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NPTEL (<https://swayam.gov.in/explorer?ncCode=NPTEL>) » Edge Computing (course)



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## Course outline

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Week 0 ()

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# Week 6: Assignment 6

The due date for submitting this assignment has passed.

Due on 2025-03-05, 23:59 IST.

Assignment submitted on 2025-03-03, 20:13 IST

1) Which algorithm can synchronize clocks in a distributed system using a master process to average offsets? **1 point**

- ☐ Christian's Algorithm
- ☐ NTP
- ☒ Berkley's Algorithm
- ☐ DTP

Yes, the answer is correct.

Score: 1

Accepted Answers:

*Berkley's Algorithm*

2) What problem is solved by using logical clocks in distributed systems? **1 point**

- ☐ Message loss recovery
- ☒ Event ordering across processes
- ☐ Reducing memory usage
- ☐ Faster message transmission

Yes, the answer is correct.

Score: 1

Accepted Answers:

*Event ordering across processes*

3) What does the term "external synchronization" imply in distributed systems? **1 point**

- ☒ All clocks are synchronized to a single external reference

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- ☐ Clocks are synchronized relative to each other
- ☐ Clocks are not synchronized
- ☐ Each process maintains its local time independently

Yes, the answer is correct.

Score: 1

Accepted Answers:

*All clocks are synchronized to a single external reference*

4) Which relationship between events is established by Lamport Timestamps?

**1 point**

- ☒ Happens-before relationship
- ☐ Total ordering
- ☐ Concurrent event relationship
- ☐ Absolute event timing

Yes, the answer is correct.

Score: 1

Accepted Answers:

*Happens-before relationship*

5) What is the maximum drift between two clocks if each has a maximum drift rate of 5 ms per second? **1 point**

- ☐ 5 ms
- ☒ 10 ms
- ☐ 15 ms
- ☐ 20 ms

Yes, the answer is correct.

Score: 1

Accepted Answers:

*10 ms*

6) Which protocol is widely used for clock synchronization in distributed systems?

**1 point**

- ☐ FTP
- ☐ FTTP
- ☒ NTP
- ☐ TCP

Yes, the answer is correct.

Score: 1

Accepted Answers:

*NTP*

7) What rule does Lamport Timestamps use for assigning timestamps to events in the same process? **1 point**

- ☐ The timestamp is incremented by 2 for each event
- ☐ The timestamp is always set to 1
- ☐ The timestamp is decremented by 1 for each event
- ☒ The timestamp is incremented by 1 for each event

Yes, the answer is correct.

Score: 1

Accepted Answers:

*The timestamp is incremented by 1 for each event*

8) Which technology does Google's B4 use for traffic engineering?

**1 point**

- ☐ MPLS
- ☒ Software-defined networking (SDN)
- ☐ Virtual LAN
- ☐ Internet Protocol (IP)

Yes, the answer is correct.

Score: 1

Accepted Answers:

*Software-defined networking (SDN)*

9) What is the main purpose of vector timestamps in distributed systems?

**1 point**

- ☒ To detect and manage concurrent events
- ☐ To synchronize physical clocks
- ☐ To replace logical clocks
- ☐ To reduce network latency

Yes, the answer is correct.

Score: 1

Accepted Answers:

*To detect and manage concurrent events*

10) Which of the following algorithms is used for external time synchronization in distributed systems?

**1 point**

- ☐ Berkeley Algorithm
- ☐ Lamport Timestamps
- ☐ Paxos
- ☒ Cristian's Algorithm

Yes, the answer is correct.

Score: 1

Accepted Answers:

*Christian's Algorithm*