down layer nodes. The cluster architecture defines the planning of distributed task request execution target node.

Heterogeneous HCE cluster architecture can be built to get a complex planning strategy for tasks execution planning.

DRCE application

The Distributed Remote Common Execution as a service have several main application areas for target end-user project system. The concrete cluster architecture schema and DRCE usage depends on task timing and size of income and outgoing data for processing.

Small tasks execution effective parallelism. Usable for one host or several physical hosts in pool. Because HCE node handlers are single-threaded and connected with ZMQ socket that used in buffered asynchronous mode effectiveness of small tasks with time from 1 to 50 ms is near to physical platform possibility.

Middle tasks execution also effective parallelism and results data reducing.

In simple mode the results data reducing includes only collecting the data from several nodes in pool that is connected and managed by one shard manager.

In more complex mode the resulted data reducing can to include some custom data processing after collecting. The reducer's data processing executable can be specified with request task parameters for each level of cluster hierarchical structure. In result the outgoing data will be transformed from set of parts from down level nodes processing results to one item that is result of processing on next level of cluster hierarchical structure.

HCE key functional principles

- *Free* network cluster structure architecture. Target applied project can construct specific schema of network relations that succeeds on hardware, load-balancing, file-over, fault-tolerance and another principles on the basis of one simple Lego-like engine.

- *Stable* based on ZMQ sockets reversed client-server networking protocol with connection heart-beating, automated restoration and messages buffering.

- *Easy* asynchronous connections handling with NUMA oriented architecture of messages handlers.

- *Unified* I/O messages based on json format.

- Ready to have client APIs bindings for many programmer languages covered by ZMQ library. Can be easily integrated and deployed.