Q4

Here are the CPU Models on Discovery and the running result of Linpack:

```
[zhang.yam@c0221 ~]$ lscpu
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:            Little Endian
CPU(s):                48
On-line CPU(s) list:   0-47
Thread(s) per core:    2
Core(s) per socket:    12
Socket(s):             2
NUMA node(s):          2
Vendor ID:             GenuineIntel
CPU family:            6
Model:                 63
Model name:            Intel(R) Xeon(R) CPU E5-2690 v3 @ 2.60GHz
Stepping:              2
CPU MHz:               2599.841
CPU max MHz:           3500.0000
CPU min MHz:           1200.0000
BogoMIPS:              5199.98
Virtualization:        VT-x
L1d cache:             32K
L1i cache:             32K
L2 cache:              256K
L3 cache:              30720K
NUMA node0 CPU(s):     0-11,24-35
NUMA node1 CPU(s):     12-23,36-47
```

```
[zhang.yam@c0221 ~]$ ./linpack
22 October 2022 02:40:05 PM

LINPACK_BENCH
  C version

  The LINPACK benchmark.
  Language: C
  Datatype: Double precision real
  Matrix order N               = 1000
  Leading matrix dimension LDA = 1001

     Norm. Resid      Resid           MACHEP         X[1]          X[N]

        6.491510        0.000000    2.220446e-16        1.000000        1.000000

      Factor     Solve      Total     MFLOPS       Unit      Cray-Ratio

   0.850000   0.000000   0.850000  786.666667   0.002542  15.178571

LINPACK_BENCH
  Normal end of execution.

22 October 2022 02:40:06 PM
```

```
[zhang.yam@c0637 ~]$ lscpu
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:            Little Endian
CPU(s):                28
On-line CPU(s) list:   0-27
Thread(s) per core:    1
Core(s) per socket:    14
Socket(s):             2
NUMA node(s):          2
Vendor ID:             GenuineIntel
CPU family:            6
Model:                 79
Model name:            Intel(R) Xeon(R) CPU E5-2680 v4 @ 2.40GHz
Stepping:              1
CPU MHz:               1264.599
CPU max MHz:           3300.0000
CPU min MHz:           1200.0000
BogoMIPS:              4789.30
Virtualization:        VT-x
L1d cache:             32K
L1i cache:             32K
L2 cache:              256K
L3 cache:              35840K
NUMA node0 CPU(s):     0,2,4,6,8,10,12,14,16,18,20,22,24,26
NUMA node1 CPU(s):     1,3,5,7,9,11,13,15,17,19,21,23,25,27
```

```
[zhang.yam@c0637 ~]$ ./linpack
22 October 2022 03:03:24 PM

LINPACK_BENCH
  C version

  The LINPACK benchmark.
  Language: C
  Datatype: Double precision real
  Matrix order N               = 1000
  Leading matrix dimension LDA = 1001

     Norm. Resid      Resid           MACHEP         X[1]          X[N]

        6.491510        0.000000    2.220446e-16        1.000000        1.000000

      Factor     Solve      Total     MFLOPS       Unit      Cray-Ratio

   0.700000   0.010000   0.710000  941.784038   0.002124  12.678571

LINPACK_BENCH
  Normal end of execution.

22 October 2022 03:03:24 PM
```

```
[zhang.yam@d0021 ~]$ lscpu
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:            Little Endian
CPU(s):                56
On-line CPU(s) list:   0-55
Thread(s) per core:    1
Core(s) per socket:    28
Socket(s):             2
NUMA node(s):          2
Vendor ID:             GenuineIntel
CPU family:            6
Model:                 85
Model name:            Intel(R) Xeon(R) Platinum 8276 CPU @ 2.20GHz
Stepping:              7
CPU MHz:               3699.877
CPU max MHz:           4000.0000
CPU min MHz:           1000.0000
BogoMIPS:              4400.00
Virtualization:        VT-x
L1d cache:             32K
L1i cache:             32K
L2 cache:              1024K
L3 cache:              39424K
NUMA node0 CPU(s):     0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46,48,50,52,54
NUMA node1 CPU(s):     1,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33,35,37,39,41,43,45,47,49,51,53,55
```

```
[zhang.yam@d0021 ~]$ ./linpack
22 October 2022 03:05:02 PM

LINPACK_BENCH
  C version

  The LINPACK benchmark.
  Language: C
  Datatype: Double precision real
  Matrix order N               = 1000
  Leading matrix dimension LDA = 1001

     Norm. Resid      Resid           MACHEP         X[1]          X[N]

        6.491510        0.000000    2.220446e-16        1.000000        1.000000

      Factor     Solve      Total     MFLOPS       Unit      Cray-Ratio

   0.610000   0.000000   0.610000  1096.174863   0.001825  10.892857

LINPACK_BENCH
  Normal end of execution.

22 October 2022 03:05:03 PM
```

```
[zhang.yam@d0132 ~]$ lscpu
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:            Little Endian
CPU(s):                128
On-line CPU(s) list:   0-127
Thread(s) per core:    1
Core(s) per socket:    64
Socket(s):             2
NUMA node(s):          8
Vendor ID:             AuthenticAMD
CPU family:            23
Model:                 49
Model name:            AMD EPYC 7702 64-Core Processor
Stepping:              0
CPU MHz:               1996.123
BogoMIPS:              3992.24
Virtualization:        AMD-V
L1d cache:             32K
L1i cache:             32K
L2 cache:              512K
L3 cache:              16384K
NUMA node0 CPU(s):     0-15
NUMA node1 CPU(s):     16-31
NUMA node2 CPU(s):     32-47
NUMA node3 CPU(s):     48-63
NUMA node4 CPU(s):     64-79
NUMA node5 CPU(s):     80-95
NUMA node6 CPU(s):     96-111
NUMA node7 CPU(s):     112-127
```

```
[zhang.yam@d0132 ~]$ ./linpack
22 October 2022 03:07:09 PM

LINPACK_BENCH
  C version

  The LINPACK benchmark.
  Language: C
  Datatype: Double precision real
  Matrix order N              = 1000
  Leading matrix dimension LDA = 1001

     Norm. Resid      Resid           MACHEP         X[1]          X[N]

        6.491510        0.000000    2.220446e-16        1.000000        1.000000

      Factor     Solve      Total     MFLOPS       Unit      Cray-Ratio

   0.830000   0.010000   0.840000  796.031746   0.002512  15.000000

LINPACK_BENCH
  Normal end of execution.

22 October 2022 03:07:10 PM
```