**ZooKeeper, “the four-letter words”**

In Apache **ZooKeeper**, **“the four-letter words”** refer to a set of simple commands that provide operational data and control functions for ZooKeeper servers. These commands are used for monitoring and administrative purposes. Despite their simplicity, they are extremely useful for troubleshooting and managing ZooKeeper clusters.

**Key Features of Four-Letter Words**

1. **Scope**: Used to query the state of the ZooKeeper server or perform certain administrative actions.
2. **Access**: These commands are sent over a TCP connection to the ZooKeeper server’s client port (default: 2181).
3. **Output**: Provides plain-text responses with operational insights.

**Common Four-Letter Commands**

| **Command** | **Description** | **Example Output** |
| --- | --- | --- |
| **ruok** | Checks if the server is running. Responds with imok if the server is healthy. | imok |
| **stat** | Provides detailed server status, including client connections and ZooKeeper version. | Connections, number of zNodes, server mode (leader, follower, standalone). |
| **srvr** | Provides similar data as stat, with additional details for observer nodes in the ensemble. | Includes observer details for read-only members. |
| **conf** | Displays the server’s configuration details. | Lists the data directory, client port, and quorum peers. |
| **mntr** | Outputs metrics in a key-value format for monitoring purposes. | Leader status, outstanding requests, latency, followers synced, etc. |
| **cons** | Lists active client connections, including IP addresses and session details. | IP  , queued requests, session details. |
| **dump** | Lists unprocessed sessions and ephemeral nodes (leader-only command). | Information about unprocessed sessions in the leader. |
| **wchc** | Displays a list of watched nodes for clients. (Not recommended for large clusters due to performance.) | Lists clients watching specific nodes. |
| **wchp** | Displays a list of watched nodes and their corresponding paths. | Lists paths being watched and the clients watching them. |
| **envi** | Prints server environment details (e.g., Java version, operating system). | Details about JVM, ZooKeeper version, OS type, and memory usage. |
| **reqs** | Lists outstanding requests waiting for processing. | Current queued requests for the ZooKeeper server. |
| **isro** | Checks if the server is in read-only mode. | Responds with rw (read-write) or ro (read-only). |
| **kill** | Terminates the ZooKeeper server process. (Should be used with caution.) | No output. Server stops. |

**Security Considerations**

* **Access Control**: Ensure these commands are restricted to trusted users by controlling access to the ZooKeeper client port.
* **Disabling Commands**: Some four-letter words can be disabled in zoo.cfg using:

4lw.commands.whitelist=stat,ruok,mntr

**Common Use Cases**

1. **Health Checks**:
   * Use ruok and stat to verify server health and status.
2. **Monitoring**:
   * Use mntr to collect metrics for dashboards.
3. **Debugging**:
   * Use cons and wchc to inspect client activity and watch counts.
4. **Cluster Management**:
   * Use conf and srvr to inspect server configurations and roles.

By leveraging these "four-letter words," ZooKeeper administrators can effectively monitor and manage their clusters. Let me know if you'd like examples of automation scripts for these commands!