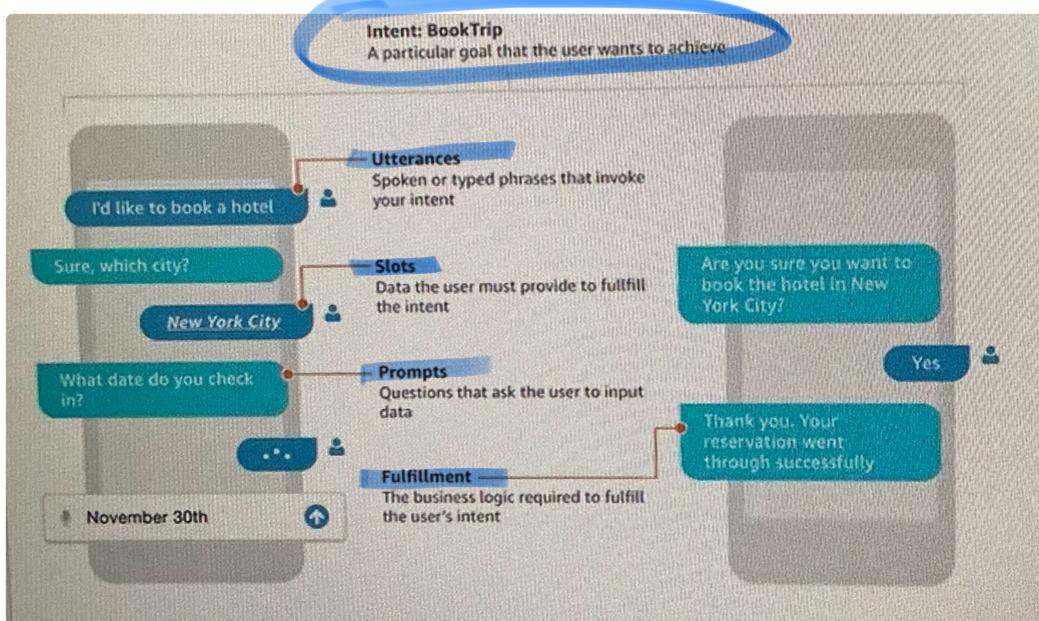


Lecture 4 - 26th Sept 2025

== Amazon LEX .



== Lex Bot building steps

① Configure

- Traditional
- Bot name, IAM policies to connect Lambda & other stuff .
- Add Language .

② Intents

- Add Intents
 - sample utterances
- Slots
 - Name
 - Slot type
 - Amazon default
 - declare custom ELSEWHERE
 - Prompt
 - ↳ Ques" asked by bot which will fill the slot.
- Initial Response
- Confirmation Prompt . → shown before taking action .
 - Bot Prompt
 - Probable Decline Response from User .

- Fulfillment → need to enable Lambda
from "Code Hooks".
↓

"Any backend action that completes the
INTENT".

- Closing Response

③ How to Connect to other AWS services:

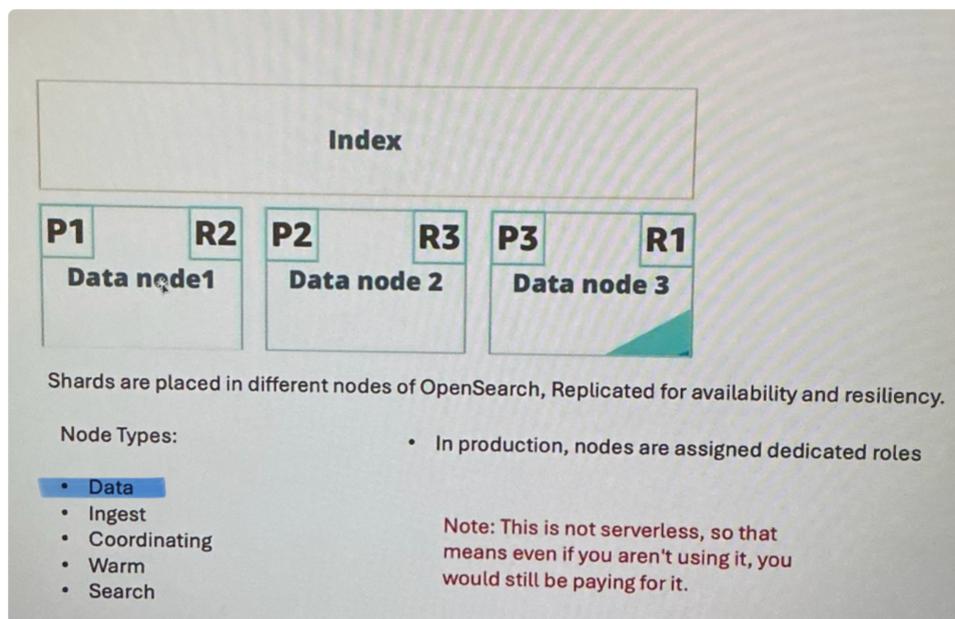
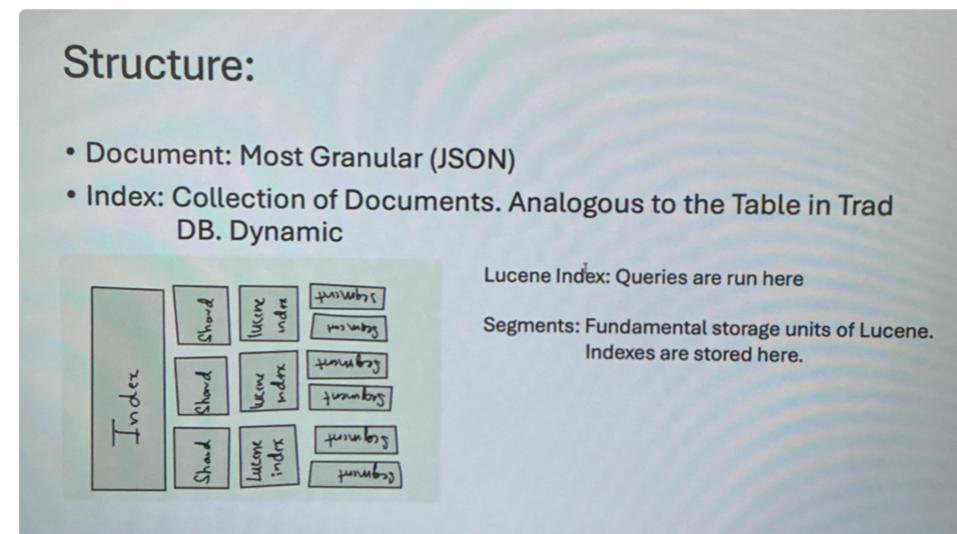
- Create an Alias
- Click on "Languages"
- Select Lambda to use

④ Build & Test the bot.

⑤ Intent Chaining can be done by
changing values in "Closing Response"
section of an Intent.

== OpenSearch / Elasticsearch

- searching → can be used on vector DB
- analytics.
- Structure



- ~~1~~
1. Standard Create
 2. Domain with / without standby
 3. No. of data nodes
 4. Network → public access
 5. Access Policy .



OpenSearch → Index → key → query DynamoDB

~~2~~ Dynamo .

- NoSQL
- serverless
- Partition keys -

In Amazon DynamoDB, every item (record) in a table is stored and retrieved based on its primary key.

The primary key always includes a partition key, and optionally, a sort key.

52:00

~~==~~ Virtualization .

→ isolation .

→ feels like a physical machine

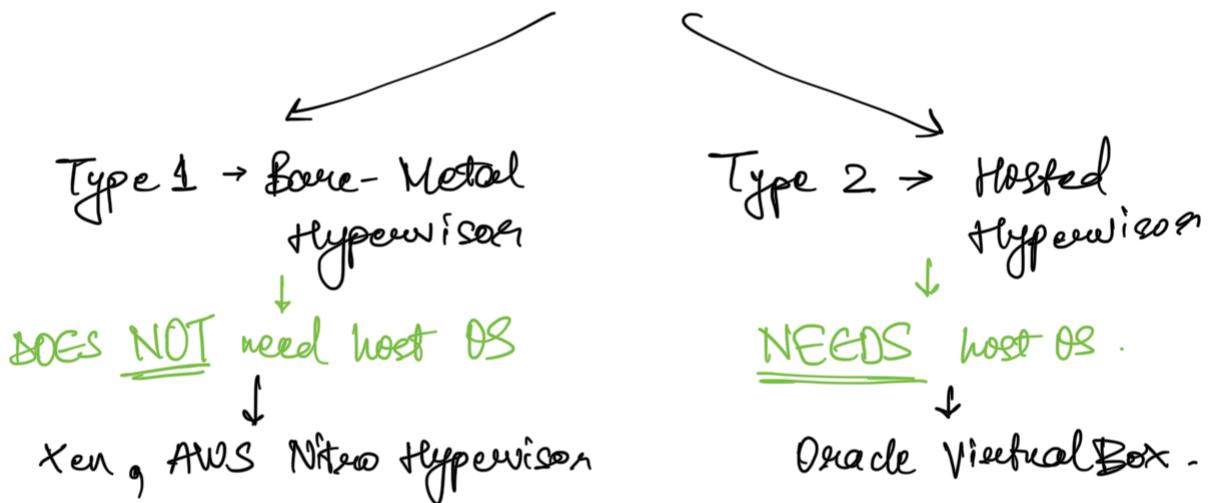
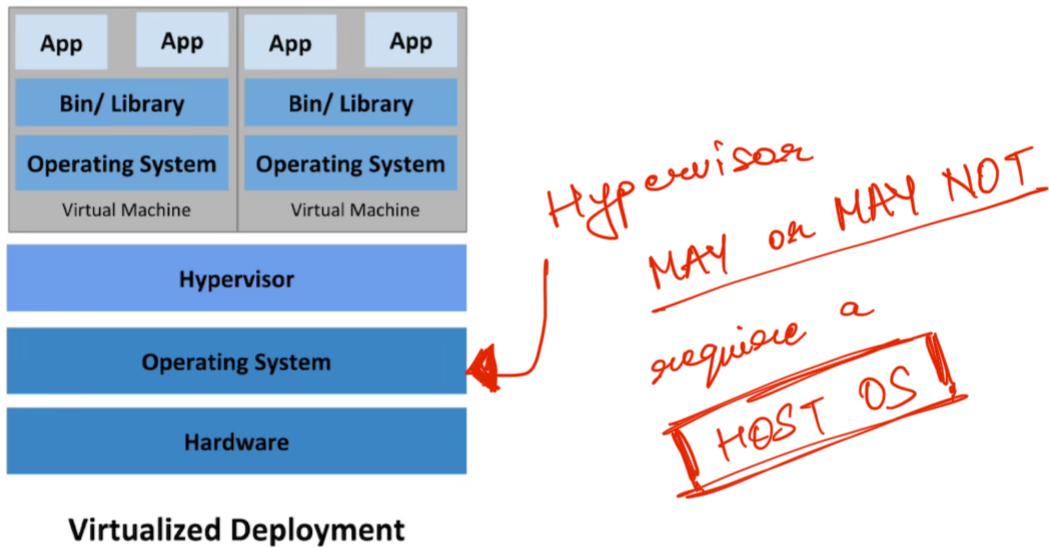
↓ But we DON'T need
that level of ISOLATION

DOCKER X
KUBERNETES . ↗

- ①. "Virtualization is a Technology".
- ②. "Cloud Computing is a service that is enabled by virtualization technology".



→ Virtualization: "Hypervisor" enables a single computer to act like many separate computers .



== Types of Virtualization

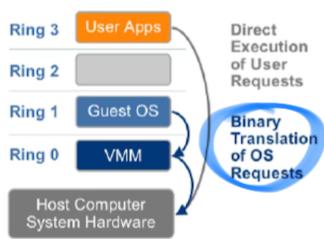


Figure 5 – The binary translation approach to x86 virtualization

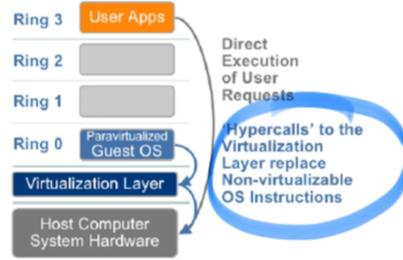


Figure 6 – The Paravirtualization approach to x86 Virtualization

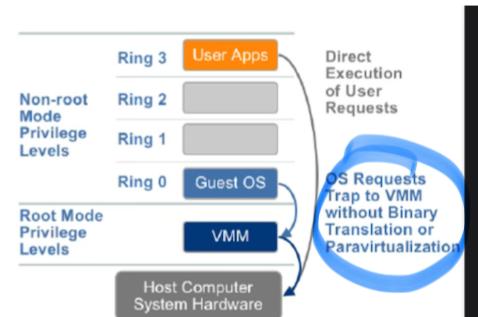
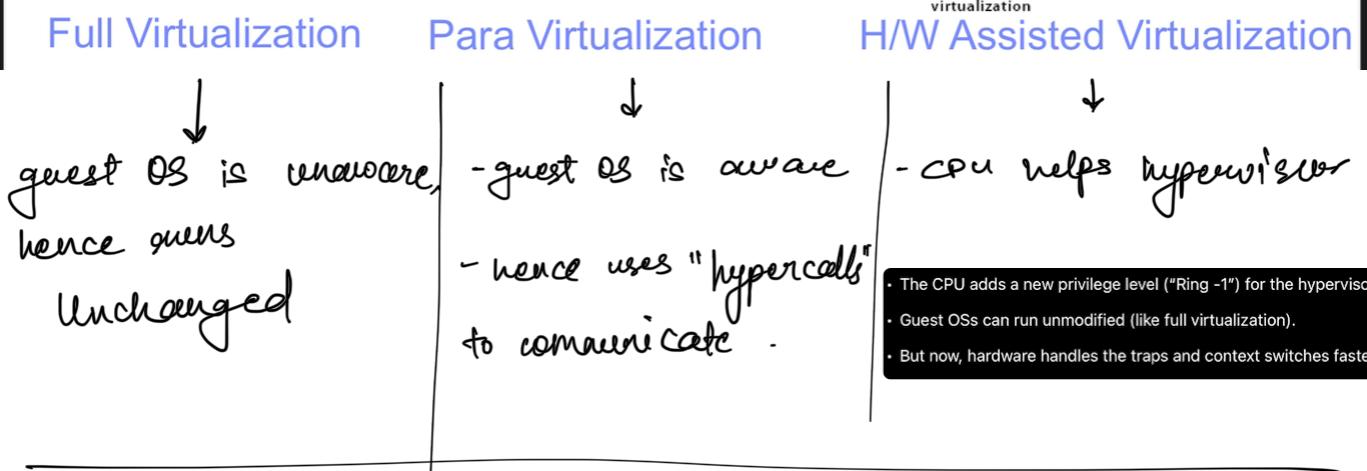


Figure 7 – The hardware assist approach to x86 virtualization



" VMs can be migrated whilst they are working "

∴ Zero downtime during migration OR maintenance

~~PPT~~

Which hypervisor to choose to place/run the VM?

??

== Virtualization works even during
"Migration" OR/AND "Maintenance".

- Called as 'Live Migration'.
- Overview of how it works
 - VM's state is abstracted by Hypervisor
 - Hypervisor copies state to another VM
 - synchronize the differences
 - and then - resume working



→ The entire diagram can be

Iterative memory copy for

"Live Migration"

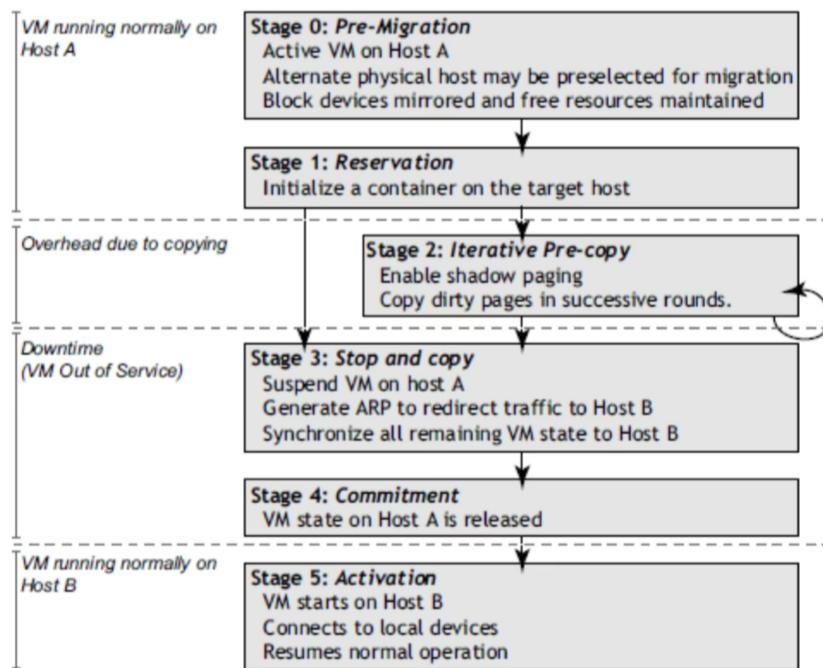
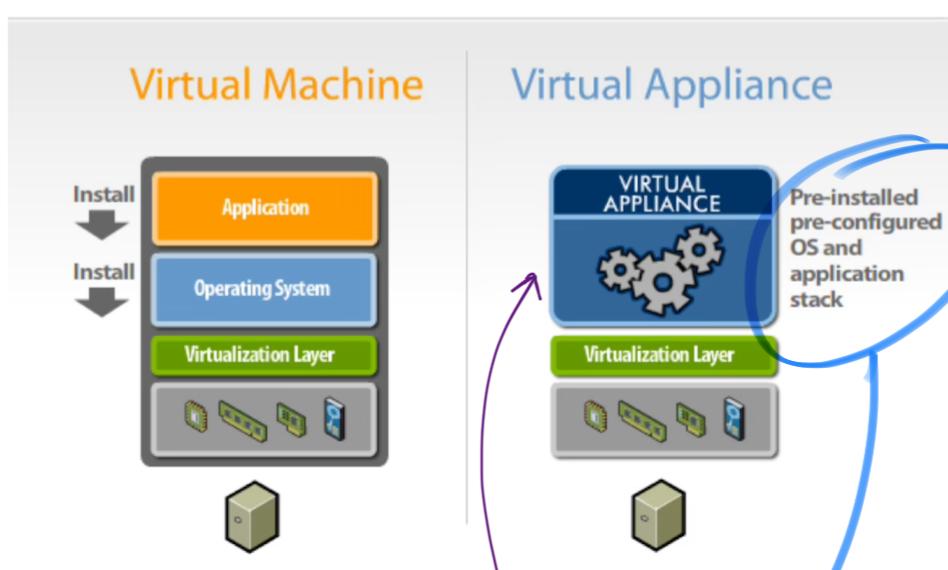


Figure 1: Migration timeline

Stage	What Happens	State of VM
Stage 0: Pre-Migration	VM is running normally on Host A . Another host (Host B) is chosen as the destination. Resources and storage are prepared.	● Running
Stage 1: Reservation	The hypervisor allocates memory, CPU, and storage on Host B to receive the VM.	● Running
Stage 2: Iterative Pre-Copy	The memory pages of the VM are copied from Host A → Host B <i>while the VM is still running</i> . - "Shadow paging" tracks memory pages changed during copying. - Changed (dirty) pages are copied again in rounds until few are left.	● Running (almost continuous)
Stage 3: Stop-and-Copy	Finally, the VM is paused for a few milliseconds. Remaining "dirty pages" (last updates) and CPU state are copied to Host B.	● Brief pause (~milliseconds)
Stage 4: Commitment	Host B now has the full state of the VM. Host A releases its version.	● Resuming
Stage 5: Activation	VM starts running on Host B. Network	● Running

traffic is redirected to the new host. Users continue as normal.

Virtual Machine VS Virtual Appliance



If has OS + Application .

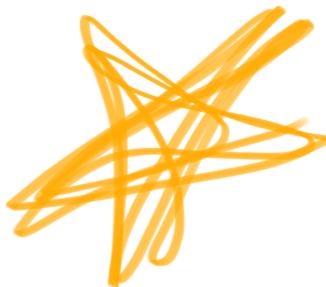
→ It is a fully built VM Image

bundled with OS

pre-configured application .

= Image

"A template or snapshot of a system used to create VMs".



"This snapshot includes

- ① OS
- ② Other configurations.
- ③ sometimes applications .

= BigQuery

Dremel is Technology → BigQuery is Service