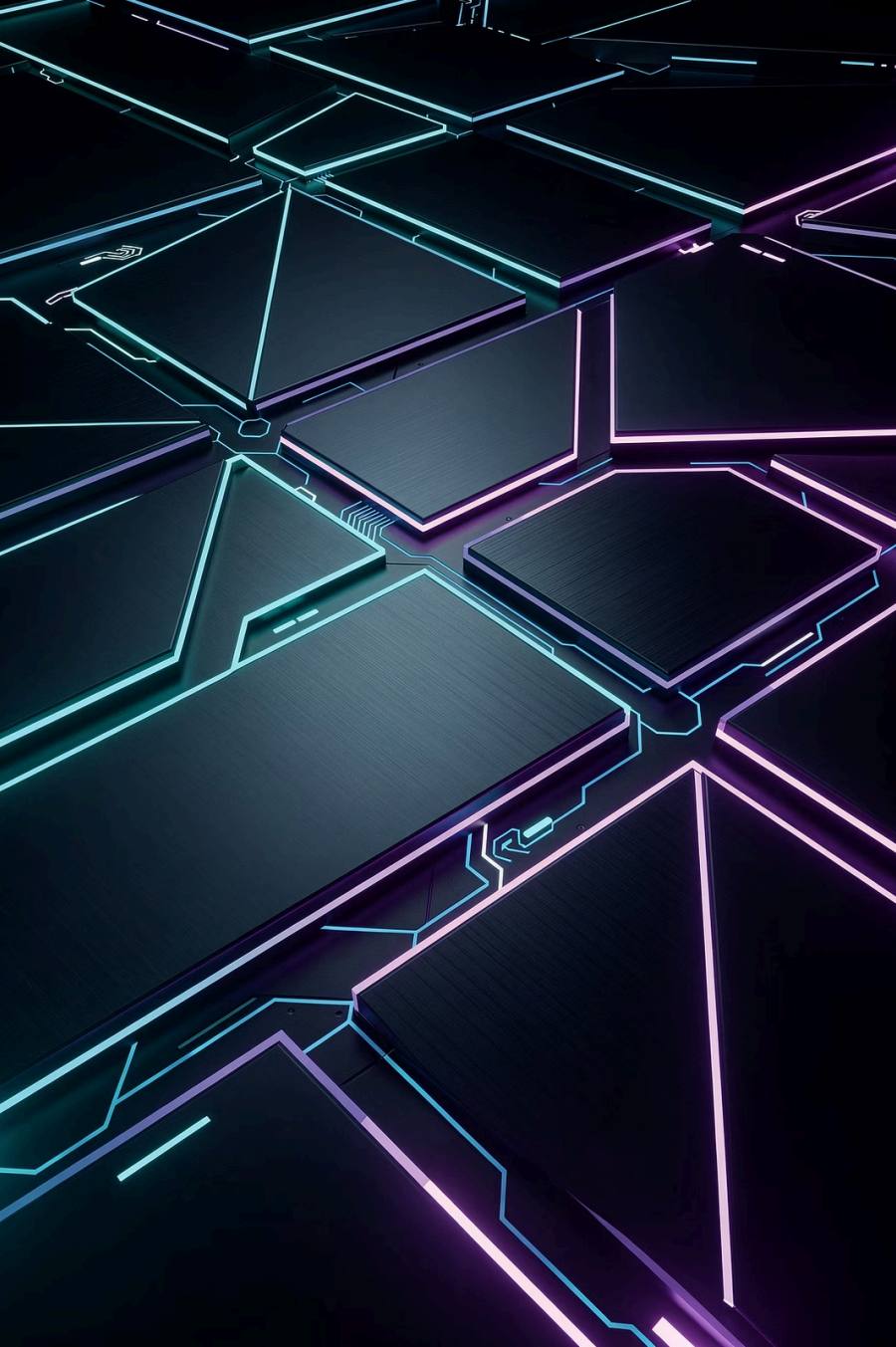




APGC v0.1 — Artifact Panel Geometry Contract

The formal geometry language for Aptlantis Studio interface artifacts — defining shape families, angle energy, corner profiles, safe zones, and manga-inspired panel composition for deterministic SVG and HTML generation.

DRAFT V0.1

APTLANTIS STUDIO

SESM · NIPC · AIC · NEON INK

What APGC Solves

Shape as a First-Class Design Layer

Aptlantis Studio panels are not limited to squares and rectangles. Many panels may be four-sided shapes with slanted edges, asymmetric corners, trapezoid-like forms, manga-inspired compositions, cut-corner containers, and shard accents. Without a contract, generators improvise — producing geometry drift across artifacts.

Shape

Communicates visual rhythm, energy, and composition

Color

Communicates semantic role — governed by NIPC

State

Controls intensity — governed by AIC

Metadata

Carries meaning — governed by SESM

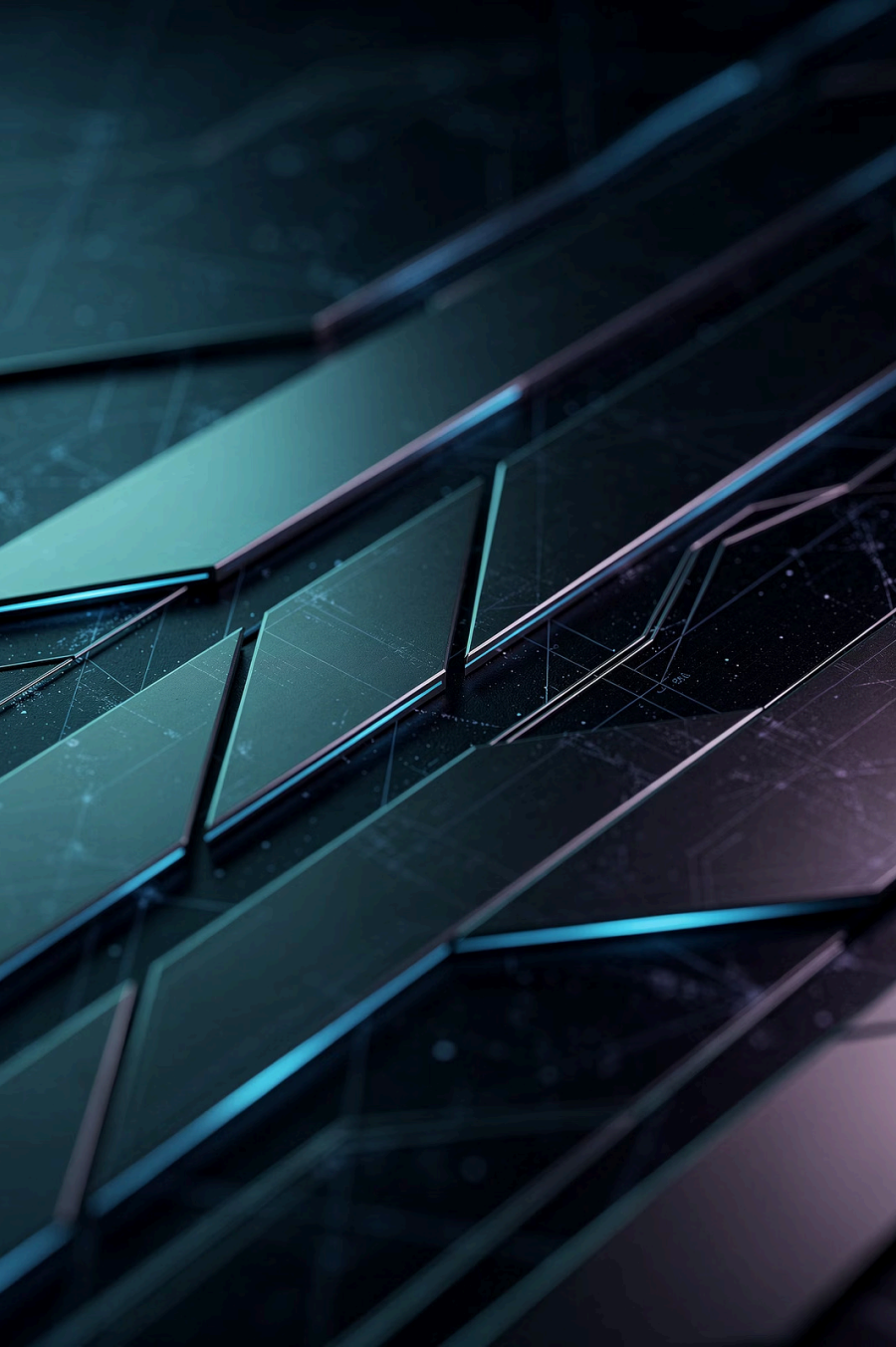
📄 APGC makes those shapes **deterministic rather than random** — alive without compromising clarity, accessibility, archive-friendliness, or deterministic generation.

Chapter 1 — Architecture

Relationship to the Existing Spec Stack

APGC is a geometry layer that sits beside — not above or below — SESM, NIPC, AIC, and Neon Ink. Each spec owns a distinct concern. APGC gives generators and design agents a formal way to decide geometry without overriding any other layer.

Layer / Spec	Responsibility	What it answers
SESM	Embedded metadata, asset identity, provenance	What is this artifact? Where did it come from?
NIPC	Semantic color families, psychological intent, hue rules	What does the hue mean? How intense is the neon?
AIC	Artifact types, required fields, layout regions	What artifact type is this? Which fields are required?
Neon Ink	Brand system, typography, panel grammar, page composition	What should Aptlantis Studio feel like?
APGC	Shape families, corner behavior, angle energy, safe zones	What shape should a panel use? How angular may it be?



Chapter 2 — Goals & Philosophy

Design Goals & Non-Goals

APGC Is Designed To

- Prevent geometry drift across generated SVG and HTML artifacts
- Make manga-inspired panel design deterministic and reusable
- Support non-rectangular four-sided panels without sacrificing readability
- Define shape families that communicate visual energy
- Preserve safe text regions inside angled or asymmetric panels
- Give design agents and build agents explicit geometry rules
- Allow expressive layouts while preserving archive-grade structure

APGC Does Not

- Define color semantics — that is NIPC's domain
- Replace AIC artifact contracts or SESM metadata
- Require every artifact to be non-rectangular
- Require manga-style geometry everywhere
- Require JavaScript or animation
- Make geometry the only carrier of meaning
- Define full page routing or content strategy

Design Philosophy

Manga Energy Without Manga Confusion

Manga panel composition uses angled quadrilaterals, irregular gutters, dynamic cuts, and strong visual rhythm. Aptlantis Studio borrows the useful parts while guarding against the confusing ones.

→ Borrow: Motion & Energy

Diagonal reading flow, section rhythm, dramatic framing, hierarchy, expressive information architecture.

→ Borrow: Visual Hierarchy

Scale variation, asymmetric composition, directional slants that guide the eye across the artifact surface.

Avoid: Unreadable Text Regions

Random angles that push text into clipped corners must never occur in production artifacts.

Avoid: Excessive Fragmentation

Unclear reading order, too many competing focal points, and arbitrary polygon generation undermine the system.

- ❏ **Shape is rhythm, not truth.** A slanted panel may suggest forward motion. But error must still be represented by semantic state and text — never by shape alone.

Canonical Shape Families

Shape family is the primary geometry classification. Twelve families are defined in APGC v0.1, ranging from energy level 0 (calm rectangles) to level 5 (rare visual interrupts). Generators must select only from this list — not improvise.

Shape Family	Energy	Meaning	Best Use
rect-stable	0	Stability, neutrality, dense readability	Docs, tables, metadata, long text
soft-card	0–1	Friendly artifact card	Dataset cards, Q&A items, ordinary panels
cut-corner	1–2	Technical, compiled, artifact-like	Schema cards, download cards, generated artifacts
slant-forward	1–3	Motion, progress, next step	Pipelines, navigation, process flow
slant-back	1–3	History, archive, reflection	Changelog, snapshots, prior versions
trapezoid-wide	1–3	Section identity, banner energy	Headers, hero strips, category panels
manga-panel-a	2–3	Dynamic but readable	Featured sections, section mosaics
manga-panel-b	3–4	Strong asymmetry	Hero mosaics, visual-first panels
manga-panel-c	4	Dramatic composition	Rare campaign or splash surfaces
shard	1–4	Small angular accent	Badges, labels, pointer marks
burst	4–5	Interrupt, spotlight, dramatic emphasis	Rare hero/alert graphics only

The Angle Energy Scale

Angle energy is a numeric measure of how visually dynamic or angular a panel is. Higher energy means stronger slants, more asymmetry, and more dramatic composition. The scale runs from 0 (rectangular, quiet) to 5 (rupture, visual interrupt).

	0 — Rectangular Stable, grid-aligned. Dense content, docs, metadata.
	1–2 — Technical / Editorial Cards, schema panels, Q&A, feature cards. Text must remain in safe zone.
	3–4 — Dynamic / Dramatic Visual sections, hero mosaics, marketing surfaces. Low text density required.
	5 — Rupture Rare alerts and splash graphics only. Never use with dense text.

 **Maximum Energy Rule:** No artifact with long body text should exceed `angle_energy: 2` unless the text is fully contained inside a verified inner safe zone.

Chapter 5 — Directional Semantics

Skew Direction & Reading Flow

Geometry may imply direction, but it must remain secondary to explicit labels, color, state, and metadata. For English-language Aptlantis Studio pages, forward motion should guide the eye from **top-left** → **center** → **lower-right**.



forward

Continue, progress, next step. Use for pipelines, navigation, actions.



back

History, prior state, archive. Use for snapshots, changelog, older releases.



upward

Growth, elevation, spotlight. Use for featured metrics, improvement dashboards.



inward

Focus, convergence. Use for summary panels, synthesis, canonical answers.



mixed

Manga composition rhythm. Use for hero mosaics only — not standard artifact panels.

Corner Profiles & Offset Limits

Corner profile defines how the corners of a panel are shaped. Ten canonical profiles are defined, ranging from plain archival square corners to full manga-irregular geometry. Generators must select from this list only.

Corner Profile	Meaning	Best Use
square	Stable, archival	Docs, tables
soft-radius	Friendly	Cards, Q&A
single-cut	Technical accent	Badges, utility panels
dual-cut	Artifact feel	Download, schema cards
opposite-cut	Motion/balance	Navigation panels
asymmetric-soft	Manga-like readable	Feature, section panels
asymmetric-sharp	Higher drama	Hero support panels
manga-irregular	Full manga	Visual mosaics

Corner Offset Limits by Density

Density	Max Offset
dense	12px
compact	20px
standard	32px
spacious	48px
hero	72px
visual-only	120px

⊗ Corner offset must **never intrude** into the inner safe zone — a validation failure condition.

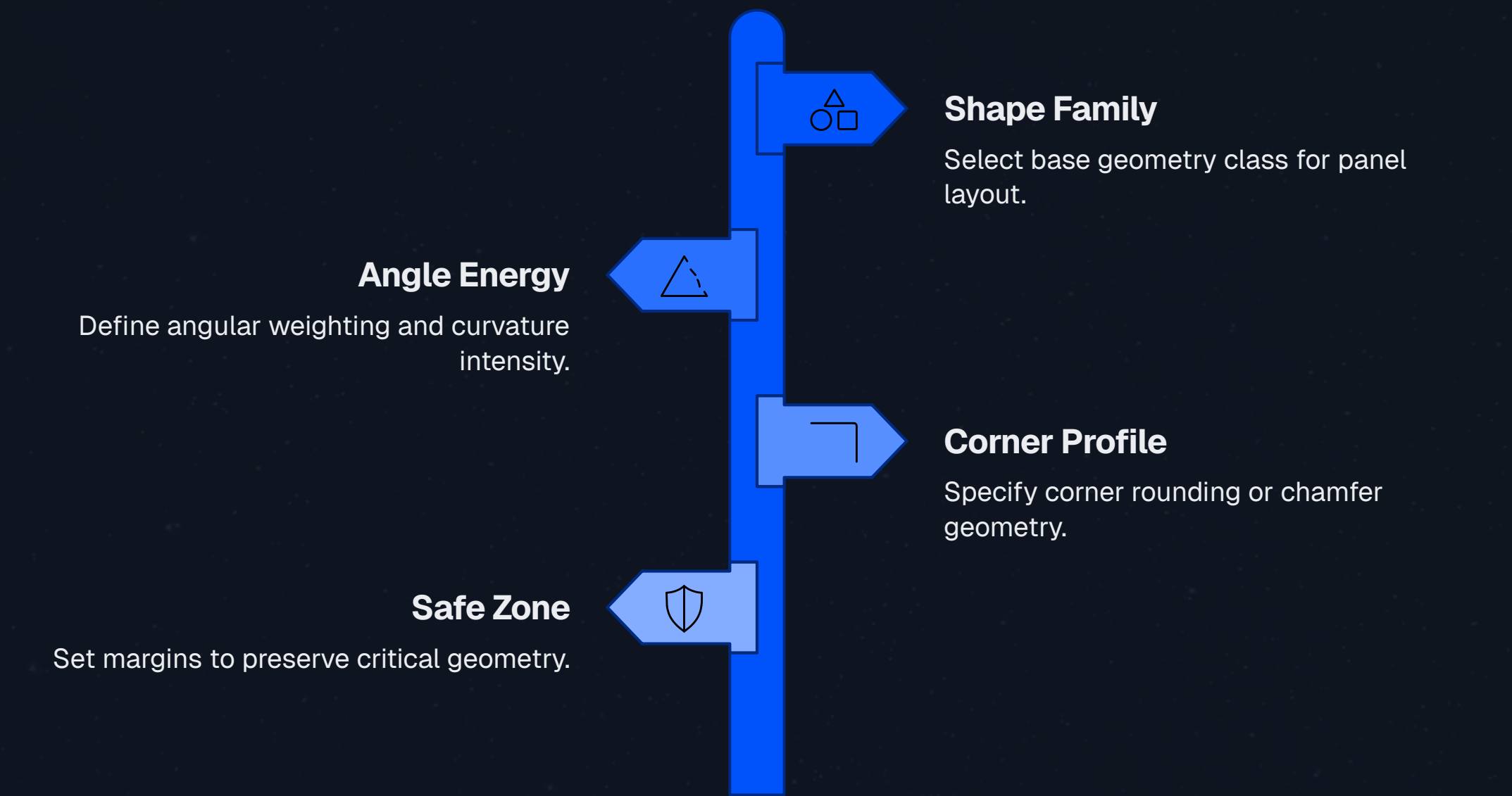
Inner Safe Zones Are Mandatory

Safe zones are mandatory for all non-rectangular panels that contain text, numbers, controls, or important icons. Text may not render outside the safe zone. The safe zone type varies by use case.

	full-rect Entire panel is text-safe. Used for rectangular panels only.
	inset-rect Inner rectangle inside a shaped panel. The default for most artifact panels.
	center-band Horizontal safe band for hero banners and title strips.
	stat-grid Grid-safe regions for numbers and stats panels with predictable cell positions.
	visual-only No text safety guaranteed. Decorative images and abstract shards only.

Five Geometry Decisions

Every APGC-governed panel is defined by exactly five orthogonal decisions. This object structure is the recommended representation in AIC contracts, SESM metadata, and generator templates.



These five decisions form a deterministic chain: given the same artifact type, density, and theme version, a generator should produce identical geometry every time unless a seed or override is explicitly provided. Determinism is a first-class requirement.

```
{
  "geometry": {
    "contract": "apgc-0.1",
    "shape_family": "manga-panel-a",
    "angle_energy": 2,
    "corner_profile": "asymmetric-soft",
    "safe_zone": { "type": "inset-rect", "x": 32, "y": 28,
    "width": 536, "height": 164 },
    "responsive_fallback": "soft-card"
  }
}
```

SVG-First Artifact Generation

SVG is the canonical render target for APGC because Aptlantis Studio treats many interface units as compiled SVG artifacts. Polygon points are expressed in clockwise order. HTML surfaces may use CSS clip-path as an equivalent.

SVG Quadrilateral (Clockwise)

```
<polygon
  points="0,16 580,0 600,204 20,220"
  fill="#111827"
  stroke="#22D3EE"
  stroke-width="2"
/>
<!-- top-left → top-right
      → bottom-right → bottom-left -->
```

Preferred SVG Primitives

- `<polygon>` — simple four-sided shapes
- `<path>` — cut-corner or mixed geometry
- `<clipPath>` — image/content masks
- `<metadata>` — SESM/APGC embedding

CSS clip-path Equivalent

```
.apgc-manga-panel-a {
  clip-path: polygon(
    0% 7%,
    96.7% 0%,
    100% 92.7%,
    3.3% 100%
  );
}
```

Responsive Breakpoints

Width	Geometry
≥ 1200px	Full geometry allowed
900–1199px	Reduce offsets by 20%
640–899px	Reduce offsets by 40%
< 640px	Fallback to soft-card

⚠ Focus Rule: If a clipped panel contains links or buttons, focus outlines must remain visible and must not be clipped beyond recognition. Use an outer wrapper for focus and an inner clipped panel for shape.

Shape Selection by Artifact Type

AIC artifact type contracts should reference APGC for geometry decisions. Each artifact type has a recommended default shape, a set of allowed families, and a maximum angle energy ceiling.

AIC Artifact Type	Default Shape	Allowed Families	Max Energy
dataset-card	soft-card	soft-card, cut-corner, manga-panel-a	2
dataset-header	trapezoid-wide	rect-stable, trapezoid-wide, manga-panel-a	3
pipeline-panel	slant-forward	cut-corner, slant-forward, manga-panel-a	3
qa-item	soft-card	soft-card, cut-corner, slant-forward	2
stats-tile	rect-stable	rect-stable, soft-card, cut-corner	2
theme-board	manga-panel-a	trapezoid-wide, manga-panel-a, manga-panel-b	4
download-card	cut-corner	cut-corner, slant-forward	2
schema-card	cut-corner	rect-stable, cut-corner	2
archive-summary	slant-back	rect-stable, soft-card, slant-back	2
brand-promo-panel	manga-panel-b	manga-panel-a, manga-panel-b, burst	5

Chapter 11 — Manga Mosaics

Manga Mosaic Composition

A manga mosaic is a group of APGC panels arranged as a section, hero, or visual explainer. Mosaics must create visual rhythm, preserve reading order, vary panel scale intentionally, and use asymmetry without randomness.

manga-grid-a

Balanced feature sections. Large primary panel left/top, 2–4 supporting panels right/bottom, moderate slants, clear safe zones.

manga-grid-b

Energetic sections. Large angled hero panel, varied-height supports, stronger diagonal gutters, limited body text.

hero-split-diagonal

Page headers. Left identity block, right visual/artifact block, diagonal divider, center-band safe zone.

rail-and-stack

Sections with side navigation. Thin vertical trapezoid rail, stacked content panels, small shards for status markers.

archive-strip

Timelines, snapshots, changelogs. Mostly rectangular panels, slant-back accents, muted geometry, horizontal reading flow.

pipeline-flow

Pipeline explainers. Forward-slanted stages, violet process accents, orange execution shards, green verification endpoint.

Chapter 12 — Validation

Validation Rules for Generators

Generators should validate APGC fields before output. Six fields are required for every production artifact. Validators should check both failure conditions and emittable warnings.

Required Fields

- `contract`
- `shape_family`
- `angle_energy`
- `corner_profile`
- `safe_zone`
- `responsive_fallback`

For decorative assets,

Generator Resolution Order

A generator receiving APGC-governed artifact requests must follow a deterministic resolution chain. Given the same inputs — source data, artifact type, theme version, shape family, angle energy, and viewBox — the output geometry must be identical every time.

01

Read Artifact Type

Load from AIC contract to determine allowed shape families and maximum energy.

02

Read Semantic Role & State

Load from NIPC/AIC/SESM data to constrain geometry based on meaning.

03

Determine Density

Classify as dense, compact, standard, spacious, hero, or visual-only to set energy ceiling and corner offset limit.

04

Choose Shape Family & Clamp Energy

Select shape family and clamp `angle_energy` to the allowed range for both artifact type and density level.

05

Calculate Polygon & Safe Zone

Compute outer polygon, inner safe zone, and validate that corner offsets do not intrude into the safe zone.

06

Render & Embed Metadata

Render SVG or HTML, embed APGC fields in `<metadata>` or SESM vendor extension, and run the validator.

Recommended Polygon Presets

These presets assume a 600×220 viewBox and are the canonical starting points for generators. Safe zone coordinates are pre-calculated to guarantee text never escapes the inner rectangle.

Shape Family	Outer Polygon Points	Safe Zone (x, y, w, h)
rect-stable	[[0,0],[600,0],[600,220],[0,220]]	x:24 y:24 w:552 h:172
cut-corner	[[0,0],[576,0],[600,24],[600,220],[24,220],[0,196]]	x:32 y:28 w:536 h:164
slant-forward	[[24,0],[600,0],[576,220],[0,220]]	x:48 y:26 w:504 h:168
slant-back	[[0,0],[576,0],[600,220],[24,220]]	x:48 y:26 w:504 h:168
trapezoid-wide	[[36,0],[564,0],[600,220],[0,220]]	x:56 y:30 w:488 h:160
manga-panel-a	[[0,16],[580,0],[600,204],[20,220]]	x:36 y:30 w:528 h:158
manga-panel-b	[[20,0],[600,28],[560,220],[0,192]]	x:56 y:42 w:488 h:136
shard	[[0,8],[92,0],[108,32],[14,40]]	x:14 y:8 w:78 h:24

 All points expressed in clockwise order: top-left → top-right → bottom-right → bottom-left. Deviation from clockwise order will fail SVG rendering validation.

Accessibility & Density Rules

Accessibility Mandates

Non-rectangular panels must preserve all of the following regardless of angle energy:

- **Text contrast**

Glow and bleed effects must never reduce contrast within the safe zone.

- **Focus visibility**

Focus outlines must not be clipped. Outer wrapper receives focus; inner panel receives shape.

- **Reading order**

DOM order must follow reading order even when CSS repositions panels visually.

- **Shape-only meaning**

Error, warning, verified, and deprecated status must *never* be communicated by shape alone.

Density × Energy Constraints

Density	Max Energy	Safe Zone
dense	1	Required
compact	2	Required
standard	2	Required
spacious	3	Required
hero	4	Required for text
visual-only	5	Optional

⚠ **Long Text Rule:** Any panel with body text longer than 240 characters must use `rect-stable` or `soft-card` at energy 0–1.

APGC Metadata Placement & Override Policy

APGC fields may appear in AIC artifact contracts, SESM ui hints, SESM vendor extension fields, generator templates, JSON/TOML theme config, and SVG <metadata> blocks. Overrides are allowed but must be visible and rare.

Full Vendor Extension Pattern

```
{
  "extra": { "vendor": { "aptlantis": {
    "apgc": {
      "contract": "apgc-0.1",
      "shape_family": "manga-panel-a",
      "angle_energy": 2,
      "skew_direction": "forward",
      "corner_profile": "asymmetric-soft",
      "safe_zone": {
        "type": "inset-rect",
        "x": 32, "y": 28,
        "width": 536, "height": 164
      },
      "responsive_fallback": "soft-card"
    },
  }
  }
}
```

Override Policy

Override Object

```
"geometry_override": {
  "enabled": true,
  "reason": "...",
  "approved_by": "design-system" }
```

Valid Override Reasons

- Hero campaign visual
- One-off infographic
- Decorative splash asset
- Experimental theme board
- Archived legacy mockup

Template Naming Convention

```
{artifact_type}.{shape_family}.{density}.svg.tmpl
```

```
pipeline-panel.slant-forward.standard.svg.tmpl
theme-board.manga-panel-a.spacious.svg.tmpl
hero.manga-panel-b.hero.svg.tmpl
```

Summary

The Five-Layer Separation of Responsibilities

APGC makes shape a first-class part of the Aptlantis Studio design system. It allows the system to use manga-informed quadrilateral panels, slants, cuts, shards, trapezoids, and mosaics without drifting into arbitrary decoration — remaining deterministic, accessible, static-friendly, archive-aware, and generator-ready.

SESM Embedded meaning — identity, provenance, agent hints, links	NIPC Color meaning — hue, semantic family, psychological intent, intensity	AIC Artifact structure — types, required fields, regions, render targets
Neon Ink Brand expression — typography, voice, page rhythm, visual identity		APGC Geometry rhythm — shape, corners, angles, safe zones, mosaics

✔ **Opinionated Default:** Default panels are rectangles or soft cards. Geometry escalates purposefully — from stable utility panels through editorial slants to rare manga-panel hero surfaces — always guided by artifact type, density, and semantic role.