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кафедра програмних засобів

ЗВІТ

з лабораторної роботи № 1

з дисципліни «Кросплатформне програмування» на тему:

«СТВОРЕННЯ РОЗПОДІЛЕНОЇ СИСТЕМИ НА БАЗІ HTCONDOR»

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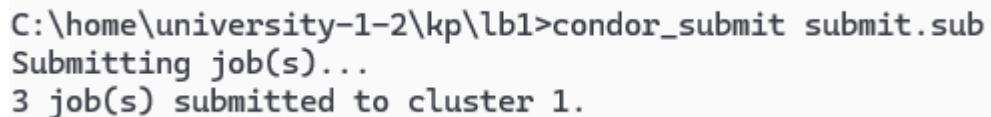
2024

1 Мета роботи:

Навчитися розгортати та конфігурувати обчислювальний кластер на базі системи HTCondor.

2 Хід виконання самостійної роботи:

Після запуску condor на трьох різних машинах було запущено скрипт командою “condor_submit submit.sub”, результат зображений на рисунку 2.1



```
C:\home\university-1-2\kp\lb1>condor_submit submit.sub
Submitting job(s)...
3 job(s) submitted to cluster 1.
```

Рисунок 2.1 – Результат запуску submit

Далі було запущено команду для моніторингу “condor_q –sub Itlait”, результат зображений на рисунку 2.2

```

C:\home\university-1-2\kp\lb1>condor_q -sub ltlai

-- Submitter: ltlai@ltlaitoff-win : <192.168.0.104:9618?... : ltlaitoff-win @ 04/11/24 18:21:33
OWNER BATCH_NAME   SUBMITTED   DONE    RUN    IDLE  TOTAL  JOB_IDS
ltlai ID: 1         4/11 18:11   -       -       3      3 1.0-2
ltlai ID: 2         4/11 18:19   -       -       3      3 2.0-2

Total for query: 6 jobs; 0 completed, 0 removed, 6 idle, 0 running, 0 held, 0 suspended
Total for all users: 6 jobs; 0 completed, 0 removed, 6 idle, 0 running, 0 held, 0 suspended

C:\home\university-1-2\kp\lb1>ydir simple*.out
'ydir' is not recognized as an internal or external command,
operable program or batch file.

C:\home\university-1-2\kp\lb1>dir simple*.out
Volume in drive C has no label.
Volume Serial Number is D64A-66D0

Directory of C:\home\university-1-2\kp\lb1

11.04.2024  18:21                58 simple.0.out
11.04.2024  18:21                58 simple.1.out
11.04.2024  18:21                58 simple.2.out
               3 File(s)              174 bytes
               0 Dir(s)  421 799 272 448 bytes free

```

Рисунок 2.2 – Результат запуску condor_q -sub ltlait

В результаті в директорії з'явилися додаткові файли. А саме файли .out, .log та .error. Директорія показана на рисунку 2.3.

```

11.04.2024  18:29      <DIR>      .
11.04.2024  18:01      <DIR>      ..
11.04.2024  18:29      38 884 LB 1 KP by Ivan Shchedrovskyi.docx
11.04.2024  18:21                0 simple.0.error
11.04.2024  18:21                58 simple.0.out
11.04.2024  18:21                0 simple.1.error
11.04.2024  18:21                58 simple.1.out
11.04.2024  18:21                0 simple.2.error
11.04.2024  18:21                58 simple.2.out
11.04.2024  18:04       476 simple.c
11.04.2024  18:08      368 034 simple.exe
11.04.2024  18:21         8 729 simple.log
11.04.2024  18:04       201 submit.sub
               11 File(s)           416 498 bytes
               2 Dir(s)  421 746 548 736 bytes free

```

Рисунок 2.3 – Всі файли в директорії

Відображення результуючих файлів яке виконано командою `dir simple*.out` показано на рисунку 2.4.

```
C:\home\university-1-2\kp\lb1>dir simple*.out
Volume in drive C has no label.
Volume Serial Number is D64A-66D0

Directory of C:\home\university-1-2\kp\lb1

11.04.2024  18:21                58 simple.0.out
11.04.2024  18:21                58 simple.1.out
11.04.2024  18:21                58 simple.2.out
               3 File(s)              174 bytes
               0 Dir(s)  421 747 351 552 bytes free
```

Рисунок 2.4 – Відображення результуючих файлів

Контент файлу `simple.log`(він занадто великий для фото):

```
000 (001.000.000) 2024-04-11 18:09:34 Job submitted from host: <192.168.0.104:9618?addr=192.168.0.104-9618&alias=ltlaitoff-win&noUDP&sock=schedd_9824_8572>
...
000 (001.001.000) 2024-04-11 18:09:34 Job submitted from host: <192.168.0.104:9618?addr=192.168.0.104-9618&alias=ltlaitoff-win&noUDP&sock=schedd_9824_8572>
...
000 (001.002.000) 2024-04-11 18:09:34 Job submitted from host: <192.168.0.104:9618?addr=192.168.0.104-9618&alias=ltlaitoff-win&noUDP&sock=schedd_9824_8572>
...
000 (001.000.000) 2024-04-11 18:11:48 Job submitted from host: <192.168.0.104:9618?addr=192.168.0.104-9618&alias=ltlaitoff-win&noUDP&sock=schedd_19596_5ada>
...
000 (001.001.000) 2024-04-11 18:11:48 Job submitted from host: <192.168.0.104:9618?addr=192.168.0.104-9618&alias=ltlaitoff-win&noUDP&sock=schedd_19596_5ada>
...
000 (001.002.000) 2024-04-11 18:11:48 Job submitted from host: <192.168.0.104:9618?addr=192.168.0.104-9618&alias=ltlaitoff-win&noUDP&sock=schedd_19596_5ada>
...
000 (002.000.000) 2024-04-11 18:19:00 Job submitted from host: <192.168.0.104:0?alias=ltlaitoff-win&sock=schedd_17540_b5de>
...
000 (002.001.000) 2024-04-11 18:19:00 Job submitted from host: <192.168.0.104:0?alias=ltlaitoff-win&sock=schedd_17540_b5de>
...
000 (002.002.000) 2024-04-11 18:19:00 Job submitted from host: <192.168.0.104:0?alias=ltlaitoff-win&sock=schedd_17540_b5de>
...
001 (001.002.000) 2024-04-11 18:21:46 Job executing on host: <192.168.0.104:9618?addr=192.168.0.104-9618&alias=ltlaitoff-win&noUDP&sock=startd_10792_1ed4>
SlotName: slot1_3@ltlaitoff-win
CondorScratchDir = "C:\condor\execute\dir_11596"
```

Cpus = 1
Disk = 411929
Memory = 128

...

001 (002.000.000) 2024-04-11 18:21:46 Job executing on host: <192.168.0.104:9618?addrs=192.168.0.104-9618&alias=ltlaitoff-win&noUDP&sock=startd_10792_1ed4>

SlotName: slot1_4@ltlaitoff-win
CondorScratchDir = "C:\condor\execute\dir_10600"
Cpus = 1
Disk = 411929
Memory = 128

...

001 (001.001.000) 2024-04-11 18:21:46 Job executing on host: <192.168.0.104:9618?addrs=192.168.0.104-9618&alias=ltlaitoff-win&noUDP&sock=startd_10792_1ed4>

SlotName: slot1_2@ltlaitoff-win
CondorScratchDir = "C:\condor\execute\dir_13104"
Cpus = 1
Disk = 411929
Memory = 128

...

001 (002.002.000) 2024-04-11 18:21:46 Job executing on host: <192.168.0.104:9618?addrs=192.168.0.104-9618&alias=ltlaitoff-win&noUDP&sock=startd_10792_1ed4>

SlotName: slot1_6@ltlaitoff-win
CondorScratchDir = "C:\condor\execute\dir_19568"
Cpus = 1
Disk = 411929
Memory = 128

...

001 (001.000.000) 2024-04-11 18:21:46 Job executing on host: <192.168.0.104:9618?addrs=192.168.0.104-9618&alias=ltlaitoff-win&noUDP&sock=startd_10792_1ed4>

SlotName: slot1_1@ltlaitoff-win
CondorScratchDir = "C:\condor\execute\dir_3116"
Cpus = 1
Disk = 411929
Memory = 128

...

001 (002.001.000) 2024-04-11 18:21:46 Job executing on host: <192.168.0.104:9618?addrs=192.168.0.104-9618&alias=ltlaitoff-win&noUDP&sock=startd_10792_1ed4>

SlotName: slot1_5@ltlaitoff-win
CondorScratchDir = "C:\condor\execute\dir_19312"
Cpus = 1
Disk = 411929
Memory = 128

...

006 (001.000.000) 2024-04-11 18:21:46 Image size of job updated: 8936

9 - MemoryUsage of job (MB)
8936 - ResidentSetSize of job (KB)

...

006 (002.002.000) 2024-04-11 18:21:46 Image size of job updated: 15080

15 - MemoryUsage of job (MB)
15080 - ResidentSetSize of job (KB)

...

006 (001.002.000) 2024-04-11 18:21:46 Image size of job updated: 15072

15 - MemoryUsage of job (MB)
15072 - ResidentSetSize of job (KB)

...

006 (002.000.000) 2024-04-11 18:21:46 Image size of job updated: 15072

15 - MemoryUsage of job (MB)
15072 - ResidentSetSize of job (KB)

```

...
006 (001.000.000) 2024-04-11 18:21:46 Image size of job updated: 11620
    12 - MemoryUsage of job (MB)
    11620 - ResidentSetSize of job (KB)
...
006 (002.001.000) 2024-04-11 18:21:46 Image size of job updated: 15076
    12 - MemoryUsage of job (MB)
    11624 - ResidentSetSize of job (KB)
...
006 (001.001.000) 2024-04-11 18:21:46 Image size of job updated: 15068
    15 - MemoryUsage of job (MB)
    15068 - ResidentSetSize of job (KB)
...
005 (001.000.000) 2024-04-11 18:21:46 Job terminated.
    (1) Normal termination (return value 0)
        Usr 0 00:00:00, Sys 0 00:00:00 - Run Remote Usage
        Usr 0 00:00:00, Sys 0 00:00:00 - Run Local Usage
        Usr 0 00:00:00, Sys 0 00:00:00 - Total Remote Usage
        Usr 0 00:00:00, Sys 0 00:00:00 - Total Local Usage
    0 - Run Bytes Sent By Job
    0 - Run Bytes Received By Job
    0 - Total Bytes Sent By Job
    0 - Total Bytes Received By Job
    Partitionable Resources :  Usage Request Allocated
    Cpus      :      1      1
    Disk (KB) :   375   375  411929
    Memory (MB) :   12    1   128

    Job terminated of its own accord at 2024-04-11T15:21:46Z with exit-code 0.
...
005 (001.002.000) 2024-04-11 18:21:46 Job terminated.
    (1) Normal termination (return value 0)
        Usr 0 00:00:00, Sys 0 00:00:00 - Run Remote Usage
        Usr 0 00:00:00, Sys 0 00:00:00 - Run Local Usage
        Usr 0 00:00:00, Sys 0 00:00:00 - Total Remote Usage
        Usr 0 00:00:00, Sys 0 00:00:00 - Total Local Usage
    0 - Run Bytes Sent By Job
    0 - Run Bytes Received By Job
    0 - Total Bytes Sent By Job
    0 - Total Bytes Received By Job
    Partitionable Resources :  Usage Request Allocated
    Cpus      :      1      1
    Disk (KB) :   375   375  411929
    Memory (MB) :   15    1   128

    Job terminated of its own accord at 2024-04-11T15:21:46Z with exit-code 0.
...
005 (002.000.000) 2024-04-11 18:21:46 Job terminated.
    (1) Normal termination (return value 0)
        Usr 0 00:00:00, Sys 0 00:00:00 - Run Remote Usage
        Usr 0 00:00:00, Sys 0 00:00:00 - Run Local Usage
        Usr 0 00:00:00, Sys 0 00:00:00 - Total Remote Usage
        Usr 0 00:00:00, Sys 0 00:00:00 - Total Local Usage
    0 - Run Bytes Sent By Job
    0 - Run Bytes Received By Job
    0 - Total Bytes Sent By Job
    0 - Total Bytes Received By Job
    Partitionable Resources :  Usage Request Allocated
    Cpus      :      1      1

```

Disk (KB) : 375 375 411929
Memory (MB) : 15 1 128

Job terminated of its own accord at 2024-04-11T15:21:46Z with exit-code 0.

...

005 (002.001.000) 2024-04-11 18:21:46 Job terminated.

(1) Normal termination (return value 0)

Usr 0 00:00:00, Sys 0 00:00:00 - Run Remote Usage

Usr 0 00:00:00, Sys 0 00:00:00 - Run Local Usage

Usr 0 00:00:00, Sys 0 00:00:00 - Total Remote Usage

Usr 0 00:00:00, Sys 0 00:00:00 - Total Local Usage

0 - Run Bytes Sent By Job

0 - Run Bytes Received By Job

0 - Total Bytes Sent By Job

0 - Total Bytes Received By Job

Partitionable Resources : Usage Request Allocated

Cpus : 1 1

Disk (KB) : 375 375 411929

Memory (MB) : 12 1 128

Job terminated of its own accord at 2024-04-11T15:21:46Z with exit-code 0.

...

005 (002.002.000) 2024-04-11 18:21:46 Job terminated.

(1) Normal termination (return value 0)

Usr 0 00:00:00, Sys 0 00:00:00 - Run Remote Usage

Usr 0 00:00:00, Sys 0 00:00:00 - Run Local Usage

Usr 0 00:00:00, Sys 0 00:00:00 - Total Remote Usage

Usr 0 00:00:00, Sys 0 00:00:00 - Total Local Usage

0 - Run Bytes Sent By Job

0 - Run Bytes Received By Job

0 - Total Bytes Sent By Job

0 - Total Bytes Received By Job

Partitionable Resources : Usage Request Allocated

Cpus : 1 1

Disk (KB) : 375 375 411929

Memory (MB) : 15 1 128

Job terminated of its own accord at 2024-04-11T15:21:46Z with exit-code 0.

...

005 (001.001.000) 2024-04-11 18:21:46 Job terminated.

(1) Normal termination (return value 0)

Usr 0 00:00:00, Sys 0 00:00:00 - Run Remote Usage

Usr 0 00:00:00, Sys 0 00:00:00 - Run Local Usage

Usr 0 00:00:00, Sys 0 00:00:00 - Total Remote Usage

Usr 0 00:00:00, Sys 0 00:00:00 - Total Local Usage

0 - Run Bytes Sent By Job

0 - Run Bytes Received By Job

0 - Total Bytes Sent By Job

0 - Total Bytes Received By Job

Partitionable Resources : Usage Request Allocated

Cpus : 1 1

Disk (KB) : 375 375 411929

Memory (MB) : 15 1 128

Job terminated of its own accord at 2024-04-11T15:21:46Z with exit-code 0.

...

А також на рисунку 2.5 показаний контент кожного .out файлу.

```
C:\home\university-1-2\kp\lb1>type simple.0.out
Thinking really hard for 4 seconds...
We calculated: 20

C:\home\university-1-2\kp\lb1>type simple.1.out
Thinking really hard for 4 seconds...
We calculated: 22

C:\home\university-1-2\kp\lb1>type simple.2.out
Thinking really hard for 4 seconds...
We calculated: 24
```

Рисунок 2.5 – Показ контенту кожного .out файлу

Після перегляду результуючих файлів можна зробити висновок, що програма працює коректно значення аргументів помножених на 2 підраховано вірно, та затримка перед виконанням наступного аргументу була 4 секунди.

3 Висновки:

Я навчився розгортати та конфігурувати обчислювальний кластер на базі системи HTCondor.