
Algorithm 1 New RibEntry *entry* with New FaceEntry *face*

```
1: Add entry to RIB
2: Add face to entry
3: Create FIB update to add face to entry.name in FIB
4: if face.CHILD_INHERIT == false and face.CAPTURE == false then
5:   Create ancestor_face_list
6:   for each ancestor_face in ancestor_face_list do
7:     if ancestor_face is not in entry.face_list then
8:       Create FIB update to add ancestor_face to entry.name in FIB
9:     end if
10:  end for
11: else if face.CHILD_INHERIT == true and face.CAPTURE == true then
12:   Create ancestor_face_list
13:   for each child in entry.children do
14:     for each ancestor_face in ancestor_face_list do
15:       if child.CAPTURE == true then
16:         ignore child and subtree
17:       end if
18:       if ancestor_face is in child.face_list and child.face.CHILD_INHERIT then
19:         Do not remove ancestor_face from child or subtree
20:       else if ancestor_face is not in child.face_list then
21:         create FIB update to remove ancestor_face from child.name in FIB
22:       end if
23:       if face is in child.face_list and child.face.CHILD_INHERIT then
24:         Ignore child and child.subtree
25:       else if face is not in child.face_list then
26:         create FIB update to add face to child.name in FIB
27:       end if
28:     end for
29:   end for
30: else if face.CHILD_INHERIT == true then
31:   Create ancestor_face_list
32:   for each ancestor_face in ancestor_face_list do
33:     create FIB update to add ancestor_face to entry.name in FIB
34:   end for
35:   if ancestor_face_list has a face with same ID as face.faceId then
36:     replace with face
37:   end if
38:   for each child in entry.children do
39:     for each ancestor_face in ancestor_face_list do
40:       if child.CAPTURE == true then
41:         ignore child and subtree
42:       end if
43:       if ancestor_face is in child.face_list and child.face.CHILD_INHERIT then
44:         Do not add ancestor_face to child or subtree
45:       else if ancestor_face is not in child.face_list then
46:         create FIB update to add ancestor_face to child.name in FIB
47:       end if
48:     end for
49:   end for
50: else if face.CAPTURE == true then
51:   Create ancestor_face_list
52:   for each ancestor_face in ancestor_face_list do
53:     for each child in entry.children do
54:       if child.CAPTURE == true then
55:         ignore child and subtree
56:       end if
57:       if ancestor_face is in child.face_list and child.face.CHILD_INHERIT then
58:         remove ancestor_face from ancestor_face_list
59:       else if ancestor_face is not in child.face_list then
60:         create FIB update to remove ancestor_face from child.name in FIB
61:       end if
62:     end for
63:   end for
64: end if
```

Algorithm 2 Add New FaceEntry *face* to Existing RibEntry *entry*

```
1: Add face to RIB entry
2: Create FIB update to add face to entry.name in FIB
3: ancestor_face_list = empty list
4: if entry.capture became true then
5:   Create ancestor_face_list
6:   for each ancestor_face in ancestor_face_list do
7:     if ancestor_face is not in entry.face_list then
8:       Create FIB update to remove ancestor_face from entry.name in FIB
9:     end if
10:   end for
11: end if
12: for each child in entry.children do
13:   for each ancestor_face in ancestor_face_list do
14:     if child.CAPTURE == true then
15:       ignore child and subtree
16:     end if
17:     if ancestor_face is in child.face_list and child.face.CHILD_INHERIT then
18:       Do not apply to child and subtree
19:     else if ancestor_face is not in child.face_list then
20:       create FIB update to remove ancestor_face from child.name in FIB
21:     end if
22:   end for
23:   if face.CHILD_INHERIT == true then
24:     if face is in child.face_list and child.face.CHILD_INHERIT then
25:       Do not add face to child or subtree
26:     else if face is not in child.face_list then
27:       create FIB update to add face to child.name in FIB
28:     end if
29:   end if
30: end for
```

Algorithm 3 Update Existing FaceEntry *face* in Existing RibEntry *entry*

```
1: Updating entry in RIB
2: if face.cost did not change and face.flags did not change then
3:   return
4: end if
5: if face.cost is different from previous cost then
6:   create FIB update to update face.cost in entry.name in FIB
7:   if face.flags did not change and face.CHILD_INHERIT == true then
8:     for each child in entry.children do
9:       if child.CAPTURE == true then
10:        ignore child and subtree
11:       end if
12:       if face is in child.face_list and child.face.CHILD_INHERIT then
13:        ignore child and subtree
14:       else if face is not in child.face_list then
15:        create FIB update to update face.cost in child.name in FIB
16:       end if
17:     end for
18:   end if
19: end if
20: if turn on CHILD_INHERIT flag then
21:   for each child in entry.children do
22:     if child.CAPTURE == true then
23:       ignore child and child.children
24:     else if entry.face is in child.face_list then
25:       ignore child
26:     else if entry.face is in child.face_list and child.face.CHILD_INHERIT then
27:       ignore child and child.children
28:     else
29:       create FIB update to add entry.face to child.name in FIB
30:     end if
31:   end for
32: else if turn off CHILD_INHERIT flag then
33:   ancestor_face = ancestor with face.faceId and CHILD_INHERIT
34:   for each child in entry.children do
35:     if child.CAPTURE == true then
36:       ignore child and child.children
37:     else if entry.face is in child.face_list then
38:       ignore child
39:     else if entry.face is in child.face_list and child.face.CHILD_INHERIT then
40:       ignore child and child.children
41:     else
42:       create FIB update to remove entry.face from child.name in FIB
43:       create FIB update to add ancestor_face to child.name in FIB
44:     end if
45:   end for
46: end if
```

Algorithm 4 Update Existing FaceEntry *face* in Existing RibEntry *entry* (continued)

```

1: if turn on CAPTURE flag then
2:   create ancestor_face_list
3:   for each ancestor_face in ancestor_face_list do
4:     if ancestor_face is in entry.face_list then
5:       continue
6:     else
7:       create FIB update to remove ancestor_face from entry.name in FIB
8:     end if
9:   end for
10:  for each child in entry.children do
11:    for each ancestor_face in ancestor_face_list do
12:      if ancestor_face is in child.face_list and face.CHILD_INHERIT then
13:        Do not remove ancestor_face from child or subtree
14:      else if face is not in child.face_list then
15:        create FIB update to remove face from child.name in FIB
16:      end if
17:    end for
18:  end for
19: else if turn off CAPTURE flag then
20:   create ancestor_face_list
21:   for each ancestor_face in ancestor_face_list do
22:     if ancestor_face is in entry.face_list then
23:       continue
24:     else
25:       create FIB update to add ancestor_face to entry.name in FIB
26:     end if
27:   end for
28:   for each child in entry.children do
29:     for each ancestor_face in ancestor_face_list do
30:       if ancestor_face is in child.face_list and face.CHILD_INHERIT then
31:         Do not add ancestor_face to child or subtree
32:       else if ancestor_face is not in child.face_list then
33:         create FIB update to add ancestor_face to child.name in FIB
34:       end if
35:     end for
36:   end for
37: end if

```

Algorithm 5 Remove FaceEntry *face* from RibEntry *entry*

```
1: Remove face from RIB entry
2: Create FIB update to remove face from entry.name in FIB
3: if face.CHILD_INHERIT and face.CAPTURE then
4:   if entry.capture was turned off then
5:     Create ancestor_face_list
6:   end if
7:   for each child in entry.children do
8:     if child.CAPTURE == true then
9:       ignore child and subtree
10:    end if
11:    if face is in child.face_list and child.face.CHILD_INHERIT then
12:      Ignore child and child.subtree
13:    else if face is not in child.face_list then
14:      create FIB update to remove face from child.name in FIB
15:    end if
16:    for each ancestor_face in ancestor_face_list do
17:      if child.CAPTURE == true then
18:        ignore child and subtree
19:      end if
20:      if ancestor_face is in entry.face_list and entry.face.CHILD_INHERIT then
21:        remove ancestor_face from ancestor_face_list
22:      else if face is not in entry.face_list then
23:        create FIB update to add ancestor_face to entry.name in FIB
24:      end if
25:      if ancestor_face is in child.face_list and child.face.CHILD_INHERIT then
26:        remove ancestor_face from ancestor_face_list
27:      else if ancestor_face is not in child.face_list then
28:        create FIB update to add ancestor_face to child.name in FIB
29:      end if
30:    end for
31:  end for
32: else if face.CHILD_INHERIT then
33:   if entry.capture == false then
34:     Create ancestor_face_list
35:   end if
36:   for each child in entry.children do
37:     if child.CAPTURE == true then
38:       ignore child and subtree
39:     end if
40:     if face is in child.face_list and child.face.CHILD_INHERIT then
41:       Ignore child and child.subtree
42:     else if face is not in child.face_list then
43:       create FIB update to remove face from child.name in FIB
44:     end if
45:     if entry.capture == false then
46:       for each ancestor_face in ancestor_face_list do
47:         if ancestor_face is in child.face_list and child.face.CHILD_INHERIT
48:           then
49:             continue
50:         else if ancestor_face is not in child.face_list then
51:           create FIB update to add ancestor_face to child.name in FIB
52:         end if
53:       end for
54:     end if
55:   end for
56: end if
```

Algorithm 6 Remove FaceEntry *face* from RibEntry *entry* (continued)

```
1: if face.CAPTURE then
2:   if entry.capture was turned off then
3:     Create ancestor_face_list
4:   end if
5:   for each ancestor_face in ancestor_face_list do
6:     if entry.capture was turned off then
7:       if ancestor_face is in entry.face_list and entry.face.CHILD_INHERIT then
8:         ignore
9:       else if face is not in entry.face_list then
10:        create FIB update to add ancestor_face to entry.name in FIB
11:      end if
12:    end if
13:  end for
14:  for each child in entry.children do
15:    if child.CAPTURE == true then
16:      ignore child and subtree
17:    end if
18:    for each ancestor_face in ancestor_face_list do
19:      if ancestor_face is in child.face_list and child.face.CHILD_INHERIT then
20:        Do not add ancestor_face to child or subtree
21:      else if ancestor_face is not in child.face_list then
22:        create FIB update to add ancestor_face to child.name in FIB
23:      end if
24:    end for
25:  end for
26: end if
27: if face was blocking an inherited face then
28:   create FIB update to add blocked_face to entry.name in FIB
29: end if
```

Algorithm 7 Create Ancestor Face List

```
1: To create ancestor_face_list given a RibEntry entry:
2: Create list ancestor_face_list
3: parent = entry.parent
4: while parent != NULL do
5:   for each face in parent.face_list do
6:     if face.CHILD_INHERIT == true then
7:       Add face to ancestor_face_list
8:     end if
9:   end for
10:  if parent.CAPTURE == true then
11:    break
12:  end if
13:  parent = parent.parent
14: end while
15: return ancestor_face_list
```
