

```
2 2025-01-14 17:44:09,646 - INFO - MLP(
3   (layer_input): Linear(in_features=784, out_features
4     =200, bias=True)
5   (relu): ReLU()
6   (dropout): Dropout(p=0.5)
7   (layer_hidden): Linear(in_features=200,
8     out_features=10, bias=True)
9 )
10 2025-01-14 17:44:09,646 - INFO - use data from these
11 clients: [2 8 6 9 1]
12 2025-01-14 17:44:28,085 - INFO - Round 0, Average
13 loss 0.302
14 permutation: (0, 1, 2, 3, 4)
15 [0.0000000e+00 5.12063785e-05 6.62642408e-03 0.
16 0000000e+00
17 0.0000000e+00 0.0000000e+00 6.78117726e-04 0.
18 0000000e+00
19 5.86630354e-04 1.37506589e-04]
20 permutation: (0, 1, 2, 4, 3)
21 [0.          0.00010574 0.01438529 0.          0
22 .          0.
23 0.00077074 0.          0.00078214 0.000192  ]
24 permutation: (0, 1, 3, 2, 4)
25 [0.          0.00013429 0.02235573 0.          0
26 .          0.
27 0.0007793 0.          0.00082625 0.00031123]
28 permutation: (0, 1, 3, 4, 2)
29 [0.          0.00020498 0.03039307 0.          0
30 .          0.
31 0.00086016 0.          0.00084117 0.00036446]
32 permutation: (0, 1, 4, 2, 3)
33 [0.          0.00027995 0.03843198 0.          0
34 .          0.
35 0.00095438 0.          0.00087218 0.00035865]
36 permutation: (0, 1, 4, 3, 2)
37 [0.          0.00033443 0.04649464 0.          0
38 .          0.
39 0.00102576 0.          0.00091412 0.00041323]
40 permutation: (0, 2, 1, 3, 4)
41 [0.          0.00040093 0.05456302 0.          0
42 .          0.
```

```
31 0.00105656 0.          0.00096568 0.00047728]
32 permutation: (0, 2, 1, 4, 3)
33 [0.          0.0004377  0.06265279 0.          0
   .
   0.
34 0.00106337 0.          0.00100004 0.00051819]
35 permutation: (0, 2, 3, 1, 4)
36 [0.          0.00047368 0.07074918 0.          0
   .
   0.
37 0.00108275 0.          0.0010319  0.00054503]
38 permutation: (0, 2, 3, 4, 1)
39 [0.          0.00051454 0.07883642 0.          0
   .
   0.
40 0.00109396 0.          0.00107866 0.00058275]
41 permutation: (0, 2, 4, 1, 3)
42 [0.          0.00054124 0.08694112 0.          0
   .
   0.
43 0.00109599 0.          0.00111216 0.00061793]
44 permutation: (0, 2, 4, 3, 1)
45 [0.          0.00056457 0.0950385  0.          0
   .
   0.
46 0.00111609 0.          0.00115633 0.00064957]
47 permutation: (0, 3, 1, 2, 4)
48 [0.          0.00060039 0.10314337 0.          0
   .
   0.
49 0.00114026 0.          0.00117802 0.00067547]
50 permutation: (0, 3, 1, 4, 2)
51 [0.          0.00062688 0.11124915 0.          0
   .
   0.
52 0.00116344 0.          0.00119463 0.00068209]
53 permutation: (0, 3, 2, 1, 4)
54 [0.          0.00064516 0.11936658 0.          0
   .
   0.
55 0.0011701  0.          0.00120789 0.00068789]
56 permutation: (0, 3, 2, 4, 1)
57 [0.          0.00066012 0.12748816 0.          0
   .
   0.
58 0.00117591 0.          0.001217   0.00069283]
59 permutation: (0, 3, 4, 1, 2)
60 [0.          0.00066418 0.1356039  0.          0
   .
   0.
61 0.00119759 0.          0.0012336  0.00070034]
```

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62 permutation: (0, 3, 4, 2, 1)
63 [0.          0.00067145 0.14372299 0.          0
   .
   0.
64 0.00121168 0.          0.00124938 0.00071281]
65 permutation: (0, 4, 1, 2, 3)
66 [0.          0.00066786 0.15184047 0.          0
   .
   0.
67 0.00123746 0.          0.00126764 0.00073686]
68 permutation: (0, 4, 1, 3, 2)
69 [0.          0.00066444 0.15996789 0.          0
   .
   0.
70 0.00124572 0.          0.00127011 0.00075684]
71 permutation: (0, 4, 2, 1, 3)
72 [0.          0.00066676 0.16808861 0.          0
   .
   0.
73 0.00125404 0.          0.00128765 0.00077686]
74 permutation: (0, 4, 2, 3, 1)
75 [0.          0.00065656 0.17622687 0.          0
   .
   0.
76 0.00125323 0.          0.00129013 0.00077856]
77 permutation: (0, 4, 3, 1, 2)
78 [0.          0.00064381 0.18435762 0.          0
   .
   0.
79 0.00126406 0.          0.0012984  0.00078096]
80 permutation: (0, 4, 3, 2, 1)
81 [0.          0.00064601 0.19248342 0.          0
   .
   0.
82 0.00127643 0.          0.0013158  0.00078581]
83 permutation: (1, 0, 2, 3, 4)
84 [0.          0.00066432 0.19249336 0.          0
   .
   0.
85 0.00129642 0.          0.00943652 0.00080749]
86 permutation: (1, 0, 2, 4, 3)
87 [0.          0.00067365 0.19249748 0.          0
   .
   0.
88 0.00130319 0.          0.01756301 0.00082919]
89 permutation: (1, 0, 3, 2, 4)
90 [0.          0.00069117 0.19250835 0.          0
   .
   0.
91 0.00132406 0.          0.02568282 0.00084753]
92 permutation: (1, 0, 3, 4, 2)
```

93 [0.	0.00069872	0.1925035	0.	0
.	0.			
94 0.00133755	0.	0.03381336	0.00086603]	
95 permutation:	(1, 0, 4, 2, 3)			
96 [0.	0.00070296	0.19250864	0.	0
.	0.			
97 0.0013426	0.	0.04195065	0.00087194]	
98 permutation:	(1, 0, 4, 3, 2)			
99 [0.	0.00070127	0.19251281	0.	0
.	0.			
100 0.00135347	0.	0.05009132	0.0008753]	
101 permutation:	(1, 2, 0, 3, 4)			
102 [0.	0.00070047	0.19251708	0.	0
.	0.			
103 0.00135776	0.	0.05823367	0.00088121]	
104 permutation:	(1, 2, 0, 4, 3)			
105 [0.	0.00070972	0.1925264	0.	0
.	0.			
106 0.00137453	0.	0.06637266	0.0008896]	
107 permutation:	(1, 2, 3, 0, 4)			
108 [0.	0.00073308	0.1925456	0.	0
.	0.			
109 0.00139793	0.	0.07450005	0.00091049]	
110 permutation:	(1, 2, 3, 4, 0)			
111 [0.	0.00074058	0.19255729	0.	0
.	0.			
112 0.0014055	0.	0.0826391	0.00092798]	
113 permutation:	(1, 2, 4, 0, 3)			
114 [0.	0.00074479	0.19255645	0.	0
.	0.			
115 0.00141305	0.	0.09077986	0.00093466]	
116 permutation:	(1, 2, 4, 3, 0)			
117 [0.	0.00074655	0.19256407	0.	0
.	0.			
118 0.00141573	0.	0.09892133	0.00093394]	
119 permutation:	(1, 3, 0, 2, 4)			
120 [0.	0.00073326	0.19255244	0.	0
.	0.			
121 0.00141327	0.	0.10707369	0.00092225]	
122 permutation:	(1, 3, 0, 4, 2)			
123 [0.	0.00072828	0.19255498	0.	0

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123 .          0.  
124 0.00142252 0.           0.11521103 0.00092729]  
125 permutation: (1, 3, 2, 0, 4)  
126 [0.          0.00074428 0.19257015 0.          0  
     .          0.  
127 0.00144104 0.           0.12334077 0.00094408]  
128 permutation: (1, 3, 2, 4, 0)  
129 [0.          0.00074353 0.19256689 0.          0  
     .          0.  
130 0.00143443 0.           0.13149309 0.00093409]  
131 permutation: (1, 3, 4, 0, 2)  
132 [0.          0.00073177 0.19256938 0.          0  
     .          0.  
133 0.00144025 0.           0.1396388 0.00093571]  
134 permutation: (1, 3, 4, 2, 0)  
135 [0.          0.00072093 0.19256446 0.          0  
     .          0.  
136 0.00143452 0.           0.14778778 0.00092744]  
137 permutation: (1, 4, 0, 2, 3)  
138 [0.          0.00072347 0.19258207 0.          0  
     .          0.  
139 0.00144713 0.           0.15591673 0.00095091]  
140 permutation: (1, 4, 0, 3, 2)  
141 [0.          0.00072009 0.19259882 0.          0  
     .          0.  
142 0.00146229 0.           0.16405069 0.00096851]  
143 permutation: (1, 4, 2, 0, 3)  
144 [0.          0.00071005 0.19259479 0.          0  
     .          0.  
145 0.0014599 0.            0.17219388 0.00097444]  
146 permutation: (1, 4, 2, 3, 0)  
147 [0.          0.00070665 0.19259891 0.          0  
     .          0.  
148 0.00144992 0.           0.18033711 0.00097947]  
149 permutation: (1, 4, 3, 0, 2)  
150 [0.          0.00069495 0.19260149 0.          0  
     .          0.  
151 0.00145249 0.           0.18848107 0.00096697]  
152 permutation: (1, 4, 3, 2, 0)  
153 [0.          0.00068999 0.19260242 0.          0  
     .          0.
```

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154 0.00145168 0.           0.1966242 0.0009645 ]
155 permutation: (2, 0, 1, 3, 4)
156 [0.           0.00069988 0.19260167 0.           0
     .
     0.
157 0.00958001 0.           0.19664331 0.00098282]
158 permutation: (2, 0, 1, 4, 3)
159 [0.           0.00071391 0.19260912 0.           0
     .
     0.
160 0.01771009 0.           0.19665656 0.00099183]
161 permutation: (2, 0, 3, 1, 4)
162 [0.           0.00072126 0.1926083 0.           0
     .
     0.
163 0.0258351 0.           0.19668234 0.00100593]
164 permutation: (2, 0, 3, 4, 1)
165 [0.           0.00073376 0.19261766 0.           0
     .
     0.
166 0.03395911 0.           0.19669816 0.00102932]
167 permutation: (2, 0, 4, 1, 3)
168 [0.           0.00074037 0.19262105 0.           0
     .
     0.
169 0.04208908 0.           0.19671394 0.00104761]
170 permutation: (2, 0, 4, 3, 1)
171 [0.           0.00072281 0.19261113 0.           0
     .
     0.
172 0.05023157 0.           0.19670891 0.00104086]
173 permutation: (2, 1, 0, 3, 4)
174 [0.           0.0007518 0.19264015 0.           0
     .
     0.
175 0.05834837 0.           0.19673126 0.00107068]
176 permutation: (2, 1, 0, 4, 3)
177 [0.           0.00075584 0.19265428 0.           0
     .
     0.
178 0.06648587 0.           0.19673378 0.00107562]
179 permutation: (2, 1, 3, 0, 4)
180 [0.           0.00076662 0.19267098 0.           0
     .
     0.
181 0.07462082 0.           0.19674304 0.0010848 ]
182 permutation: (2, 1, 3, 4, 0)
183 [0.           0.00077482 0.19267498 0.           0
     .
     0.
184 0.08276086 0.           0.19675219 0.00109891]

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185 permutation: (2, 1, 4, 0, 3)
186 [0.          0.00077477 0.19268832 0.          0
     .
     0.
187 0.09089581 0.          0.19675637 0.00110135]
188 permutation: (2, 1, 4, 3, 0)
189 [0.          0.0007788  0.19268656 0.          0
     .
     0.
190 0.09904084 0.          0.19676549 0.00109615]
191 permutation: (2, 3, 0, 1, 4)
192 [0.          0.00079193 0.19269221 0.          0
     .
     0.
193 0.10717336 0.          0.19678037 0.00110437]
194 permutation: (2, 3, 0, 4, 1)
195 [0.          0.00078511 0.192683   0.          0
     .
     0.
196 0.11532081 0.          0.19676525 0.00110015]
197 permutation: (2, 3, 1, 0, 4)
198 [0.          0.00079421 0.19270298 0.          0
     .
     0.
199 0.12345243 0.          0.19677101 0.00110678]
200 permutation: (2, 3, 1, 4, 0)
201 [0.          0.00080164 0.19271217 0.          0
     .
     0.
202 0.13158227 0.          0.1967827  0.00110182]
203 permutation: (2, 3, 4, 0, 1)
204 [0.          0.00080484 0.19271126 0.          0
     .
     0.
205 0.13971972 0.          0.19678674 0.00110007]
206 permutation: (2, 3, 4, 1, 0)
207 [0.          0.00080634 0.19271965 0.          0
     .
     0.
208 0.14785293 0.          0.19678835 0.00110586]
209 permutation: (2, 4, 0, 1, 3)
210 [0.          0.00080107 0.19272206 0.          0
     .
     0.
211 0.15598457 0.          0.19680242 0.00111991]
212 permutation: (2, 4, 0, 3, 1)
213 [0.          0.00077304 0.1927196  0.          0
     .
     0.
214 0.16412535 0.          0.19679733 0.00111228]
215 permutation: (2, 4, 1, 0, 3)
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216 [0.          0.00075698 0.19272874 0.          0
      .
      0.
217 0.17225869 0.          0.19679641 0.00111969]
218 permutation: (2, 4, 1, 3, 0)
219 [0.          0.00073343 0.19273368 0.          0
      .
      0.
220 0.18039783 0.          0.19679559 0.00111625]
221 permutation: (2, 4, 3, 0, 1)
222 [0.          0.00072567 0.19273608 0.          0
      .
      0.
223 0.18852703 0.          0.19680462 0.00110519]
224 permutation: (2, 4, 3, 1, 0)
225 [0.          0.00070771 0.19273517 0.          0
      .
      0.
226 0.19666536 0.          0.19680122 0.00109834]
227 permutation: (3, 0, 1, 2, 4)
228 [0.          0.00071612 0.19275704 0.          0
      .
      0.
229 0.19668052 0.          0.19682049 0.00921895]
230 permutation: (3, 0, 1, 4, 2)
231 [0.          0.00073112 0.19276459 0.          0
      .
      0.
232 0.196703   0.          0.19683805 0.01733384]
233 permutation: (3, 0, 2, 1, 4)
234 [0.          0.00073284 0.19275796 0.          0
      .
      0.
235 0.19670144 0.          0.19683895 0.02546702]
236 permutation: (3, 0, 2, 4, 1)
237 [0.          0.00074039 0.19276974 0.          0
      .
      0.
238 0.19671239 0.          0.19685234 0.03358769]
239 permutation: (3, 0, 4, 1, 2)
240 [0.          0.0007496  0.19278326 0.          0
      .
      0.
241 0.19674094 0.          0.19687335 0.04170242]
242 permutation: (3, 0, 4, 2, 1)
243 [0.          0.00075387 0.19277334 0.          0
      .
      0.
244 0.19675024 0.          0.19689096 0.0498297 ]
245 permutation: (3, 1, 0, 2, 4)
246 [0.          0.0007673  0.19278674 0.          0
      .
      0.

```

```
246 .          0.  
247 0.19677031 0.           0.19689847 0.0579604 ]  
248 permutation: (3, 1, 0, 4, 2)  
249 [0.          0.0007782 0.19279848 0.           0  
     .          0.  
250 0.19678125 0.           0.19690097 0.0660944 ]  
251 permutation: (3, 1, 2, 0, 4)  
252 [0.          0.0007883 0.19281018 0.           0  
     .          0.  
253 0.19678957 0.           0.19691265 0.07422511]  
254 permutation: (3, 1, 2, 4, 0)  
255 [0.          0.00079842 0.19283033 0.           0  
     .          0.  
256 0.19680137 0.           0.19691601 0.08235995]  
257 permutation: (3, 1, 4, 0, 2)  
258 [0.          0.00080593 0.19284291 0.           0  
     .          0.  
259 0.19681484 0.           0.19692025 0.09049138]  
260 permutation: (3, 1, 4, 2, 0)  
261 [0.          0.00081683 0.19285976 0.           0  
     .          0.  
262 0.19682421 0.           0.19693958 0.09861945]  
263 permutation: (3, 2, 0, 1, 4)  
264 [0.          0.00083361 0.19287407 0.           0  
     .          0.  
265 0.19683927 0.           0.19695805 0.10674427]  
266 permutation: (3, 2, 0, 4, 1)  
267 [0.          0.0008361 0.19288839 0.           0  
     .          0.  
268 0.19683349 0.           0.19697485 0.11487241]  
269 permutation: (3, 2, 1, 0, 4)  
270 [0.          0.00084789 0.19289681 0.           0  
     .          0.  
271 0.19684104 0.           0.19697407 0.1230039 ]  
272 permutation: (3, 2, 1, 4, 0)  
273 [0.          0.00086128 0.19291521 0.           0  
     .          0.  
274 0.19684855 0.           0.19699582 0.13112709]  
275 permutation: (3, 2, 4, 0, 1)  
276 [0.          0.00086217 0.19292366 0.           0  
     .          0.
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277 0.19685195 0.           0.19700508 0.13925855]
278 permutation: (3, 2, 4, 1, 0)
279 [0.           0.00085293 0.19292623 0.           0
     .
     0.
280 0.1968646 0.           0.19701271 0.14739006]
281 permutation: (3, 4, 0, 1, 2)
282 [0.           0.0008352 0.19292956 0.           0
     .
     0.
283 0.1968688 0.           0.19701524 0.15552327]
284 permutation: (3, 4, 0, 2, 1)
285 [0.           0.00082086 0.19293536 0.           0
     .
     0.
286 0.19686955 0.           0.19702357 0.16365399]
287 permutation: (3, 4, 1, 0, 2)
288 [0.           0.00079034 0.19293542 0.           0
     .
     0.
289 0.19687298 0.           0.19701601 0.17179298]
290 permutation: (3, 4, 1, 2, 0)
291 [0.           0.00077273 0.19293716 0.           0
     .
     0.
292 0.19687135 0.           0.19701182 0.17992779]
293 permutation: (3, 4, 2, 0, 1)
294 [0.           0.00075759 0.19294728 0.           0
     .
     0.
295 0.1968687 0.           0.19701775 0.18805675]
296 permutation: (3, 4, 2, 1, 0)
297 [0.           0.00075087 0.19296076 0.           0
     .
     0.
298 0.19686374 0.           0.19702371 0.19618399]
299 permutation: (4, 0, 1, 2, 3)
300 [0.           0.00883518 0.19300715 0.           0
     .
     0.
301 0.19692184 0.           0.19708683 0.19623206]
302 permutation: (4, 0, 1, 3, 2)
303 [0.           0.01691169 0.19305546 0.           0
     .
     0.
304 0.1969819 0.           0.19714189 0.19628044]
305 permutation: (4, 0, 2, 1, 3)
306 [0.           0.02501717 0.19308659 0.           0
     .
     0.
307 0.19700802 0.           0.1971797 0.19631319]

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308 permutation: (4, 0, 2, 3, 1)
309 [0.          0.0331225  0.19310617 0.          0
     .
     0.
310 0.19704845 0.          0.19722013  0.19634525]
311 permutation: (4, 0, 3, 1, 2)
312 [0.          0.04122881 0.19313147 0.          0
     .
     0.
313 0.19707956 0.          0.19724704  0.19636548]
314 permutation: (4, 0, 3, 2, 1)
315 [0.          0.0493249  0.19316191 0.          0
     .
     0.
316 0.19710592 0.          0.19728423  0.19639101]
317 permutation: (4, 1, 0, 2, 3)
318 [0.          0.0574194  0.19318982 0.          0
     .
     0.
319 0.19714555 0.          0.19731881  0.19642639]
320 permutation: (4, 1, 0, 3, 2)
321 [0.          0.06551304 0.19322524 0.          0
     .
     0.
322 0.19718517 0.          0.19734242  0.19646768]
323 permutation: (4, 1, 2, 0, 3)
324 [0.          0.07362254 0.1932524  0.          0
     .
     0.
325 0.19720475 0.          0.1973586   0.19649648]
326 permutation: (4, 1, 2, 3, 0)
327 [0.          0.08171094 0.19330308 0.          0
     .
     0.
328 0.19725292 0.          0.19740006  0.19654045]
329 permutation: (4, 1, 3, 0, 2)
330 [0.          0.0898189  0.19333505 0.          0
     .
     0.
331 0.19727989 0.          0.19742112  0.19655811]
332 permutation: (4, 1, 3, 2, 0)
333 [0.          0.09791408 0.19336724 0.          0
     .
     0.
334 0.19731287 0.          0.19745324  0.19659359]
335 permutation: (4, 2, 0, 1, 3)
336 [0.          0.10602456 0.19338912 0.          0
     .
     0.
337 0.19731803 0.          0.19748354  0.19661803]
338 permutation: (4, 2, 0, 3, 1)

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```

339 [0.          0.11411919 0.19342359 0.          0
      .          0.
340 0.197339 0.          0.19752299 0.19666167]
341 permutation: (4, 2, 1, 0, 3)
342 [0.          0.12222959 0.19345394 0.          0
      .          0.
343 0.1973585 0.          0.19754833 0.19668701]
344 permutation: (4, 2, 1, 3, 0)
345 [0.          0.1303509 0.19347503 0.          0
      .          0.
346 0.19736443 0.          0.1975577 0.19670053]
347 permutation: (4, 2, 3, 0, 1)
348 [0.          0.13847478 0.19348691 0.          0
      .          0.
349 0.19736617 0.          0.19757538 0.19669639]
350 permutation: (4, 2, 3, 1, 0)
351 [0.          0.14658837 0.19351236 0.          0
      .          0.
352 0.19739069 0.          0.1975966 0.1967142 ]
353 permutation: (4, 3, 0, 1, 2)
354 [0.          0.15471891 0.19351076 0.          0
      .          0.
355 0.19740004 0.          0.19761343 0.19672253]
356 permutation: (4, 3, 0, 2, 1)
357 [0.          0.16284619 0.1935217 0.          0
      .          0.
358 0.19741599 0.          0.19762274 0.19672662]
359 permutation: (4, 3, 1, 0, 2)
360 [0.          0.17096765 0.19354426 0.          0
      .          0.
361 0.19743606 0.          0.1976294 0.19672739]
362 permutation: (4, 3, 1, 2, 0)
363 [0.          0.17908314 0.19356616 0.          0
      .          0.
364 0.19745372 0.          0.19764278 0.19673335]
365 permutation: (4, 3, 2, 0, 1)
366 [0.          0.1871879 0.19358379 0.          0
      .          0.
367 0.19747458 0.          0.19767127 0.19674746]
368 permutation: (4, 3, 2, 1, 0)
369 [0.          0.19530252 0.19360904 0.          0
      .          0.

```

```

369 .          0.
370 0.19749139 0.          0.19769146 0.1967484 ]
371 2025-01-14 20:49:13,469 - INFO - Round0 User 0:
    Shapley Value = 0.0000
372 2025-01-14 20:49:13,470 - INFO - Round0 User 1:
    Shapley Value = 0.1953
373 2025-01-14 20:49:13,470 - INFO - Round0 User 2:
    Shapley Value = 0.1936
374 2025-01-14 20:49:13,471 - INFO - Round0 User 3:
    Shapley Value = 0.0000
375 2025-01-14 20:49:13,471 - INFO - Round0 User 4:
    Shapley Value = 0.0000
376 2025-01-14 20:49:13,471 - INFO - Round0 User 5:
    Shapley Value = 0.0000
377 2025-01-14 20:49:13,471 - INFO - Round0 User 6:
    Shapley Value = 0.1975
378 2025-01-14 20:49:13,471 - INFO - Round0 User 7:
    Shapley Value = 0.0000
379 2025-01-14 20:49:13,471 - INFO - Round0 User 8:
    Shapley Value = 0.1977
380 2025-01-14 20:49:13,471 - INFO - Round0 User 9:
    Shapley Value = 0.1967
381 2025-01-14 20:49:13,472 - INFO - use data from these
    clients: [9 4 1 6 2]
382 2025-01-14 20:49:33,954 - INFO - Round 1, Average
    loss 0.154
383 permutation: (0, 1, 2, 3, 4)
384 [0.0000000e+00 3.09532229e-04 5.73293169e-05 0.
    0000000e+00
385 7.04272197e-04 0.0000000e+00 2.11369790e-04 0.
    0000000e+00
386 0.0000000e+00 6.78221198e-03]
387 permutation: (0, 1, 2, 4, 3)
388 [0.          0.0003456  0.00016978 0.          0.
    00084039 0.
389 0.00024734 0.          0.          0.01460083]
390 permutation: (0, 1, 3, 2, 4)
391 [0.          0.00034547 0.00020389 0.          0.
    00088101 0.
392 0.00036172 0.          0.          0.0225638 ]
393 permutation: (0, 1, 3, 4, 2)

```

```

394 [0.          0.0003479  0.00030407 0.          0.
     00091515 0.
395 0.00043196 0.          0.          0.0305768 ]
396 permutation: (0, 1, 4, 2, 3)
397 [0.          0.00041847 0.00035056 0.          0.
     00092809 0.
398 0.00051002 0.          0.          0.03862021]
399 permutation: (0, 1, 4, 3, 2)
400 [0.          0.00049648 0.00039536 0.          0.
     00093852 0.
401 0.00056552 0.          0.          0.04667871]
402 permutation: (0, 2, 1, 3, 4)
403 [0.          0.00040333 0.00044307 0.          0.
     00103072 0.
404 0.00059243 0.          0.          0.05476084]
405 permutation: (0, 2, 1, 4, 3)
406 [0.          0.00032879 0.00046246 0.          0.
     00101327 0.
407 0.00062857 0.          0.          0.06285369]
408 permutation: (0, 2, 3, 1, 4)
409 [0.          0.00025372 0.00049847 0.          0.
     00103756 0.
410 0.00061077 0.          0.          0.07095081]
411 permutation: (0, 2, 3, 4, 1)
412 [0.          0.00020282 0.00052593 0.          0.
     00108692 0.
413 0.00060886 0.          0.          0.07904208]
414 permutation: (0, 2, 4, 1, 3)
415 [0.          0.00013899 0.00052513 0.          0.
     00111715 0.
416 0.00065074 0.          0.          0.08714502]
417 permutation: (0, 2, 4, 3, 1)
418 [0.0000000e+00 5.18532683e-05 6.06436171e-04 0.
     0000000e+00
419 1.13216399e-03 0.00000000e+00 7.57137989e-04 0.
     0000000e+00
420 0.00000000e+00 9.52514156e-02]
421 permutation: (0, 3, 1, 2, 4)
422 [0.00000000e+00 5.94188561e-05 6.34086495e-04 0.
     0000000e+00
423 1.14896302e-03 0.00000000e+00 7.66438745e-04 0.

```

```
423 00000000e+00
424 0.00000000e+00 1.03374507e-01]
425 permutation: (0, 3, 1, 4, 2)
426 [0.00000000e+00 8.62141894e-05 6.62575376e-04 0.
     00000000e+00
427 1.17579084e-03 0.00000000e+00 7.82396118e-04 0.
     00000000e+00
428 0.00000000e+00 1.11490084e-01]
429 permutation: (0, 3, 2, 1, 4)
430 [0.00000000e+00 9.01255415e-05 6.85105275e-04 0.
     00000000e+00
431 1.18747292e-03 0.00000000e+00 7.90683285e-04 0.
     00000000e+00
432 0.00000000e+00 1.19599907e-01]
433 permutation: (0, 3, 2, 4, 1)
434 [0.00000000e+00 9.15899774e-05 7.05095606e-04 0.
     00000000e+00
435 1.22505079e-03 0.00000000e+00 8.10811504e-04 0.
     00000000e+00
436 0.00000000e+00 1.27706286e-01]
437 permutation: (0, 3, 4, 1, 2)
438 [0.00000000e+00 1.11604688e-04 7.20257494e-04 0.
     00000000e+00
439 1.25518389e-03 0.00000000e+00 8.18247634e-04 0.
     00000000e+00
440 0.00000000e+00 1.35825260e-01]
441 permutation: (0, 3, 4, 2, 1)
442 [0.00000000e+00 1.28267908e-04 7.41976779e-04 0.
     00000000e+00
443 1.28273067e-03 0.00000000e+00 8.43365667e-04 0.
     00000000e+00
444 0.00000000e+00 1.43942515e-01]
445 permutation: (0, 4, 1, 2, 3)
446 [0.          0.00015685 0.00076144 0.          0.
     00131221 0.
447 0.00087102 0.          0.          0.1520538 ]
448 permutation: (0, 4, 1, 3, 2)
449 [0.          0.00017018 0.00077073 0.          0.
     00133147 0.
450 0.00088696 0.          0.          0.16017275]
451 permutation: (0, 4, 2, 1, 3)
```

```

452 [0.          0.00017188 0.00078085 0.          0.
     0013432 0.
453 0.0008979 0.          0.          0.16829584]
454 permutation: (0, 4, 2, 3, 1)
455 [0.00000000e+00 1.74403894e-04 7.99388930e-04 0.
     00000000e+00
456 1.36751171e-03 0.00000000e+00 9.12118968e-04 0.
     00000000e+00
457 0.00000000e+00 1.76411339e-01]
458 permutation: (0, 4, 3, 1, 2)
459 [0.          0.00019863 0.00081541 0.          0.
     00139603 0.
460 0.0009356 0.          0.          0.18452273]
461 permutation: (0, 4, 3, 2, 1)
462 [0.          0.00019867 0.00081888 0.          0.
     00140105 0.
463 0.00093321 0.          0.          0.19266168]
464 permutation: (1, 0, 2, 3, 4)
465 [0.          0.00024605 0.000888 0.          0.
     00947008 0.
466 0.00100064 0.          0.          0.19270498]
467 permutation: (1, 0, 2, 4, 3)
468 [0.          0.00029784 0.00096158 0.          0.
     0175297 0.
469 0.00107999 0.          0.          0.19275184]
470 permutation: (1, 0, 3, 2, 4)
471 [0.          0.00031361 0.00098659 0.          0.
     02563372 0.
472 0.00111117 0.          0.          0.19277103]
473 permutation: (1, 0, 3, 4, 2)
474 [0.          0.00037125 0.00104671 0.          0.
     03371596 0.
475 0.00116346 0.          0.          0.19279452]
476 permutation: (1, 0, 4, 2, 3)
477 [0.          0.00040714 0.00109521 0.          0.
     04181154 0.
478 0.00119769 0.          0.          0.19281547]
479 permutation: (1, 0, 4, 3, 2)
480 [0.          0.00044557 0.00113452 0.          0.
     04991298 0.
481 0.00124529 0.          0.          0.19283476]

```

```
482 permutation: (1, 2, 0, 3, 4)
483 [0.          0.00045729 0.00115373 0.          0.
     05802115 0.
484 0.00126607 0.          0.          0.19283303]
485 permutation: (1, 2, 0, 4, 3)
486 [0.          0.00044736 0.00118795 0.          0.
     06612425 0.
487 0.00129609 0.          0.          0.19285303]
488 permutation: (1, 2, 3, 0, 4)
489 [0.          0.00044742 0.00121882 0.          0.
     0742265 0.
490 0.0013153 0.          0.          0.19287553]
491 permutation: (1, 2, 3, 4, 0)
492 [0.          0.0004364 0.00125382 0.          0.
     08233805 0.
493 0.00132099 0.          0.          0.19290632]
494 permutation: (1, 2, 4, 0, 3)
495 [0.          0.00042126 0.00126878 0.          0.
     09045962 0.
496 0.00133675 0.          0.          0.19291873]
497 permutation: (1, 2, 4, 3, 0)
498 [0.          0.00042958 0.00129794 0.          0.
     09855866 0.
499 0.00137589 0.          0.          0.19295374]
500 permutation: (1, 3, 0, 2, 4)
501 [0.          0.00043624 0.0013062 0.          0.
     10668769 0.
502 0.00138431 0.          0.          0.19296373]
503 permutation: (1, 3, 0, 4, 2)
504 [0.          0.00044202 0.00131954 0.          0.
     11481422 0.
505 0.00138767 0.          0.          0.19297876]
506 permutation: (1, 3, 2, 0, 4)
507 [0.          0.00045377 0.00134455 0.          0.
     12293067 0.
508 0.0014036 0.          0.          0.19299544]
509 permutation: (1, 3, 2, 4, 0)
510 [0.          0.00046869 0.00137457 0.          0.
     13104552 0.
511 0.00141531 0.          0.          0.19302455]
512 permutation: (1, 3, 4, 0, 2)
```

```

513 [0.          0.00049695 0.00139624 0.          0.
     13915541 0.
514 0.00144197 0.          0.          0.19304615]
515 permutation: (1, 3, 4, 2, 0)
516 [0.          0.00051113 0.00141381 0.          0.
     1472744 0.
517 0.00145123 0.          0.          0.19305615]
518 permutation: (1, 4, 0, 2, 3)
519 [0.          0.00052699 0.00141974 0.          0.
     15539167 0.
520 0.00147542 0.          0.          0.1930721 ]
521 permutation: (1, 4, 0, 3, 2)
522 [0.          0.00055035 0.00144322 0.          0.
     16350478 0.
523 0.00149716 0.          0.          0.19309633]
524 permutation: (1, 4, 2, 0, 3)
525 [0.          0.00057297 0.00147255 0.          0.
     17161531 0.
526 0.00151643 0.          0.          0.1931097 ]
527 permutation: (1, 4, 2, 3, 0)
528 [0.          0.00058383 0.00148935 0.          0.
     17972925 0.
529 0.00153401 0.          0.          0.19314059]
530 permutation: (1, 4, 3, 0, 2)
531 [0.          0.0005913 0.00148934 0.          0.
     18785993 0.
532 0.00154655 0.          0.          0.19314226]
533 permutation: (1, 4, 3, 2, 0)
534 [0.          0.0006172 0.00150699 0.          0.
     19597392 0.
535 0.00158083 0.          0.          0.19317559]
536 permutation: (2, 0, 1, 3, 4)
537 [0.          0.00865513 0.00151364 0.          0.
     1960625 0.
538 0.00159082 0.          0.          0.19322455]
539 permutation: (2, 0, 1, 4, 3)
540 [0.          0.01673265 0.00156098 0.          0.
     19609558 0.
541 0.00163896 0.          0.          0.1932366 ]
542 permutation: (2, 0, 3, 1, 4)
543 [0.          0.02479259 0.00163505 0.          0.

```

```
543 19615963 0.  
544 0.00169784 0. 0. 0.19327012]  
545 permutation: (2, 0, 3, 4, 1)  
546 [0. 0.03286493 0.00168815 0. 0.  
19621958 0.  
547 0.0017444 0. 0. 0.19330297]  
548 permutation: (2, 0, 4, 1, 3)  
549 [0. 0.04095581 0.00171375 0. 0.  
1962535 0.  
550 0.00178418 0. 0. 0.19330568]  
551 permutation: (2, 0, 4, 3, 1)  
552 [0. 0.04902635 0.00176547 0. 0.  
19631516 0.  
553 0.00184923 0. 0. 0.1933286 ]  
554 permutation: (2, 1, 0, 3, 4)  
555 [0. 0.05709962 0.00182359 0. 0.  
19634986 0.  
556 0.00190397 0. 0. 0.19338257]  
557 permutation: (2, 1, 0, 4, 3)  
558 [0. 0.06517642 0.00187743 0. 0.  
19638771 0.  
559 0.00196523 0. 0. 0.19342545]  
560 permutation: (2, 1, 3, 0, 4)  
561 [0. 0.07325423 0.00193527 0. 0.  
19640977 0.  
562 0.00201892 0. 0. 0.19347825]  
563 permutation: (2, 1, 3, 4, 0)  
564 [0. 0.08136221 0.00197048 0. 0.  
19640985 0.  
565 0.00204153 0. 0. 0.1935101 ]  
566 permutation: (2, 1, 4, 0, 3)  
567 [0. 0.08946338 0.00200578 0. 0.  
19642259 0.  
568 0.00208106 0. 0. 0.19353701]  
569 permutation: (2, 1, 4, 3, 0)  
570 [0. 0.09753724 0.0020609 0. 0.  
19646516 0.  
571 0.00213873 0. 0. 0.19359969]  
572 permutation: (2, 3, 0, 1, 4)  
573 [0. 0.10562829 0.00210713 0. 0.  
19651395 0.
```

```

574 0.00217737 0.          0.          0.19363505]
575 permutation: (2, 3, 0, 4, 1)
576 [0.          0.11371335 0.00214345 0.          0.
    19656292 0.
577 0.00220444 0.          0.          0.19367476]
578 permutation: (2, 3, 1, 0, 4)
579 [0.          0.1217967 0.0021916 0.          0.
    19660358 0.
580 0.00224224 0.          0.          0.19372453]
581 permutation: (2, 3, 1, 4, 0)
582 [0.          0.12990135 0.00222184 0.          0.
    1966253 0.
583 0.00225036 0.          0.          0.19375721]
584 permutation: (2, 3, 4, 0, 1)
585 [0.          0.13800065 0.00225059 0.          0.
    19666086 0.
586 0.00227663 0.          0.          0.19379697]
587 permutation: (2, 3, 4, 1, 0)
588 [0.          0.14611107 0.00227672 0.          0.
    19669281 0.
589 0.00227484 0.          0.          0.1938222 ]
590 permutation: (2, 4, 0, 1, 3)
591 [0.          0.15420451 0.0023149 0.          0.
    19674176 0.
592 0.00231795 0.          0.          0.19385945]
593 permutation: (2, 4, 0, 3, 1)
594 [0.          0.16231482 0.00231849 0.          0.
    19676798 0.
595 0.00234417 0.          0.          0.19388564]
596 permutation: (2, 4, 1, 0, 3)
597 [0.          0.1704277 0.00233874 0.          0.
    19679327 0.
598 0.00237201 0.          0.          0.1939109 ]
599 permutation: (2, 4, 1, 3, 0)
600 [0.          0.17852731 0.00236817 0.          0.
    19682861 0.
601 0.00241152 0.          0.          0.19395286]
602 permutation: (2, 4, 3, 0, 1)
603 [0.          0.18662123 0.00239495 0.          0.
    1968721 0.
604 0.00244495 0.          0.          0.19399215]

```

```
605 permutation: (2, 4, 3, 1, 0)
606 [0.          0.19471132 0.00242896 0.          0.
     19691523 0.
607 0.00248402 0.          0.          0.19404112]
608 permutation: (3, 0, 1, 2, 4)
609 [0.          0.19471964 0.00244226 0.          0.
     19692606 0.
610 0.01060718 0.          0.          0.19405193]
611 permutation: (3, 0, 1, 4, 2)
612 [0.          0.19472618 0.00244973 0.          0.
     196936 0.
613 0.01873547 0.          0.          0.19405931]
614 permutation: (3, 0, 2, 1, 4)
615 [0.          0.19472948 0.00245977 0.          0.
     19693847 0.
616 0.02686276 0.          0.          0.19406345]
617 permutation: (3, 0, 2, 4, 1)
618 [0.          0.19472108 0.00245472 0.          0.
     19694678 0.
619 0.03499507 0.          0.          0.19405678]
620 permutation: (3, 0, 4, 1, 2)
621 [0.          0.19472275 0.0024573 0.          0.
     19694849 0.
622 0.04312072 0.          0.          0.19405262]
623 permutation: (3, 0, 4, 2, 1)
624 [0.          0.19473848 0.00247224 0.          0.
     19696261 0.
625 0.05124063 0.          0.          0.1940524 ]
626 permutation: (3, 1, 0, 2, 4)
627 [0.          0.19474181 0.00247805 0.          0.
     19697436 0.
628 0.05937048 0.          0.          0.19405988]
629 permutation: (3, 1, 0, 4, 2)
630 [0.          0.19475514 0.00249391 0.          0.
     19698606 0.
631 0.06749616 0.          0.          0.19407062]
632 permutation: (3, 1, 2, 0, 4)
633 [0.          0.19474751 0.00249466 0.          0.
     19697939 0.
634 0.07563106 0.          0.          0.19406636]
635 permutation: (3, 1, 2, 4, 0)
```

```

636 [0.          0.19475167 0.00249954 0.          0.
     19698435 0.
637 0.08375846 0.          0.          0.19407468]
638 permutation: (3, 1, 4, 0, 2)
639 [0.          0.19475084 0.00249711 0.          0.
     19698858 0.
640 0.09189162 0.          0.          0.19408474]
641 permutation: (3, 1, 4, 2, 0)
642 [0.          0.19475754 0.00249467 0.          0.
     19699031 0.
643 0.10002484 0.          0.          0.19409144]
644 permutation: (3, 2, 0, 1, 4)
645 [0.          0.19474654 0.00250216 0.          0.
     19698932 0.
646 0.10815469 0.          0.          0.19408724]
647 permutation: (3, 2, 0, 4, 1)
648 [0.          0.19472967 0.00249958 0.          0.
     1969942 0.
649 0.11627958 0.          0.          0.19408124]
650 permutation: (3, 2, 1, 0, 4)
651 [0.          0.19472032 0.00250544 0.          0.
     19698828 0.
652 0.12440604 0.          0.          0.19408457]
653 permutation: (3, 2, 1, 4, 0)
654 [0.          0.19471273 0.00250716 0.          0.
     19697484 0.
655 0.13253667 0.          0.          0.1940796 ]
656 permutation: (3, 2, 4, 0, 1)
657 [0.          0.19469663 0.00250959 0.          0.
     19697984 0.
658 0.14066235 0.          0.          0.19408627]
659 permutation: (3, 2, 4, 1, 0)
660 [0.          0.19468317 0.00251795 0.          0.
     19698241 0.
661 0.14878461 0.          0.          0.19408798]
662 permutation: (3, 4, 0, 1, 2)
663 [0.          0.19469151 0.00253389 0.          0.
     19700246 0.
664 0.15690525 0.          0.          0.19409716]
665 permutation: (3, 4, 0, 2, 1)
666 [0.          0.19470391 0.00255053 0.          0.

```

```
666 19701646 0.  
667 0.16502183 0. 0. 0.19411466]  
668 permutation: (3, 4, 1, 0, 2)  
669 [0. 0.19470308 0.00254476 0. 0.  
19702573 0.  
670 0.17314838 0. 0. 0.19411715]  
671 permutation: (3, 4, 1, 2, 0)  
672 [0. 0.19470132 0.00253973 0. 0.  
19703321 0.  
673 0.18127667 0. 0. 0.19412037]  
674 permutation: (3, 4, 2, 0, 1)  
675 [0. 0.19470119 0.00254658 0. 0.  
19703403 0.  
676 0.18940405 0. 0. 0.19413029]  
677 permutation: (3, 4, 2, 1, 0)  
678 [0. 0.19471631 0.00255512 0. 0.  
19704493 0.  
679 0.19752468 0. 0. 0.19414701]  
680 permutation: (4, 0, 1, 2, 3)  
681 [0. 0.19470868 0.0106876 0. 0.  
19704568 0.  
682 0.19751956 0. 0. 0.19414693]  
683 permutation: (4, 0, 1, 3, 2)  
684 [0. 0.19470689 0.0188184 0. 0.  
19704226 0.  
685 0.19752113 0. 0. 0.19415438]  
686 permutation: (4, 0, 2, 1, 3)  
687 [0. 0.19471001 0.0269451 0. 0.  
19704623 0.  
688 0.19753268 0. 0. 0.19416253]  
689 permutation: (4, 0, 2, 3, 1)  
690 [0. 0.19470405 0.03507672 0. 0.  
19704449 0.  
691 0.19752422 0. 0. 0.19417333]  
692 permutation: (4, 0, 3, 1, 2)  
693 [0. 0.19471387 0.04319846 0. 0.  
19705096 0.  
694 0.19752976 0. 0. 0.19418139]  
695 permutation: (4, 0, 3, 2, 1)  
696 [0. 0.1947155 0.05132425 0. 0.  
19704664 0.
```

```
697 0.19754129 0.          0.          0.19419215]
698 permutation: (4, 1, 0, 2, 3)
699 [0.          0.19471948 0.05945091 0.          0.
    19705406 0.
700 0.19754111 0.          0.          0.19419206]
701 permutation: (4, 1, 0, 3, 2)
702 [0.          0.19472941 0.06757834 0.          0.
    19706488 0.
703 0.19755188 0.          0.          0.19419197]
704 permutation: (4, 1, 2, 0, 3)
705 [0.          0.19471925 0.07572167 0.          0.
    19706647 0.
706 0.19754257 0.          0.          0.19417764]
707 permutation: (4, 1, 2, 3, 0)
708 [0.          0.19470491 0.08386005 0.          0.
    19705544 0.
709 0.1975308 0.          0.          0.19417749]
710 permutation: (4, 1, 3, 0, 2)
711 [0.          0.19470562 0.09199586 0.          0.
    19704955 0.
712 0.19753161 0.          0.          0.1941757 ]
713 permutation: (4, 1, 3, 2, 0)
714 [0.          0.19470304 0.10012663 0.          0.
    19704952 0.
715 0.19753824 0.          0.          0.19417481]
716 permutation: (4, 2, 0, 1, 3)
717 [0.          0.19468786 0.10825741 0.          0.
    19705106 0.
718 0.19754061 0.          0.          0.19416376]
719 permutation: (4, 2, 0, 3, 1)
720 [0.          0.19468105 0.11638232 0.          0.
    19705348 0.
721 0.19754966 0.          0.          0.19416192]
722 permutation: (4, 2, 1, 0, 3)
723 [0.          0.19466344 0.12451804 0.          0.
    19704851 0.
724 0.19754624 0.          0.          0.1941535 ]
725 permutation: (4, 2, 1, 3, 0)
726 [0.          0.19465316 0.13265298 0.          0.
    19704419 0.
727 0.19753779 0.          0.          0.19415584]
```

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728 permutation: (4, 2, 3, 0, 1)
729 [0.          0.19464212 0.14078629 0.          0.
     19704065 0.
730 0.1975301 0.          0.          0.1941464 ]
731 permutation: (4, 2, 3, 1, 0)
732 [0.          0.19464619 0.14891288 0.          0.
     19704309 0.
733 0.19752837 0.          0.          0.19414377]
734 permutation: (4, 3, 0, 1, 2)
735 [0.          0.19465198 0.15703862 0.          0.
     19704882 0.
736 0.19752084 0.          0.          0.19414199]
737 permutation: (4, 3, 0, 2, 1)
738 [0.          0.19465514 0.16516274 0.          0.
     19705611 0.
739 0.19752241 0.          0.          0.19415354]
740 permutation: (4, 3, 1, 0, 2)
741 [0.          0.19465671 0.17329607 0.          0.
     19704775 0.
742 0.19752229 0.          0.          0.19414675]
743 permutation: (4, 3, 1, 2, 0)
744 [0.          0.19465233 0.18142517 0.          0.
     19705441 0.
745 0.19752401 0.          0.          0.19414911]
746 permutation: (4, 3, 2, 0, 1)
747 [0.          0.19463307 0.18956004 0.          0.
     19705265 0.
748 0.19751742 0.          0.          0.19414074]
749 permutation: (4, 3, 2, 1, 0)
750 [0.          0.19462392 0.19769231 0.          0.
     197046   0.
751 0.19750754 0.          0.          0.19414251]
752 2025-01-14 23:28:53,904 - INFO - Round1 User 0:
  Shapley Value = 0.0000
753 2025-01-14 23:28:53,904 - INFO - Round1 User 1:
  Shapley Value = 0.1946
754 2025-01-14 23:28:53,904 - INFO - Round1 User 2:
  Shapley Value = 0.1977
755 2025-01-14 23:28:53,905 - INFO - Round1 User 3:
  Shapley Value = 0.0000
756 2025-01-14 23:28:53,905 - INFO - Round1 User 4:

```

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756 Shapley Value = 0.1970
757 2025-01-14 23:28:53,905 - INFO - Round1 User 5:
    Shapley Value = 0.0000
758 2025-01-14 23:28:53,905 - INFO - Round1 User 6:
    Shapley Value = 0.1975
759 2025-01-14 23:28:53,905 - INFO - Round1 User 7:
    Shapley Value = 0.0000
760 2025-01-14 23:28:53,905 - INFO - Round1 User 8:
    Shapley Value = 0.0000
761 2025-01-14 23:28:53,905 - INFO - Round1 User 9:
    Shapley Value = 0.1941
762 2025-01-14 23:28:53,907 - INFO - use data from these
    clients: [4 1 6 2 0]
763 2025-01-14 23:29:18,275 - INFO - Round 2, Average
    loss 0.124
764 permutation: (0, 1, 2, 3, 4)
765 [8.28408065e-05 1.68329505e-03 5.26398893e-05 0.
    00000000e+00
766 6.13958142e-03 0.00000000e+00 1.96655832e-04 0.
    00000000e+00
767 0.00000000e+00 0.00000000e+00]
768 permutation: (0, 1, 2, 4, 3)
769 [1.01472528e-04 2.47461744e-03 9.79263277e-05 0.
    00000000e+00
770 1.33427219e-02 0.00000000e+00 2.84303551e-04 0.
    00000000e+00
771 0.00000000e+00 0.00000000e+00]
772 permutation: (0, 1, 3, 2, 4)
773 [0.0001409 0.00285527 0.00010636 0.          0.
    02104841 0.
774 0.00031369 0.          0.          0.          ]
775 permutation: (0, 1, 3, 4, 2)
776 [0.00018432 0.00306101 0.00013131 0.          0.02892
    0.
777 0.0003746 0.          0.          0.          ]
778 permutation: (0, 1, 4, 2, 3)
779 [0.00020606 0.00320931 0.00017566 0.          0.
    03686983 0.
780 0.00040312 0.          0.          0.          ]
781 permutation: (0, 1, 4, 3, 2)
782 [0.00023122 0.00332561 0.00021406 0.          0.

```

```

782 04485086 0.
783 0.0004566 0. 0. 0. ]
784 permutation: (0, 2, 1, 3, 4)
785 [0.00028534 0.00335796 0.00027239 0. 0.
    05285426 0.
786 0.00054481 0. 0. 0. ]
787 permutation: (0, 2, 1, 4, 3)
788 [0.00037365 0.0034362 0.00027822 0. 0.
    06090419 0.
789 0.00060728 0. 0. 0. ]
790 permutation: (0, 2, 3, 1, 4)
791 [0.00039443 0.00344864 0.00037045 0. 0.
    06893359 0.
792 0.00067111 0. 0. 0. ]
793 permutation: (0, 2, 3, 4, 1)
794 [0.00048048 0.00345527 0.00043402 0. 0.
    07698332 0.
795 0.00073132 0. 0. 0. ]
796 permutation: (0, 2, 4, 1, 3)
797 [0.00055812 0.00354039 0.00044569 0. 0.
    08503813 0.
798 0.00079316 0. 0. 0. ]
799 permutation: (0, 2, 4, 3, 1)
800 [0.00060245 0.00360556 0.00050416 0. 0.
    09311793 0.
801 0.00083824 0. 0. 0. ]
802 permutation: (0, 3, 1, 2, 4)
803 [0.0006734 0.00367313 0.00055426 0. 0.
    10119944 0.
804 0.00090495 0. 0. 0. ]
805 permutation: (0, 3, 1, 4, 2)
806 [0.00072759 0.00372057 0.00057516 0. 0.
    10930019 0.
807 0.00095662 0. 0. 0. ]
808 permutation: (0, 3, 2, 1, 4)
809 [0.00078611 0.00376563 0.00060203 0. 0.
    1174033 0.
810 0.00099513 0. 0. 0. ]
811 permutation: (0, 3, 2, 4, 1)
812 [0.00083113 0.00382063 0.00062704 0. 0.
    12550908 0.

```

