Report of Assignment 7

**Description**

For this assignment, we are performing a two way communication system between Xinu and Linux. In this system, the Xinu starts the communication by sending a UDP packet to the Linux socket program. After receiving this message from Xinu, Linux program sends the message back to Xinu. Existing code has been changed to free arpcache entry folder than 5 minutes. A network version of future has also been implemented.

**17.2**

**Assumption 1**: Xinu is acting as both client and server. There is only one time communication between Xinu and Linux.

**Assumption 2**: Same port number 55555 is used for both sending and receiving.

**Functionality**

A two way communication channel has been implemented between Xinu and Linux.

|  |  |
| --- | --- |
| **File / Function** | **Description** |
|  |  |
| send\_rcv.c | 1. This Function registers a port and makes an entry in udpcache using UDP\_REGISTER. 2. UDP\_SEND is used to send a packet. 3. UDP\_RECV is used to receive a packet. |
| xsh\_sendrecv.c | This message calls send\_rcv. This method is bound to the command “sendrecv” |
| shell.c | An entry for Xsh\_sendrecv.c and command “sendrecv” |
| 17.2.c | This file is present in the Linux VM. This file has socket implementation and code to send and receive UDP packet to and from xinu. |

**17.3**

In order to implement problem 17.3, we added a new variable whenTime in the structure arpentry .This variable holds value of the time elapsed since the system was powered on. As soon as an ARP packet is received ARP\_IN is invoked. Code added in ARP\_IN function, checks all entries in the ARP table if they are older than 5 mins .Entries older than 5 mins are purged by setting their state to AR\_FREE. This is checked by subtracting the whenTime of each entry from the clktime . If an entry is not found then it has to be registered in the ARP table. At the time of its entry in the arpcache table the attribute whenTime is initialized to clktime .

|  |  |
| --- | --- |
| **File / Function** | **Description** |
|  |  |
| arp.h | A new variable to hold time associated with an entry is added in Struct arpentry. Variable name is whentime |
| Arp.c | Code change has been done in void arp\_in() method. Which does following work   1. Whenever an entry is required then all the entries present in arpcache is checked if its whenTime is more than 5 minutes old or not. If it is more than 5 minutes old then make arptr->arstate == AR\_FREE 2. Whenever a new entry is made then a time is recorded and stored in whentime. 3. Whenever an entry is referred again then its whentime is updated to current time. 4. All time is taken from clktime global variable of xinu. |

**Network Futures**:

The network Implementation of future is based on the model that a producer produces a value and send it to network i.e. in this case Linux. And consumer consume a value which it gets from the network, which is Linux VM. For different mode of operation of future different socket implementation has been done in Linux VM.

|  |  |
| --- | --- |
| **File / Function** | **Description** |
|  |  |
| future.h | A global variable of type uint32 “slot” has been added. This global variable stores the index of the entry made in arpcache table while registering UDP port and endpoint. This slot is being used by UDP\_SEND and UDP\_RECV across all instances of future . |
| future\_free.c | 1. It calls udp\_release(slot) to free entry in arpcache . |
| future\_get.c | 1. Recvudppacket is being called to get UDP packet from Linux . |
| Future\_set.c | 1. Sendudppacket is being called to send UDP message to network . |
| xsh\_prodcons | 1. Slot global variable is being populated here, which contains value returned by udp\_register . 2. Port no 50410,50410 is used for both send and receive . |
| future\_prod.c | 1. Producer produces value 3 and send it to Linux . |
| Future\_cons.c | 1. Consumer gets the value sent by Linux. |
| recvudppacket.c | 1. This function calls UDP\_RECV |
| sendudppacket.c | 1. This function calls UDP\_SEND |

**Tasks and responsibilities**

|  |  |
| --- | --- |
| **File Name/task** | **User ID** |
|  |  |
| future.h | sshalabh |
| future\_free.c | pandeyh |
| future\_get.c | sshalabh |
| Future\_set.c | sshalabh |
| xsh\_prodcons | pandeyh |
| future\_prod.c | sshalabh |
| Future\_cons.c | pandeyh |
| recvudppacket.c | sshalabh |
| sendudppacket.c | Sshalabh/pandeyh |
| arp.h | sshalabh |
| Arp.c | pandeyh |
| send\_rcv.c | sshalabh |
| xsh\_sendrecv.c | sshalabh |
| shell.c | pandeyh |
| 17.2.c | sshalabh |
| Testing | Sshalabh/pandeyh |
| Report | Sshalabh/pandeyh |