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

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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:     continue
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*