

IN5020 - Distributed Systems Group Session

Topic 6 – Replication

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Assignment 1 - Presentation

- Choose the timeslot in the following link
 - <https://docs.google.com/document/d/1r4Orgl8LJXYOM7WsghjERB4oapAqHpstKxF1Y9qCEMw/edit>
- each group has to choose one timeslot for the presentation. Add the group in the corresponding cell in the row to reserve the timeslot.
- If none of the timeslots work for a group, then let me know through mail.

Question 1 -

what are the advantages of replication?

Advantages of replication

1. Performance enhancement
 1. Proxy servers reduce the latency, distributes the workload
2. Increased availability
 1. Users will get services even if some servers are crashed
3. fault tolerance
 1. Users will receive correct service (consistency guarantees) even if some servers are fault

Question 2 -

What are the different mechanisms to propagate updates between replica?

Propagate updates

1. Push based approach
 1. Push data or updates
2. Pull based approach
 1. Pull updates from other replica
3. Hybrid approach
 1. Receive notification about update in push based manner
 2. Pulls the update

Question 3

Are 011011, 001011, 001110 legal outputs for a sequentially consistent memory? Explain?

Process 1	Process 2	Process 3				
x = 1;	y = 1;	z = 1;	x = 1;	x = 1;	y = 1;	y = 1;
print(y, z);	print(x, z);	print(x, y);	print(y, z);	y = 1;	z = 1;	x = 1;
			y = 1;	print(x, z);	print(x, y);	z = 1;
			print(x, z);	print(y, z);	print(x, z);	print(x, z);
			z = 1;	z = 1;	x = 1;	print(y, z);
			print(x, y);	print(x, y);	print(y, z);	print(x, y);
			001011	101011	010111	111111
			(a)	(b)	(c)	(d)

Three concurrently execution processes

Four valid execution sequences for the processes

answer

Process 1	Process 2	Process 3
<pre>x = 1; print(y, z);</pre>	<pre>y = 1; print(x, z);</pre>	<pre>z = 1; print(x, y);</pre>
	<pre>x = 1; z = 1; print(y, z); print(x, y); y = 1; print(x, z);</pre>	<pre>x = 1; print(y, z); z = 1; print(x, y); y = 1; print(x, z);</pre>
	011011	001011

011011, 001011 are valid outputs.

001110 is not a valid sequence:

Every legal output should end with “11” because the statements must be executed in program order.

Question 4 -

What are the different replication schemes?

Different Replication schemes

Passive Replication:

1. One replica act as primary.
2. The primary performs the execution and propagates updates to other replicas
3. Primary failure should be handled properly (cold backup, warm backup, hot standby)

Active Replication:

1. Every replica receives the request and executes the operation
2. All the replicas send the reply to the client

Quorum based Replication:

1. Set of replicas are designated as write quorum and set of replicas are designated as read quorum
2. Clients send request to write quorum and receive reply from read quorum



Thank You