

# vXPU Photonic Cognitive Fabric

Integrated digital control plane, tenant/WDM allocation, configuration ownership/epochs, scheduling, fault quarantine, ECC, telemetry, Morph compiler, behavioral PCM/MZI/WDM/thermal models, abstract 128x128 photonic GDS generation and verification/signoff harnesses.

IP-4379 · Source / reference evidence · RTL / reference evaluation

## Function and architecture

- Integrated digital control plane, tenant/WDM allocation, configuration ownership/epochs, scheduling, fault quarantine, ECC, telemetry, Morph compiler, behavioral PCM/MZI/WDM/thermal models, abstract 128x128 photonic GDS generation and verification/signoff harnesses.

## Integration summary

vXPU Photonic Cognitive Fabric provides the documented photonic compute / multi-tenant accelerator-fabric engineering ip responsibility: Integrated digital control plane, tenant/WDM allocation, configuration ownership/epochs, scheduling, fault quarantine, ECC, telemetry, Morph compiler, behavioral PCM/MZI/WDM/thermal models, abstract 128x128 photonic GDS generation and verification/signoff harnesses. Evaluate the exact VXPU-PCF-001 implementation and confirm its integration contract before using it inside the target design.

## Technical record

|                                   |                                                                                                                                                                                                                                                                            |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Canonical identity                | IP-4379                                                                                                                                                                                                                                                                    |
| Native implementation identity    | VXPU-PCF-001                                                                                                                                                                                                                                                               |
| Documented responsibility         | Integrated digital control plane, tenant/WDM allocation, configuration ownership/epochs, scheduling, fault quarantine, ECC, telemetry, Morph compiler, behavioral PCM/MZI/WDM/thermal models, abstract 128x128 photonic GDS generation and verification/signoff harnesses. |
| Recorded evidence class           | Source / reference evidence                                                                                                                                                                                                                                                |
| Interface and physical parameters | Bound to the selected source/configuration; not inferred from name or family.                                                                                                                                                                                              |

## Delivery and release binding

- Exact implementation and configuration manifest
- Documented interfaces and clock/reset contract

- Available reference or verification collateral
- Recorded physical views where authorized and applicable
- Integration acceptance criteria and unresolved gate list

Confirm for the selected release: Source/configuration identity, Interface and dependencies, Verification evidence, Process/library where applicable, Authorized package and acceptance criteria.

## Evidence and qualification

13/13 local Python tests PASS; full 128x128 GDS generated and independently structurally parsed; exact GitHub branch/commit and deterministic ZIP hash recorded; HDL gauntlet source present.

Evidence shown is the Bible record for this canonical implementation, not a fresh tool rerun. External foundry acceptance, silicon measurements, standards certification and unlisted interface/physical parameters are not inferred. Exact delivery and rights are agreed before licensing.

Canonical status: P2 HETEROGENEOUS ENGINEERING RELEASE: SOFTWARE/MODEL + ABSTRACT-GDS STRUCTURAL EVIDENCE EXECUTED; HDL SIM/LINT/SYNTH/FORMAL NOT RUN AT SEALED IMPORT; PHOTONIC PDK/DEVICE/FOUNDY/SILICON SIGNOFF OPEN.

Source basis: Bible v7.42 VERIFIED V29, IP-4379; 119.3 Canonical Version 7.20 registry record - 1 net-new identity (table 848, row 2).

## Evaluation and licensing

Evaluation: Review the exact recorded implementation and agreed test scope. Production: Named-design rights for the agreed qualified release. Custom work: Target integration, verification or physical qualification. Rights, pricing, support and acceptance criteria are agreed for the exact scope.

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