



Welcome to this session: Logging

The session will start shortly...

Questions? Drop them in the chat.
We'll have dedicated moderators
answering questions.





What is Safeguarding?

Safeguarding refers to actions and measures aimed at protecting the human rights of adults, particularly vulnerable individuals, from abuse, neglect, and harm.



To report a safeguarding concern reach out to us via email:
safeguarding@hyperiondev.com

Live Lecture Housekeeping:

- The use of disrespectful language is prohibited in the questions, this is a supportive, learning environment for all - please engage accordingly.
- No question is daft or silly - ask them!
- For all non-academic questions, please submit a query:
www.hyperiondev.com/support
- To report a safeguarding concern reach out to us via email:
safeguarding@hyperiondev.com
- If you are hearing impaired, please kindly use your computer's function through Google chrome to enable captions.



Stay Safe Series:

Mastering Online Safety One Week/step at a Time

While the digital world can be a wonderful place to make education and learning accessible to all, it is unfortunately also a space where harmful threats like online radicalisation, extremist propaganda, phishing scams, online blackmail and hackers can flourish.

As a component of this BootCamp the **Stay Safe Series** will/is designed to guide you through essential measures in order to protect yourself & your community from online dangers, whether they target your privacy, personal information or even attempt to manipulate your beliefs.

Security Tip

Verify Your Browser Extensions

Before installing browser extensions, verify their legitimacy and permissions.

- Why? Some malicious extensions can steal sensitive data or track your activity.
- How? Check reviews, download only from official stores, and ensure the developer is reputable.
- Pro Tip: Regularly audit your extensions and remove those you no longer use.

Stay safe while browsing!  

Logging



Learning Outcomes

- ❖ Explain the role of logging in software systems
- ❖ Identify different logging strategies
- ❖ Identify logging best practices
- ❖ Discuss security considerations within logging.



Software Engineering

Have you ever encountered an issue in a program that was difficult to diagnose? How did you approach finding the problem, and could logging have helped?



What is Logging?

- Logging is the process of recording events, messages, and errors in a system.
- Used for debugging, monitoring, performance analysis, and security auditing.

```
2015-10-17 15:45:11,258 INFO [main] org.apache.hadoop.metrics2Impl.MetricsConfig: loaded properties from hadoop-metrics2.properties
2015-10-17 15:45:11,399 INFO [main] org.apache.hadoop.metrics2Impl.MetricsSystemImpl: Scheduled snapshot period at 10 second(s).
2015-10-17 15:45:11,399 INFO [main] org.apache.hadoop.metrics2Impl.MetricsSystemImpl: MapTask metrics system started
2015-10-17 15:45:11,430 INFO [main] org.apache.hadoop.mapred.YarnChild: Executing with tokens:
2015-10-17 15:45:11,430 INFO [main] org.apache.hadoop.mapred.YarnChild: Kind: mapreduce.job, Service: job_1445862781478_0015, Ident: (org.apache
2015-10-17 15:45:11,602 INFO [main] org.apache.hadoop.mapred.YarnChild: Sleeping for 0ms before retrying again. Got null now.
2015-10-17 15:45:12,196 INFO [main] org.apache.hadoop.mapred.YarnChild: mapreduce.cluster.local.dir for child: /tmp/hadoop-nsrabi/nn-local-dir/u5
2015-10-17 15:45:12,741 INFO [main] org.apache.hadoop.conf.Configuration.deprecation: session.id is deprecated. Instead, use dfs.metrics.sessions
2015-10-17 15:45:13,602 INFO [main] org.apache.hadoop.yarn.util.ProcessBasedProcessTree: ProcessBasedProcessTree currently is supported only on Lix
2015-10-17 15:45:13,618 INFO [main] org.apache.hadoop.mapred.Task: Using ResourceCalculatorProcessTree : org.apache.hadoop.yarn.util.WindowsBas
2015-10-17 15:45:14,008 INFO [main] org.apache.hadoop.mapred.Task: Processing split: hdfs://nsrabi-41:9000/pageInput2.txt:402053184+134217728
2015-10-17 15:45:14,102 INFO [main] org.apache.hadoop.mapred.MapTask: (EQUATOR) 0 kv1 20214396(104857584)
2015-10-17 15:45:14,102 INFO [main] org.apache.hadoop.mapred.MapTask: mapreduce.task.io.sort.mb: 100
2015-10-17 15:45:14,102 INFO [main] org.apache.hadoop.mapred.MapTask: soft limit at 83886080
2015-10-17 15:45:14,102 INFO [main] org.apache.hadoop.mapred.MapTask: bufstart = 0; bufvoid = 104857600
2015-10-17 15:45:14,102 INFO [main] org.apache.hadoop.mapred.MapTask: kvstart = 20214396; length = 6553600
2015-10-17 15:45:14,118 INFO [main] org.apache.hadoop.mapred.MapTask: Map output collector class = org.apache.hadoop.mapred.MapTask$MapOutputBuf
2015-10-17 15:45:17,305 INFO [main] org.apache.hadoop.mapred.MapTask: Spilling map output
2015-10-17 15:45:17,305 INFO [main] org.apache.hadoop.mapred.MapTask: bufstart = 0; bufvoid = 48271024; bufvoid = 104857600
2015-10-17 15:45:17,305 INFO [main] org.apache.hadoop.mapred.MapTask: kvstart = 20214396(104857584); kvend = 17310640(69242500); length = 8903755
2015-10-17 15:45:17,305 INFO [main] org.apache.hadoop.mapred.MapTask: (EQUATOR) 57339776 kv1 14334940(57339760)
2015-10-17 15:45:20,606 INFO [main] org.apache.hadoop.mapred.MapTask: Finished spill 0
2015-10-17 15:45:20,696 INFO [main] org.apache.hadoop.mapred.MapTask: (RESET) equator 57339776 kv 14334940(57339760) kv1 12140764(48563856)
2015-10-17 15:45:30,603 INFO [main] org.apache.hadoop.mapred.MapTask: Spilling map output
2015-10-17 15:45:30,603 INFO [main] org.apache.hadoop.mapred.MapTask: bufstart = 57339776; bufvoid = 743078; bufvoid = 104857600
2015-10-17 15:45:30,603 INFO [main] org.apache.hadoop.mapred.MapTask: kvstart = 14334940(57339760); kvend = 5428044(21714576); length = 8986297/5
2015-10-17 15:45:30,603 INFO [main] org.apache.hadoop.mapred.MapTask: (EQUATOR) 9811814 kv1 2452948(9811792)
2015-10-17 15:45:39,525 INFO [main] org.apache.hadoop.mapred.MapTask: Finished spill 1
2015-10-17 15:45:39,525 INFO [main] org.apache.hadoop.mapred.MapTask: (RESET) equator 9811814 kv 2452948(9811792) kv1 244148(976592)
2015-10-17 15:45:43,307 INFO [main] org.apache.hadoop.mapred.MapTask: Spilling map output
2015-10-17 15:45:43,307 INFO [main] org.apache.hadoop.mapred.MapTask: bufstart = 9811814; bufvoid = 58036090; bufvoid = 104857600
2015-10-17 15:45:43,307 INFO [main] org.apache.hadoop.mapred.MapTask: kvstart = 2452948(9811792); kvend = 19751904(79067616); length = 8915445/65
2015-10-17 15:45:43,307 INFO [main] org.apache.hadoop.mapred.MapTask: (EQUATOR) 67104842 kv1 16776204(67104816)
```

Why is Logging Important?

- Debugging
- Monitoring
- Security
- Compliance



Types of Logs

- Application logs
- System logs
- Security logs
- Audit logs



Logging Levels

- **DEBUG** - Detailed information for development
- **INFO** - General system events
- **WARNING** - Something unusual, but not critical
- **ERROR** - A problem affecting functionality
- **CRITICAL** - A serious error causing system failure



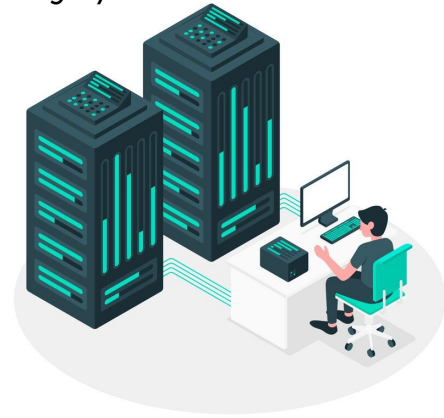
Logging Strategies

- Centralised Logging
- Rotating Logs
- Real-time Monitoring



Best Practices

- Use structured logging (e.g., JSON format).
- Avoid excessive logging to reduce noise.
- Never log sensitive data (passwords, API keys).
- Rotate logs to manage file size.
- Implement log retention policies.



Logging in Large Systems

- Managing log volumes
- Log correlation across microservices
- Real-time processing and anomaly detection



Security & Compliance in Logging

- Security Risks:
 - Logging sensitive data
 - Log injection attacks
 - Log tampering
- Compliance Requirements:
 - GDPR
 - PCI-DSS
 - HIPAA



Best Practices for Secure Logging

- Encrypt sensitive logs.
- Implement access controls for logs.
- Store logs in a tamper-proof storage.
- Regularly review logs for anomalies.



Recap

- Logging is essential for debugging, monitoring, security, and compliance.
- Use best practices to ensure logs are useful and secure.
- Understand different logging levels and types.
- Implement centralized logging for large-scale systems.



Please have a look at the poll notification and select an option.

What is the primary purpose of logging in software development?

- A. To store all user activity indefinitely
- B. To help developers debug and monitor applications
- C. To replace error handling mechanisms
- D. To slow down system performance



Please have a look at the poll notification and select an option.

Which of the following is NOT a recommended logging best practice?

- A. Avoid logging sensitive data
- B. Use structured logging
- C. Log everything, including passwords and API keys
- D. Rotate logs to manage file size

Q & A SECTION

**Please use this time to ask
any questions relating to the
topic, should you have any.**

Thank you
for attending



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