

Cellular Democracy Mechanics



There are six events that trigger the structural evolution of the [cellular democracy](#), through a state-based algorithm. They are birth of a child, death of a resident, immigration of a family, emigration of a family, loss of territory, and gain of territory.

[Switching allegiance](#) and the [dominion treble](#) are composite events that result in loss of territory and emigration of a family from one cell and gain of territory and immigration of a family in another. They are not treated as independent triggers.

The outcome from an event is a function of the state of the cellular democracy. Typically, the only material state is the state of the level-1 [dominion](#). However, in increasingly rare cases, higher [levels of dominion](#) are involved. Conditions and procedures that apply at level-2 will apply recursively to all higher levels as needed.

A cell is denoted by a cellular signature of up to 9 nodes, denoting itself and its ancestors. Each node contains the cell number from an arbitrarily ordered list of siblings. A node at level 1 is numbered from 1 to 19. The nodes at levels 2 through 9 are numbered 1 through 15. A node value of 0 indicates an orphaned or isolated cellular democracy.

[Phase II dominions](#), early [federated](#) nations, and [orphaned cells](#) have 0s in their cellular signatures. A possible cellular signature at level-3 would be 0.0.1.6.12.8.14. The cellular signature of orphans must be unique. [LGATS](#) will create virtual dominions, if required during [Phase II](#), to ensure unique signatures.

There are two primary operations triggered by the six events. They are [mitosis](#) and [fragmentation/fusion](#). Less commonly, [encirclement capture](#) and [breakout](#) operations occur. Even more rarely, encirclement capture can lead to adoption, and breakout to orphaning.

Mitosis, as in biology, occurs when a single cell breaks apart into two [daughter cells](#). The two daughter cells have identical genetic makeup down to level N. The DNA of a cell is called the district signature. The district signature (discussed next) differs from the cellular signature (discussed above). For mitosis at level N, district signatures are identical to level N, but cellular signatures are identical to level N+1,

with one of the daughter cells using the next available sibling number at level N of the cellular signature.

The district signature is an ordered list of 10 sets for each level of the cellular democracy, 0 through 9. Most non-empty sets will be at levels 1 through 5. A typical district signature might be $S = [\{\}, \{a\}, \{b, c, d\}, \{e, f\}, \{g\}, \{\}, \{h\}, \{\}, \{\}, \{\}]$, where letters are the names of districts.

A district is said to be promoted if it moves to the next higher level of dominion.

The following shows the promotion of "e" in S:

$S = [\{\}, \{a\}, \{b, c, d\}, \{f\}, \{e, g\}, \{\}, \{h\}, \{\}, \{\}, \{\}]$.

A district is said to be demoted, if it moves to the next lower level of dominion. The following shows the demotion of "c" in the original S:

$S = [\{\}, \{a, c\}, \{b, d\}, \{e, f\}, \{g\}, \{\}, \{h\}, \{\}, \{\}, \{\}]$.

Fragmentation/fusion occurs when a cell is broken into one or more pieces and these pieces are then fused with other cells. There are two major subcases. In one case, there exists at least one other cell, a sibling by definition, that has an identical district signature. The other subcase is that there does not exist such a cell. When a cell is fragmented, the sibling number is returned to the available pool. Fragments inherit the sibling number of the fused cell.

When a cell grows to a certain size, mitosis is voluntary and at the discretion of the [cellular council](#). If it reaches a greater size without mitosis, mitosis will be performed automatically by [LGATS](#). The border between the two daughter cells, if mitosis is performed by LGATS, might be different than the border chosen by residents if performed by the cellular council.

When a cell shrinks to a certain size, fragmentation/fusion is voluntary and at the discretion of the cellular council. If the cell reaches a smaller size without fragmentation/fusion, it will be performed automatically by LGATS. If one or more cells exist with the same district signature, fusion must be with those cells, even if fusion causes mitosis.

If fragmentation/fusion is performed by LGATS, the fragments chosen might be different than those which residents might find optimal. Sibling cells have no formal voice on the fragments or population that will be added to their dominion in a fragmentation/fusion. However, the district signature of sibling cells is always

retained. LGATS will favor the shortest possible chain reaction in a fragmentation/fusion.

A district found in no district signatures ceases to exist. Dominion [covenants](#), laws, injunctions, and the council itself disappear. Contracts determine ownership of resources, but covenants within the contract are no longer in force. Covenants can be reinstated by the new dominion where the associated property is located. If the covenant is restored verbatim, [judicial preview](#) is not required.

There is a minimum 24-hour delay between the time the cellular council might voluntarily perform mitosis or fragmentation/fusion and the automatic performance of fragmentation/fusion by LGATS. This is true no matter how fast the cell is growing or shrinking.

For instance, if the immigration or emigration of a large family pushed the cell into the zone of automatic LGATS action, the cellular council would still have 24 hours to perform the action.

The state machine is triggered by exogenous events and generated events. Exogenous events are in **green**.

State Machine Controlling Cellular Democracy Mechanics

| Triggering Event | Level | Size | Action |
|---|--------------|-------------|--------------------------------|
| <i>Birth or family immigration</i> | 1 | < 141 | None |
| <i>Birth or family immigration</i> | 1 | = 141 | Voluntary Mitosis |
| <i>Birth or family immigration</i> | 1 | > 141 | Forced Mitosis |
| <i>Death or family emigration</i> | 1 | > 69 | None |
| <i>Death or family emigration</i> | 1 | = 69 | Voluntary Fragmentation/Fusion |
| <i>Death or family emigration</i> | 1 | < 69 | Forced Fragmentation/Fusion |
| <i>Mitosis at level 1</i> | 2 | < 19 | None |
| <i>Mitosis at level 1</i> | 2 | = 19 | Voluntary Mitosis |
| <i>Mitosis at level 1</i> | 2 | > 19 | Forced Mitosis |
| <i>All sibling level N cells have same district in level N of signature</i> | 2 - 8 | -- | Promote District to Level N+1 |
| <i>Frag/fusion at level 1</i> | 2 | > 9 | None |
| <i>Frag/fusion at level 1</i> | 2 | = 9 | Voluntary Fragmentation/Fusion |
| <i>Frag/fusion at level 1</i> | 2 | < 9 | Forced Fragmentation/Fusion |
| <i>Fragment has district not in fusion partner</i> | | | Eliminate District |
| <i>Not all sibling level N cells have same district in level N+1 of signature</i> | 2 - 8 | -- | Demote District to Level N |
| <i>Mitosis at levels 2 - 8</i> | 3 - 9 | < 15 | None |

| | | | |
|------------------------------------|-------|------|---|
| <i>Mitosis at levels 2 - 8</i> | 3 - 9 | = 15 | Voluntary Mitosis |
| <i>Mitosis at levels 2 - 8</i> | 3 - 9 | > 15 | Forced Mitosis |
| <i>Frag/fusion at levels 2 - 8</i> | 3 - 9 | > 7 | None |
| <i>Frag/fusion at levels 2 - 8</i> | 3 - 9 | = 7 | Voluntary Fragmentation/Fusion |
| <i>Frag/fusion at levels 2 - 8</i> | 3 - 9 | < 7 | Forced Fragmentation/Fusion |
| Territory Gained | | | Check for and handle encirclement capture (see below) |
| Territory Lost or Abandoned | | | Check for and handle breakout (see below) |

Bodies of water, [unrented commons land](#), and residence-free land where the rent is less than nominal are part of the dominion that fully encloses them. This will frequently be a high-level dominion. Settlements on an island or in the middle of these wildernesses are said to be orphaned.

The gaining of territory either through allegiance switching or settlement can create a new lower-level enclosure at level N, where N is less than the previous level of enclosure M. This is called encirclement capture and the sibling number at level N of the added territory's cellular signature replaces the zero at level N of the settlement's cellular signature. The set of districts at level N of the added territory's district signature is inherited by the district signature of the settlement.

When territory is lost from a dominion, either through allegiance switching or abandonment, the dominion enclosing bodies of water, unrented commons land, and residence-free land where the rent is less than nominal might no longer do so. This is called breakout.

The old enclosing dominion's sibling number at level N is changed to zero at level N of the cellular signature of the settlement. The district signature of the settlement at level N is restored to the empty set.