Name	CPU capacity	Memory capacity	Additional Net	Image Type	CPU Speed (GHz)	Net Speed(Mbps)	Zone	Hour 1 (8:00-9:00)	Hour 2 (9:00-10:00)	Hour 3 (10:00-11:00)	Hour 4 (11:00-12:00)	Hour 5 (12:00-13	Hour 6 (13:00-14:00)	CPU capacity	Memory capacity
NCHC cloud	16	32	ENT/IPOP	centos7/rocks-basic/rocks-sge	-	-	Amarican	10,16	4,24	6,24	8,30	10,14	2,16	16	32
AIST Cloud	32	64	ENT/IPOP	centos7/rocks-basic/rocks-sge	-	-	Amarican	32,64	30,42	24,54	22,44	0,0	2,8	32	64
Indiana University cloud	16	64	IPOP	centos7/hku_biolinux/rocks-basic/rocks-sge	-	-	Amarican	2,2	2,2	6,12	6,12	6,12	6,12	16	64
NAIST cloud	92	192	ENT	centos7/hku_biolinux/rocks-basic/rocks-sge	-	-	Japan	92,192	92,192	92,192	28,56	28,56	92,192	92	192
TOS cloud	64	32	ENT/IPOP	centos7/hku_biolinux/rocks-basic/rocks-sge	-	-	Amarican	16,32	16,32	16,32	16,32	6,10	6,10	64	32
TP cloud	32	64	IPOP	centos7/hku_biolinux/rocks-basic/rocks-sge	-	-	Amarican	32,64	32,40	2,2	2,2	4,16	2,8	32	64
UCSD cloud	64	128	ENT	centos7/hku_biolinux/rocks-basic/rocks-sge	-	-	Amarican	64,128	64,128	32,64	32,64	8,44	8,44	64	128
TW cloud	64	64	ENT	centos7/hku_biolinux/rocks-basic/rocks-sge	-	-	Amarican	10,30	10,20	20,40	20,40	20,40	20,40	64	64
B1 cloud	32	32	ENT	centos7/rocks-basic/rocks-sge	-	-	Amarican	4,16	4,16	2,2	2,2	4,16	2,8	32	32
CC cloud	128	64	ENT	centos7/hku_biolinux/rocks-basic/rocks-sge	-	-	Amarican	64,32	64,32	64,32	64,40	64,40	64,32	128	64
								*available cpu,memory							

Note

This case is used as an example for the Interfaces page.

CPU speed and network speed of muti-site are equal to the minimum values in all sites. 320

Hour (x, y) x, y is CPU available, Memory available at that time.

Zone shows the location of each site that is the same or not.

Name of site, CPU, and Memory A self-defined example.

If the search returns the least number of sites (ie, if the number of sites is equal to 2 The search will stop immediately, search for sites 3 and 4)

Case 1: user receives the expected results.

Search for:

No. of sites = Any, CPU=60, Mem=80, Additional Net=IPOP, Image=rocks-basic, Time begin=8:00, Time end=10:00, Duration=From begin to end

Flow:

1) Check for sites that match Additional Net = IPOP and Image = ROCK --> NCHC cloud,AIST Cloud,Indiana University cloud,TOS cloud,TP cloud

2) Start with 2 sites: resource demand CPU=30, Mem=40 on each site

3) Check for sites that has capacity for the resource demand -->AIST Cloud,TP cloud

4) For each site, check available cpu,memory > demand during the time specified by the user (Hour1 to Hour2) ->AIST Cloud,TP cloud

5) Create combination as results

Results:

Sites	*CPU Needed*	*Total CPU Avail./Capacity*	*Mem Needed*	*Total Mem Avail./Capacity*	*CPU Speed*	*Network Speed*	*Additional Net*	*Image Types*	*Time Begin*	*Time End*
(AIST Cloud)&(TP cloud)	30:30	62/64	40:40	82/128	-	-	IPOP	rocks-basic	8:00	10:00

Case 2: User did not get the expected results.

Search for:

No. of sites = 2, CPU=70, Mem=40, Additional Net=ENT, Image=rocks-sge, Time begin=8:00, Time end=13:00, Duration=2 hours

Flow:

1) Check for sites that match Additional Net = ENT and Image = rocks-sge--> NCHC cloud,AIST Cloud,NAIST cloud,TOS cloud,UCSD cloud,TW cloud,B1 cloud,CC cloud

2) Start with 2 sites: resource demand CPU=35, Mem=20 on each site

3) Check for sites that has capacity for the resource demand -->NAIST cloud,TOS cloud,UCSD cloud,TW cloud

4.1) For each site, check available cpu,memory > demand during the time specified by the user (Hour1 to Hour3) ->NCHC cloud

4.2) For each site, check available cpu,memory > demand during the time specified by the user (Hour2 to Hour4) ->None

4.3) For each site, check available cpu,memory > demand during the time specified by the user (Hour3 toHour5) ->None

5) Create combination as results ->No results if No. of sites = 2

Hour 1 (8:00-9:00)	Hour 2 (9:00-10:00)	Hour 3 (10:00-11:00)
92,192	92,192	92,192
16,32	16,32	16,32
64,128	64,128	32,64
10,30	10,20	20,40

Hour 2 (9:00-10:00)	Hour 3 (10:00-11:00)	Hour 4 (11:00-12:00)
92,192	92,192	28,56
16,32	16,32	16,32
64,128	32,64	32,64
10,20	20,40	20,40

Hour 3 (10:00-11:00)	Hour 4 (11:00-12:00)	Hour 5 (12:00-13:00)
92,192	28,56	28,56
16,32	16,32	6,10
32,64	32,64	8,44
20,40	20,40	20,40

Case 3: The system tries to show the results by changing the search rule from the 50/50 rule to the 80/20 rule.

Search for:

No. of sites = Any, CPU=80, Mem=60, Additional Net=None, Image=centos7, Time begin=11:00, Time end=13:00, Duration=From begin to end

Flow:

1) Check for sites that match Additional Net = None and Image = centos7-->NCHC cloud,AIST Cloud,Indiana University cloud,NAIST cloud,TOS cloud,TP cloud,UCSD cloud,TW cloud,B1 cloud,CC cloud

2) Start with 2 sites: resource demand CPU=40, Mem=30 on each site

3) Check for sites that has capacity for the resource demand -->NAIST cloud,TOS cloud,UCSD cloud,TW cloud,CC cloud

4) For each site, check available cpu,memory > demand during the time specified by the user (Hour4 and Hour5) ->

5) Create combination as results ->No results if No. of sites = 2

Hour 4 (11:00-12:00)	Hour 5 (12:00-13:00)
28,56	28,56
16,32	6,10
32,64	8,44
20,40	20,40
64,40	64,40

6) System return to Start sites with 3 and resource demand to CPU=80/3, Mem=10 on each site but 80 can not be divisible by 3. Search 3 site can not do.

7)The system tries to recalculate from 50/50 to 80/20 using the CPU. Maximum Memory in Results

8) from 7) resource demand CPU=64 (80% of 80), Mem=36 (80% of 60) on each site

9) from 7) resource demand CPU=16 (20% of 80), Mem=24 (20% of 60) on each site

10) from 8) Check for sites that has capacity for the resource demand -->NAIST cloud,UCSD cloud,TW cloud,CC cloud

10.1) For each site, check available 80% of cpu,80% of memory > demand during the time specified by the user (Hour4 and Hour5) ->CC cloud

11) from 8) Check for sites that has capacity for the resource demand -->NAIST cloud,CC cloud

11.1) For each site, check available 20% of cpu,20% of memory > demand during the time specified by the user (Hour4 and Hour5) ->NAIST cloud,CC cloud

12) Create combination as results from 10.1) and 11.1)

Results:

Sites	***CPU Needed***	***Total CPU Avail./Capacity***	***Mem Needed***	***Total Mem Avail./Capacity***	***CPU Speed***	***Network Speed***	***Additional Net***	***Image Types***	***Time Begin***	***Time End***
(NAIST cloud)&(CC cloud)	16:64	92/220	24:36	60/96	-	-	None	centos7	11:00	13:00

Case 4: The system tries to show the results by changing the search rule from the 50/50 rule to Putting resources into the rest of the resources, as many resources as possible.

Search for:

No. of sites = 2, CPU=150, Mem=150, Additional Net=ENT, Image=hku_biolinux, Time begin=8:00, Time end=10:00, Duration= -

Flow:

1) Check for sites that match Additional Net = ENT and Image = hku_biolinux-->NAIST cloud,TOS cloud,UCSD cloud,TW cloud,CC cloud

2) Start with 2 sites: resource demand CPU=75, Mem=75 on each site

3) Check for sites that has capacity for the resource demand -->NAIST cloud,TOS cloud,UCSD cloud,TW cloud,CC cloud

4) For each site, check available cpu,memory > demand during the time specified by the user (Hour1 to Hour2) ->.NAIST cloud

5) Create combination as results ->No results if No. of sites = 2 (in rule 50/50)

6)The system tries to find the site with the most resources left over from all. ->NAIST cloud

7)The system uses all the resources of the NAIST cloud and then selects the rest to reduce the size of the resource.

8)NAIST cloud CPU Using resources to shrink the remaining needs 150-92 = 58

9)NAIST cloud Memory can be used only if the other site is not using memory, which is a violation of the rules that the site must reserve at least 2 units of memory. This site is reserved for 148 remaining needs 2

10)The required resources are left to CPU = 58, Memory = 2 to be searched.

NAIST cloud CPU = 92 memory 148 Missing site with CPU = 58 and memory = 2

11) Start with CPU = 58 and memory = 2 Check for sites that has capacity for the resource demand -->UCSD cloud,CC cloud

12) It get NAIST combine with UCSD cloud and CC cloud

Result:

Sites	***CPU Needed***	***Total CPU Avail./Capacity***	***Mem Needed***	***Total Mem Avail./Capacity***	***CPU Speed***	***Network Speed***	***Additional Net***	***Image Types***	***Time Begin***	***Time End***
(NAIST cloud)&(UCSD cloud)	92:58	156/156	148:2	320/320	-	-	ENT	hku_biolinux	8:00	10:00
(NAIST cloud)&(CC cloud)	92:58	156/220	148:2	224/256	-	-	ENT	hku_biolinux	8:00	10:00