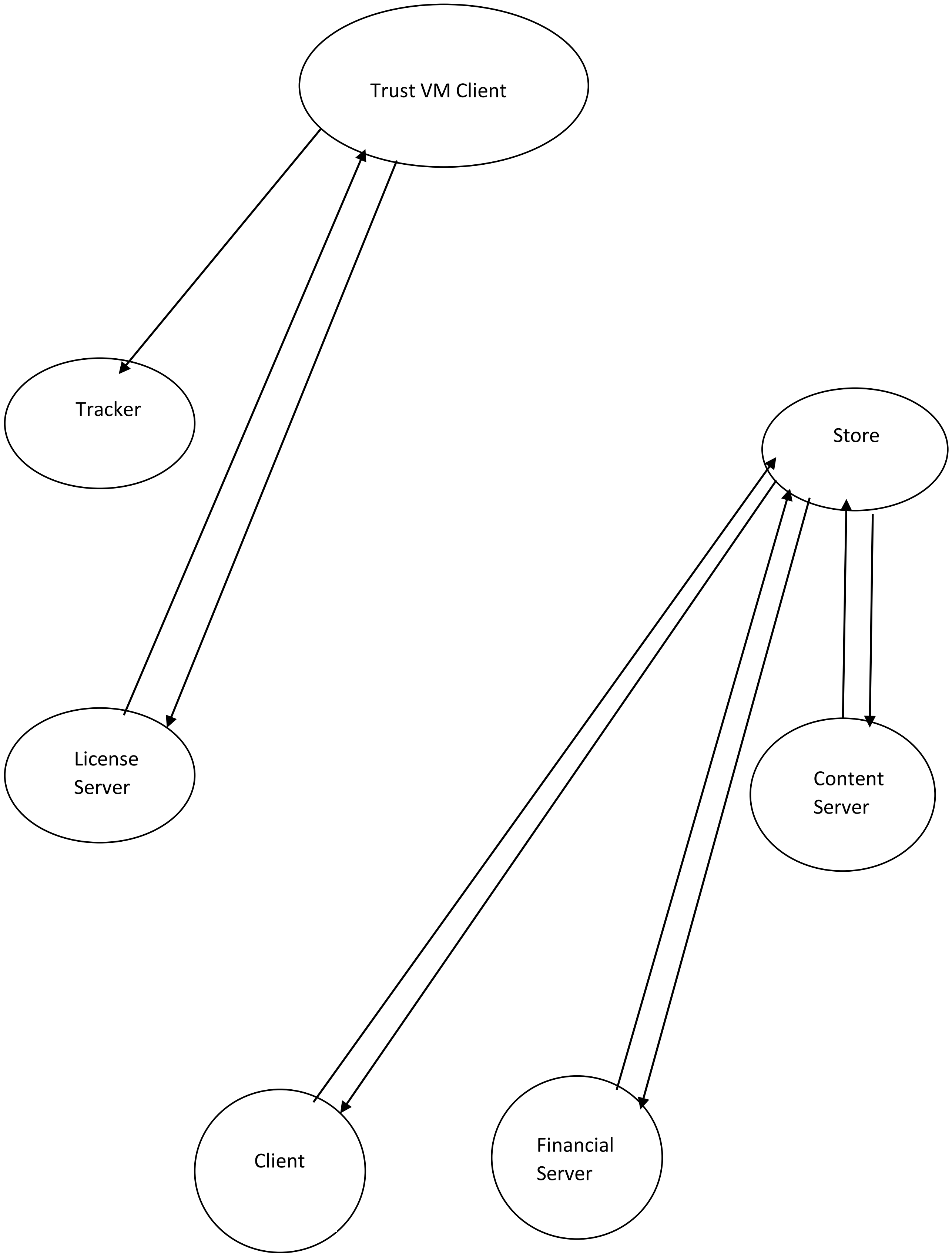
COMS3200

Assignment 1

Samuel Teed
43211915

Part A

1. Diagram



2. Communication primitives

Sending Process	**Send Primitive**	**Receiving Process**	**Receive Primitive**	**Message Format Name**
Client	RPC call	Store	RPC accept	Client Query
Client	RPC call	Store	RPC accept	Client buy request
Store	RPC reply	Client	RPC call	Query Response
Store	RPC reply	Client	RPC call	Purchase response
Store	RPC reply	Client	RPC call	Media item
Store	Non-blocking	Financial Server	Non-blocking	Store buy request
Financial Server	Non-blocking	Store	Non-blocking	Purchase response
Store	Non-blocking	Content Server	Non-blocking	Request item
Content Server	Non-blocking	Store	Non-blocking	Media item
Trusted VM Client	Blocking	License Server	Non-blocking	First play
License Server	Non-blocking	Trusted VM Client	Blocking	Item License
Trusted VM Client	Non-Blocking	Tracker	Non-blocking	Item Use

3. Justification of primitives

Client uses RPC to communicate to the store because it needs to use a blocking semantic as a single client should not be sending multiple requests. Since client is using RPC call the store will use RPC reply and RPC accept appropriately to handle messaging with the client.

All communication between the servers needs to be done with non-blocking semantics. That is the store, financial server and content server always use non-blocking semantics. This is because the servers need to be always able to handle multiple request and this is best done using non-blocking.

The VM client uses blocking when requesting a license the first time it uses an item since the client should not be able to play the item if it has not be confirmed the client owns the item yet. However the VM client can use a non-blocking semantic when communicating with the tracker since this is not a vital process the client does not need a response before using the media item.

4. Message format

i. Client Query

Client sends different words or numbers to search for a media item. A search can be any one of the fields or both the title and author fields.

Key word	Title	Author	ID
Variable length String	Variable length String	Variable length String	10 digit Unsigned Integer
4 to 36 bytes	4 to 36 bytes	4 to 36 bytes	8 bytes

Overall size = 4 to 72 bytes

ii. Query Response

Store returns all data relating to a specific media item.

Item ID	Item type	Authors	Title	Keywords	Price
Unsigned Integer	Unsigned Integer (less than 256)	Variable length String (multiplied by number of authors <5)	Variable length String	Variable length String	Floating Point
8 bytes	4 bytes	(4 to 36)*(0 to 5) bytes	4 to 36 bytes	4 to 36 bytes	4 bytes

Overall size = 56 to 292 bytes

iii. Client buy request

Client asks store to buy an item

Item ID	Credit Card number
Unsigned Integer	Fix length String
8 bytes	4 bytes

Overall size = 12 bytes

iv. Purchase response

A message from financial server to store, store to client or content server to store detailing whether a purchase is successful.

Purchase response message
Fixed length String
32 bytes

Overall size = 32 bytes

v. Store buy request

The store asks the financial server if a buy is possible

Price	Credit Card number
Floating point	Fixed length String
4 bytes	4 bytes

Overall size = 8 bytes

vi. Request Item

Store request item from content server

Item ID
Unsigned Integer
8 bytes

Overall size = 8 bytes

vii. Media Item

The content server sends it requested media item

Media Item
Variable length opaque data type
200 bytes

Overall size = 200 bytes

viii. First Play

VM client request item license after try to use media item for the first time

Use condition
Variable length string
4 to 36 bytes

Overall size = 4 to 36 bytes

ix. Item License

License server return expiry date and the license ID

License ID	Access rights	Expiry date
Unsigned Integer	Variable length string	Unsigned integer
4 bytes	4 to 36 bytes	4 bytes

Overall size = 16 to 44 bytes

x. Item use

VM client notifies tracker that an item is being used

Item ID	Date
Unsigned Integer	Unsigned Integer
8 bytes	8 bytes

Overall size = 16 bytes

5. Assumptions and limitations

Assumptions made mostly relate to the size of some of the data items. It is assumed that any variable length string will fall between the sizes of 4 to 36 bytes. It is also assumed that the ID of items and licences are numbers and that media items are of the size 200 bytes. It is also assumed that a media item will have between 0 and 5 authors. The assumed data sizes also limits the each of those field to their designated sizes.