Network Programming Assignment, Design Document: Q2

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The program makes usage of TCP Connections using sockets and pipes to build a cluster shell that can execute commands over different nodes in the cluster. Details of different structures and design decisions are highlighted below-:

Key Assumptions -:

1) System Variable PATH_MAX is used as maximum length of all commands/ paths.
2) It is assumed that a proper input format of commands is followed by the user, violation of which may lead to unexpected behaviour from program.
3) For commands of type n*.<CMD>, it is assumed that there is going to be no input, however its output may be redirected using pipes.
4) IP to Node mapping is One to One.

Headers (in header.h)

```
#define SERV_PORT 6970
#define MAX_PENDING 128
#define BUFFER_SIZE 20
#define MAX_NODE_COUNT 10
#define CONFIG_FILE_PATH "./config.txt"
#define HOME_DIRECTORY "/home/”
```

1) SERV_PORT: Denotes the port that all cluster_shell servers will be listening on.
2) MAX_PENDING: Denotes the maximum number of connections that the listening port can put in wait before dropping connections
3) BUFFER_SIZE: Denotes the size of all buffers used throughout the cluster shell.
4) MAX_NODE_COUNT: Denotes the maximum number of nodes that can be present in the CONFIG FILE
5) CONFIG_FILE_PATH: Path to CONFIG FILE.

NOTE-:
The cluster shell does not place any limits over the size of input to the server / output from the server, however the packets are sent over network in form of Input_Buffer and Output_Buffer structures that take only BUFFER_SIZE characters in one write/read. However, command is read in a single network call and has the maximum size of PATH_MAX.

The clustershell_client runs in an indefinite loop until a signal is given to end the program. Each command is executed in its own process and output is shared by virtue of pipes. The clustershell_server maintains working directories separately for each node, persistent till end of clustershell_server program.

The clustershell also supports error propagation through network for all kinds of commands appended by an appropriate indicator of what the category of error is.