



Shell HPC Site Update

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Definitions & cautionary note

Cautionary Note

The companies in which Shell plc directly and indirectly owns investments are separate legal entities. In this **[report]** “Shell”, “Shell Group” and “Group” are sometimes used for convenience to reference Shell plc and its subsidiaries in general. Likewise, the words “we”, “us” and “our” are also used to refer to Shell plc and its subsidiaries in general or to those who work for them. These terms are also used where no useful purpose is served by identifying the particular entity or entities. “Subsidiaries”, “Shell subsidiaries” and “Shell companies” as used in this **[report]** refer to entities over which Shell plc either directly or indirectly has control. The terms “joint venture”, “joint operations”, “joint arrangements”, and “associates” may also be used to refer to a commercial arrangement in which Shell has a direct or indirect ownership interest with one or more parties. The term “Shell interest” is used for convenience to indicate the direct and/or indirect ownership interest held by Shell in an entity or unincorporated joint arrangement, after exclusion of all third-party interest.

Forward-Looking statements

This **[report]** contains forward-looking statements (within the meaning of the U.S. Private Securities Litigation Reform Act of 1995) concerning the financial condition, results of operations and businesses of Shell. All statements other than statements of historical fact are, or may be deemed to be, forward-looking statements. Forward-looking statements are statements of future expectations that are based on management’s current expectations and assumptions and involve known and unknown risks and uncertainties that could cause actual results, performance or events to differ materially from those expressed or implied in these statements. Forward-looking statements include, among other things, statements concerning the potential exposure of Shell to market risks and statements expressing management’s expectations, beliefs, estimates, forecasts, projections and assumptions. These forward-looking statements are identified by their use of terms and phrases such as “aim”; “ambition”; “anticipate”; “aspire”, “aspiration”, “believe”; “commit”; “commitment”; “could”; “desire”; “estimate”; “expect”; “goals”; “intend”; “may”; “milestones”; “objectives”; “outlook”; “plan”; “probably”; “project”; “risks”; “schedule”; “seek”; “should”; “target”; “vision”; “will”; “would” and similar terms and phrases. There are a number of factors that could affect the future operations of Shell and could cause those results to differ materially from those expressed in the forward-looking statements included in this **[report]**, including (without limitation): (a) price fluctuations in crude oil and natural gas; (b) changes in demand for Shell’s products; (c) currency fluctuations; (d) drilling and production results; (e) reserves estimates; (f) loss of market share and industry competition; (g) environmental and physical risks, including climate change; (h) risks associated with the identification of suitable potential acquisition properties and targets, and successful negotiation and completion of such transactions; (i) the risk of doing business in developing countries and countries subject to international sanctions; (j) legislative, judicial, fiscal and regulatory developments including tariffs and regulatory measures addressing climate change; (k) economic and financial market conditions in various countries and regions; (l) political risks, including the risks of expropriation and renegotiation of the terms of contracts with governmental entities, delays or advancements in the approval of projects and delays in the reimbursement for shared costs; (m) risks associated with the impact of pandemics, regional conflicts, such as the Russia-Ukraine war and the conflict in the Middle East, and a significant cyber security, data privacy or IT incident; (n) the pace of the energy transition; and (o) changes in trading conditions. No assurance is provided that future dividend payments will match or exceed previous dividend payments. All forward-looking statements contained in this **[report]** are expressly qualified in their entirety by the cautionary statements contained or referred to in this section. Readers should not place undue reliance on forward-looking statements. Additional risk factors that may affect future results are contained in Shell plc’s Form 20-F and amendment thereto for the year ended December 31, 2024 (available at www.shell.com/investors/news-and-filings/sec-filings.html and www.sec.gov). These risk factors also expressly qualify all forward-looking statements contained in this **[report]** and should be considered by the reader. Each forward-looking statement speaks only as of the date of this **[report]**, **[April 30, 2024]**. Neither Shell plc nor any of its subsidiaries undertake any obligation to publicly update or revise any forward-looking statement as a result of new information, future events or other information. In light of these risks, results could differ materially from those stated, implied or inferred from the forward-looking statements contained in this **[report]**.

Shell’s net carbon intensity

Also, in this **[report]** we may refer to Shell’s “net carbon intensity” (NCI), which includes Shell’s carbon emissions from the production of our energy products, our suppliers’ carbon emissions in supplying energy for that production and our customers’ carbon emissions associated with their use of the energy products we sell. Shell’s NCI also includes the emissions associated with the production and use of energy products produced by others which Shell purchases for resale. Shell only controls its own emissions. The use of the terms Shell’s “net carbon intensity” or NCI is for convenience only and not intended to suggest these emissions are those of Shell plc or its subsidiaries.

Shell’s net-zero emissions target

Shell’s operating plan and outlook are forecasted for a three-year period and ten-year period, respectively, and are updated every year. They reflect the current economic environment and what we can reasonably expect to see over the next three and ten years. Accordingly, the outlook reflects our Scope 1, Scope 2 and NCI targets over the next ten years. However, Shell’s operating plan and outlook cannot reflect our 2050 net-zero emissions target, as this target is outside our planning period. Such future operating plans and outlooks could include changes to our portfolio, efficiency improvements and the use of carbon capture and storage and carbon credits. In the future, as society moves towards net-zero emissions, we expect Shell’s operating plans and outlooks to reflect this movement. However, if society is not net zero in 2050, as of today, there would be significant risk that Shell may not meet this target.

Forward-Looking non-GAAP measures

This **[report]** may contain certain forward-looking non-GAAP measures such as **[adjusted earnings]** and **[divestments]**. We are unable to provide a reconciliation of these forward-looking non-GAAP measures to the most comparable GAAP financial measures because certain information needed to reconcile those non-GAAP measures to the most comparable GAAP financial measures is dependent on future events some of which are outside the control of Shell, such as oil and gas prices, interest rates and exchange rates. Moreover, estimating such GAAP measures with the required precision necessary to provide a meaningful reconciliation is extremely difficult and could not be accomplished without unreasonable effort. Non-GAAP measures in respect of future periods which cannot be reconciled to the most comparable GAAP financial measure are calculated in a manner which is consistent with the accounting policies applied in Shell plc’s consolidated financial statements.

The contents of websites referred to in this **[report]** do not form part of this **[report]**.

We may have used certain terms, such as resources, in this **[report]** that the United States Securities and Exchange Commission (SEC) strictly prohibits us from including in our filings with the SEC. Investors are urged to consider closely the disclosure in our Form 20-F and any amendment thereto, File No 1-32575, available on the SEC website www.sec.gov.

Agenda

01 Shell Upstream
Ambition

02 Hybrid HPC

03 AWS
Setup & Configuration

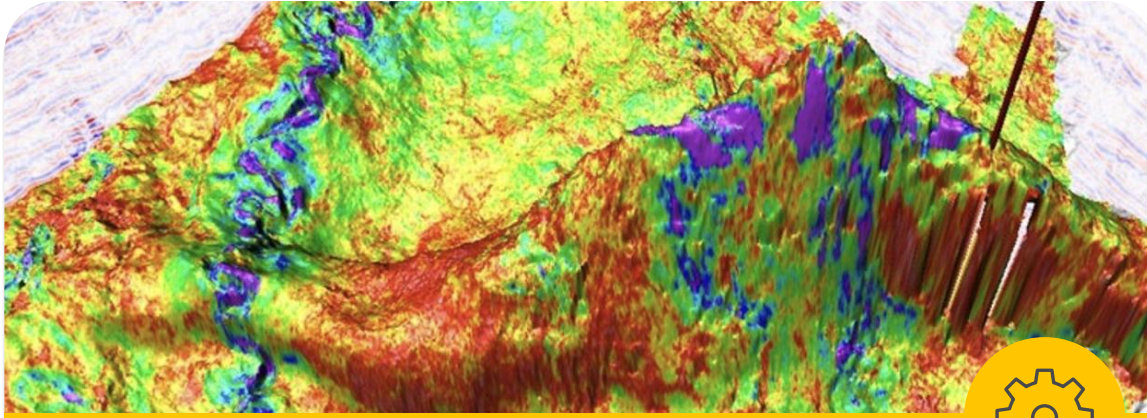
04 On-Premise
Embedded Sustainability

05 Balancing It All

06 Q&A

Shell Upstream Ambition

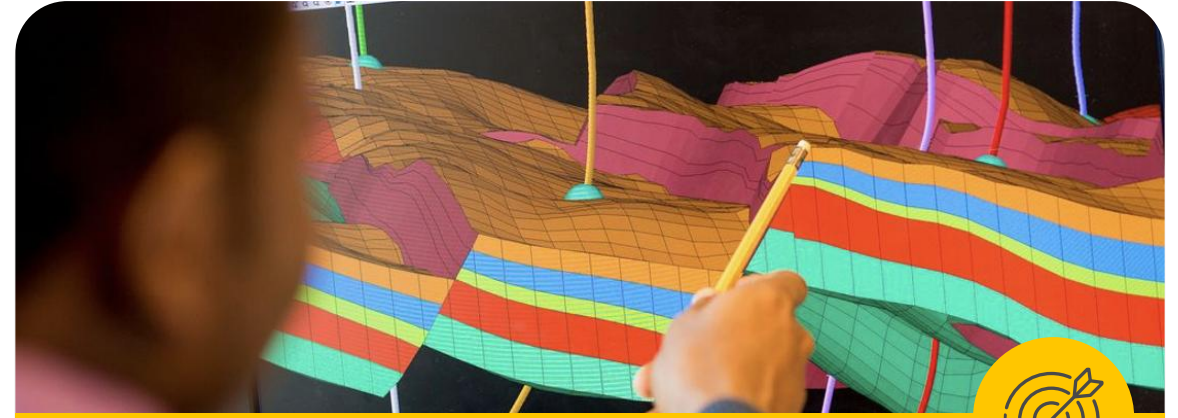
Renewed Subsurface Innovation Strategy to Enable the Ambition



Strengthening Core Workflows

Simplified Digital Landscape and Scaling What Works

- Workflow Simplification
- Seamless Data Discovery, Access & Integration
- Deep AI-Agent-Based Automation



Targeted Differentiation

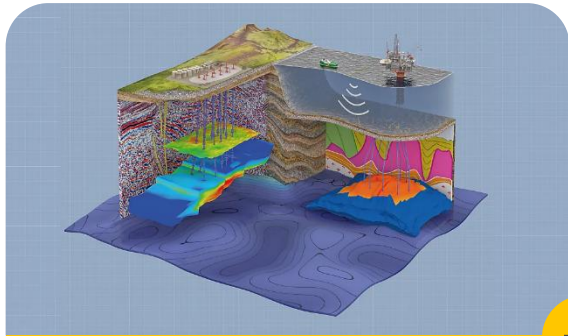
Investing Boldly Where Shell Leads

- Quantitative Imaging for Competitive Recovery
- Opportunity Identification to Accelerate Growth
- Next-Gen Reservoir Simulation for Production Attainment

Shell Upstream Ambition

Renewed Subsurface Innovation Strategy to Enable the Ambition

MORE COMPLEX



Geologic complexity drive more physics

Compute needs grow an order of magnitude as more accurate physics is added. Wave equation algorithms scale exponentially meaning compute needs go up rapidly.

THE 10X CHALLENGE



Enabling more rapid decisions

Embarrassingly parallel workloads mean more compute enables faster results.

VALUE OF INFORMATION



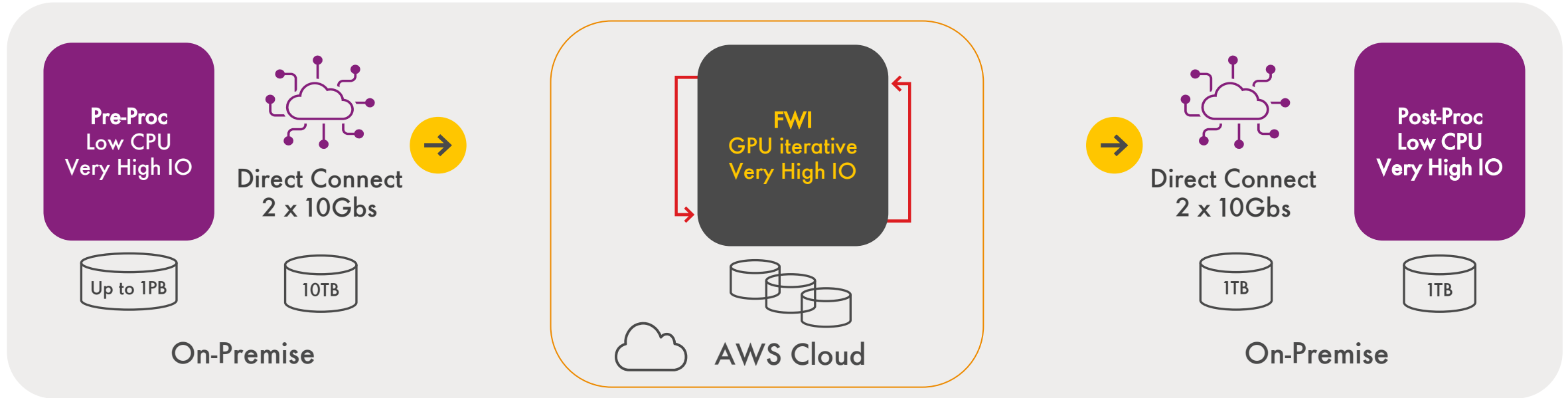
Business decision driven capacity delivery

Move to capacity decisions that are elastic and based on business need rather than procurement timelines

DELIVERY TIMELINES



Current Hybrid HPC Model



Example: Seismic Processing HPC Workflow

AWS

- 2 x 10Gbps network connection from Shell Data Center directly into AWS (AWS Direct Connect)
- A Shell Dedicated Instance pool + Capacity Blocks + SPOT for burst capacity for fast turn-around and/or higher quality
- Leveraging Multi-AZs / project and multi-regions for different projects & use-cases

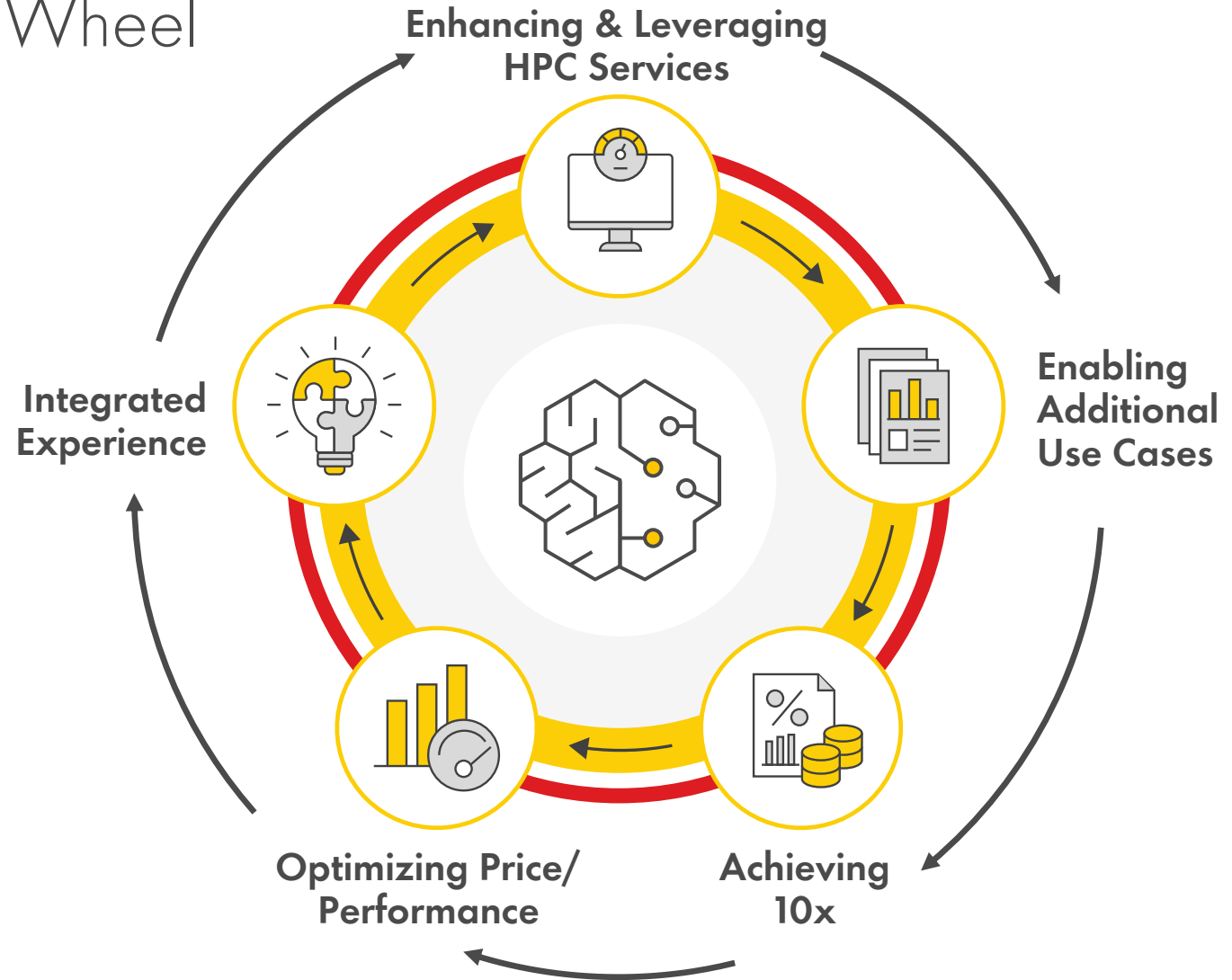
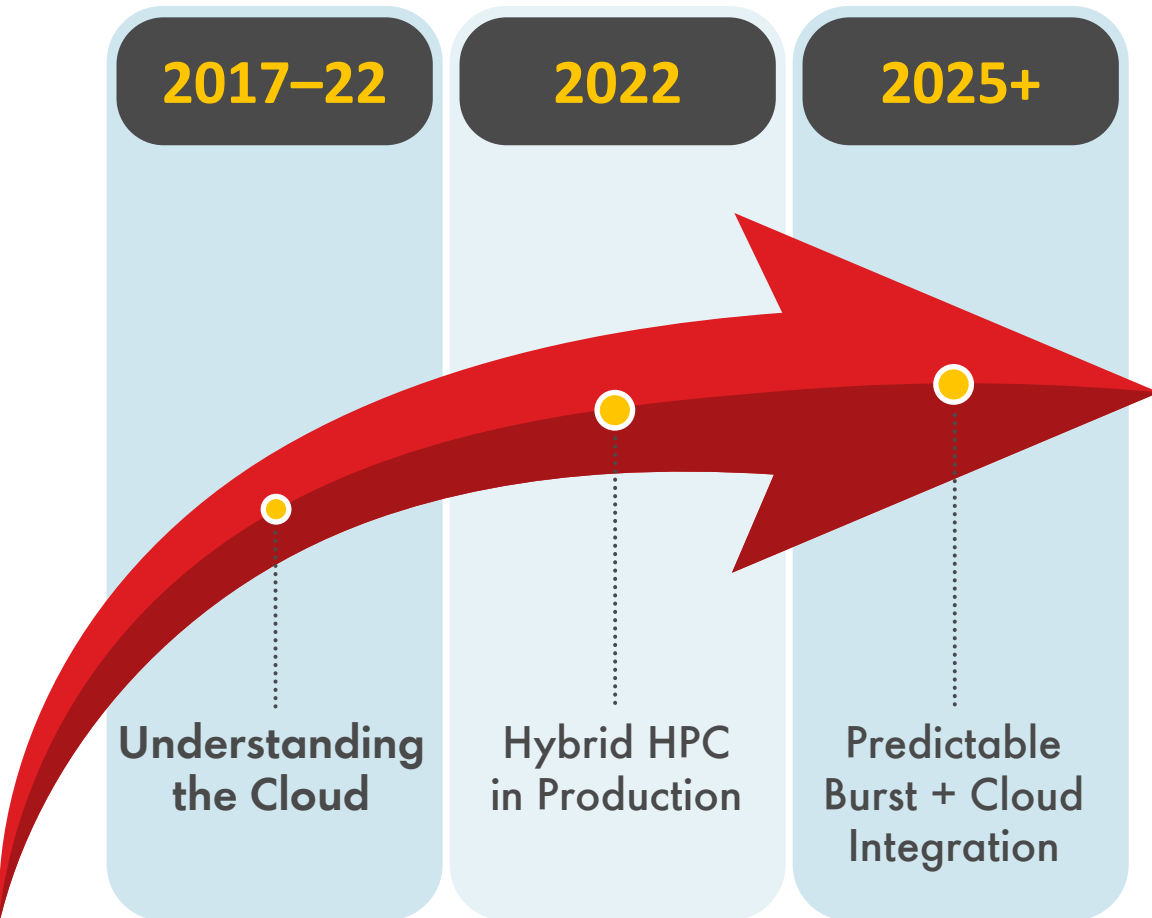
On Premise

- CPU Capacity
- High Performance Storage
- Media Ingestion & Export
- Archiving

AWS HPC

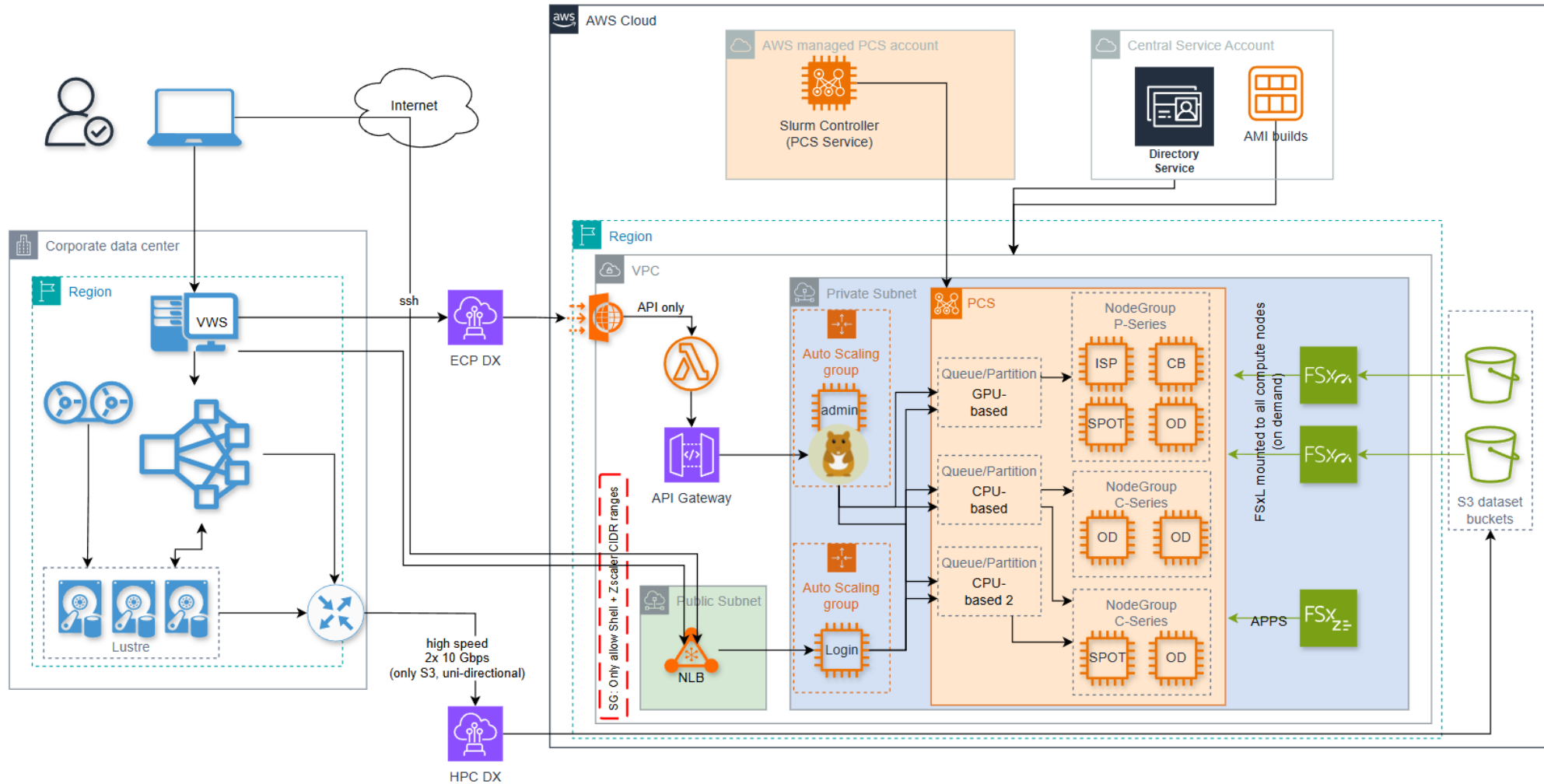
Shell's HPC Evolution

Moving from a Staircase to a Fly Wheel

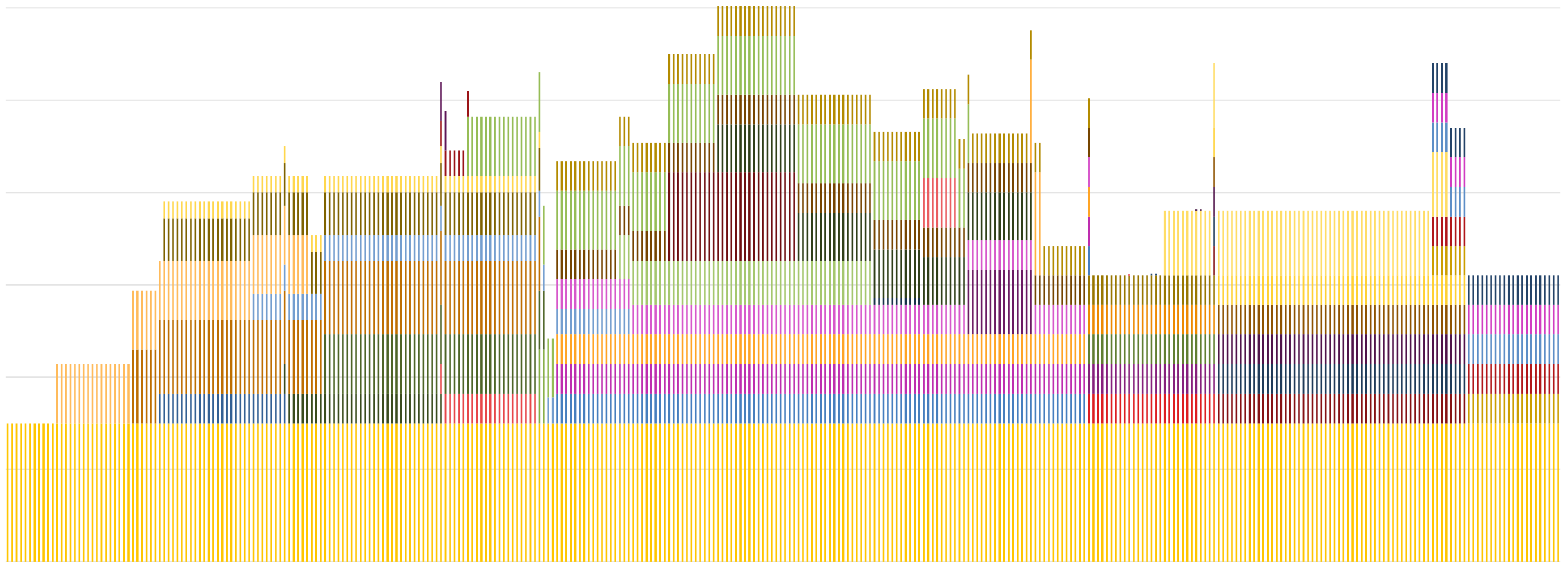


HPC Solution Architecture HPC Evolution

Current High-level Architecture



Elastic HPC: The Engine Behind Continuous Decision-Making



On-Premise

On Premise

HPC PLATFORM FACTS

Serving Size One Production HPC Platform Deployment
4 Data Centers (Global)

Lifecycle Facts

Automotive-style refresh for predictability, efficiency, and circularity

3-Year Cycle

Core Ingredients

CPU AMD • NVMe on-node • Limited InfiniBand (fit-for-purpose, not over-engineered)

GPU NVIDIA • Seismic-Optimized Deployments

Data & File Services

Total Storage LUS • “10 Islands” architecture

Primary File System Qumulo • I/O Intensive Workloads & Home drives & application directories

Archive & Retention Tape drives & servers • HSM-managed tape archive

Platform Stack

Operating System RHEL

Deployment Satellite (current) → MAAS for repeatability and speed

Operational Value

Reporting Consolidated HPC reporting • **Monitoring** End-to-end telemetry & insight • **Risk** Information Risk Management embedded by design

Sustainability Profile

Energy Efficiency Performance-per-watt led • PUE Optimization

Circularity Predictable refresh cycles • Reuse, redeploy, responsible retirement

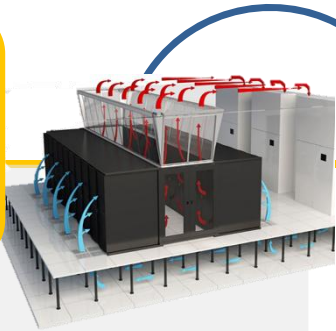
People & Operating Model

Skills Continuous skillset evolution (and periodic revolution) • **Mindset** Embedded service-oriented operating model

⚠ Designed for reliability, efficiency, and scale. Sustainability is built in—not added later.

Shell's deployment of a hybrid liquid cooling environment

Traditional air cooling



PUE of 1.5 – 2.4

- Most common data center cooling mechanism today
- High noise levels
- Density limit of ~30kW/rack
- Exit temperatures of around 120°F (~50°C)

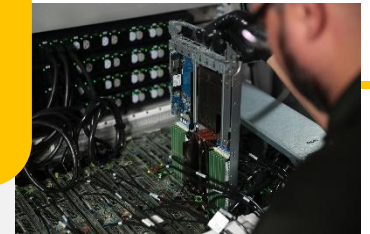
Direct-to-chip liquid cooling



PUE of 1.2 – 1.4

- Utilizes a water/glycol-based coolant to remove heat from the hottest components, e.g. CPUs & GPUs
- Exit temperatures of around 80°F (~26°C)

Single-phase immersion cooling



PUE of 1.03 – 1.1

- Systems are fully immersed in a non-conductive liquid

*PUE = Power usage effectiveness (PUE), a ratio indicating how efficiently a data center uses energy

From Design to Deployment - www.shell.com/immersion



Pioneering sustainable HPC solutions

Amsterdam, The Netherlands

Implemented immersion cooling solution for Shell's HPC cluster in Amsterdam in 2022, helping to deliver high-end GPU processing power while reducing energy consumption within the data center

Houston, Texas USA

Fall 2023 we completed an upgrade of Shell's HPC cluster to a fully immersed system at the Skybox facility, which also operates on renewable power purchased directly from Shell Energy North America

Bangalore, India

2025 an immersion cooled H100 GPU AI cluster at Shell Technology Centre Bangalore





Balancing It All

HPC Strategy: *We can't control the market – but we can control our foundations*

Platform & OS Efficiency

Standardized OS deployment and lifecycle
Fewer variants, faster patching, lower ops effort

Data-Driven Operations

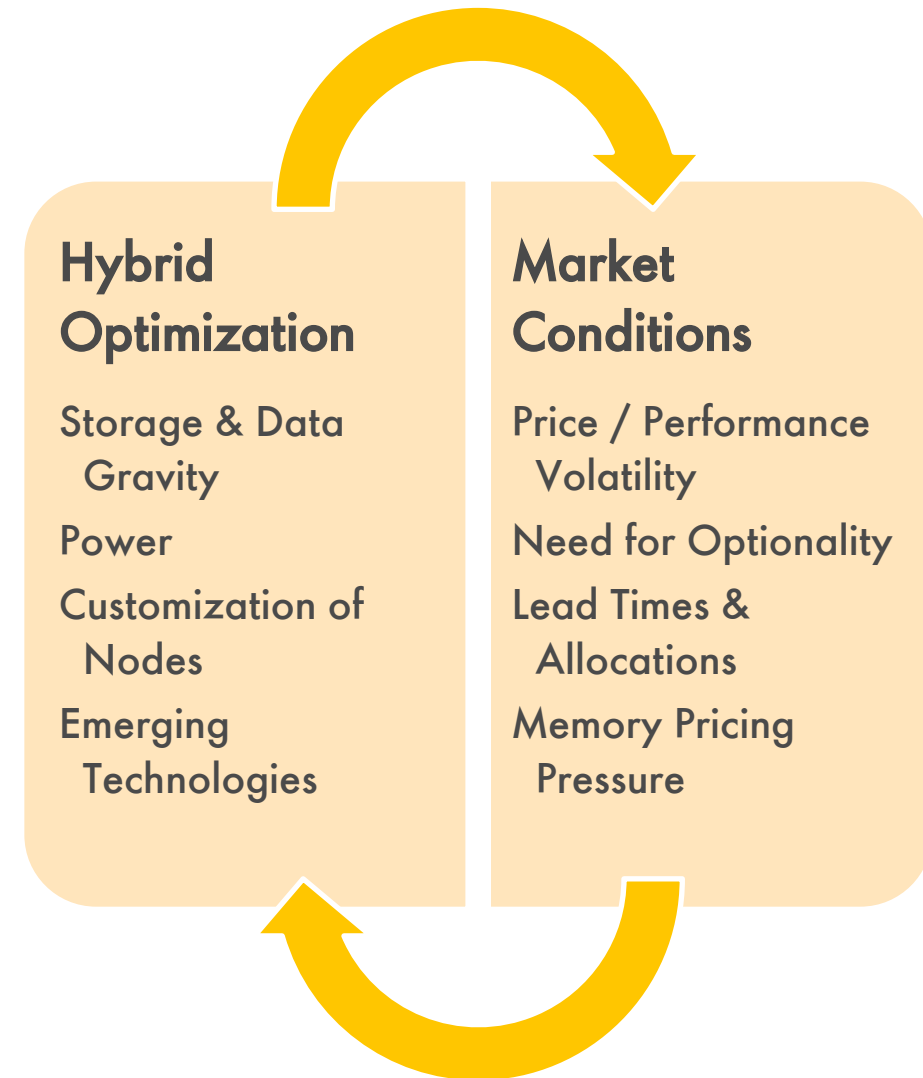
Consistent HPC reporting (cost, usage, performance)
Monitoring & observability to enable predictability

Automation & Simplification

Reduce manual operations and bespoke processes
Focus on repeatable, market-standard platforms

Speed & Predictability

Faster delivery of environments and changes
Clear, reliable ways of working aligned to Shell
Enterprise IDT Strategy



Q&A

