

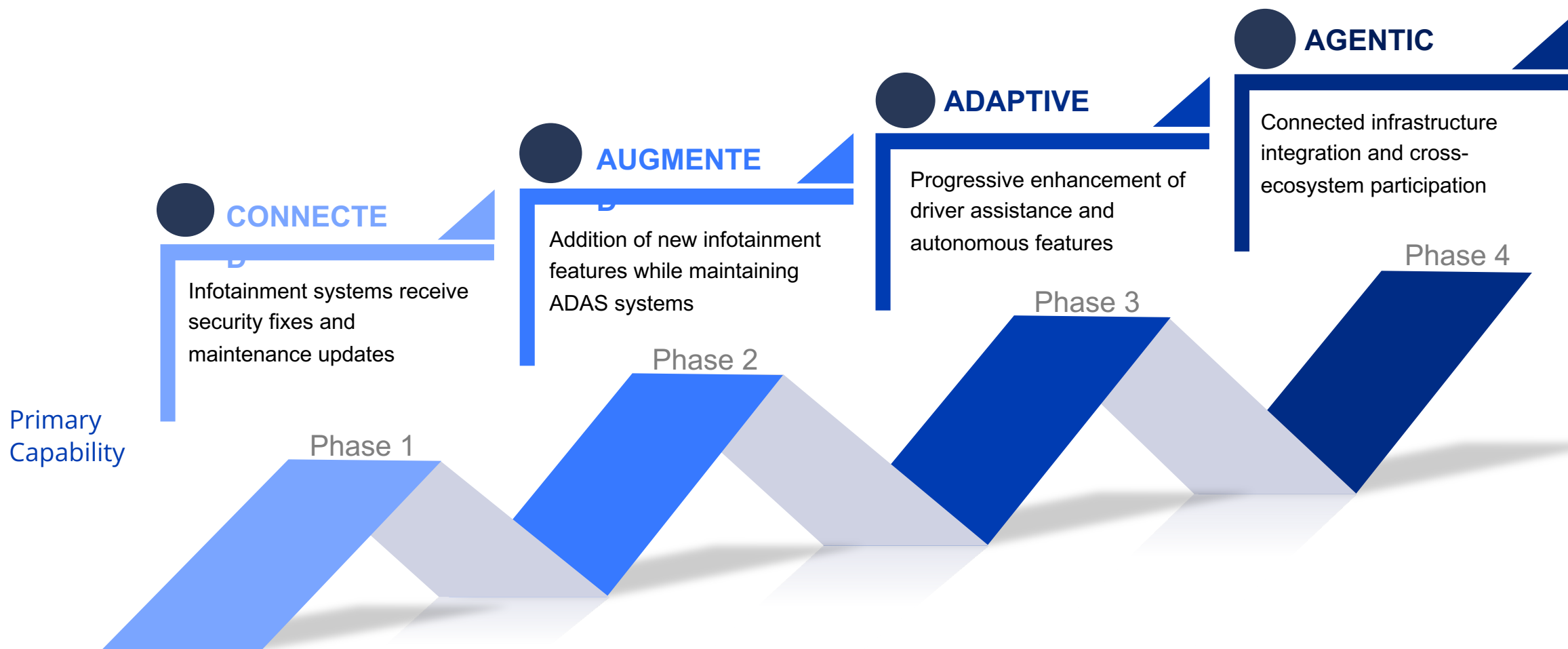
Transforming MCUs in an AI-Defined Era

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Core thesis

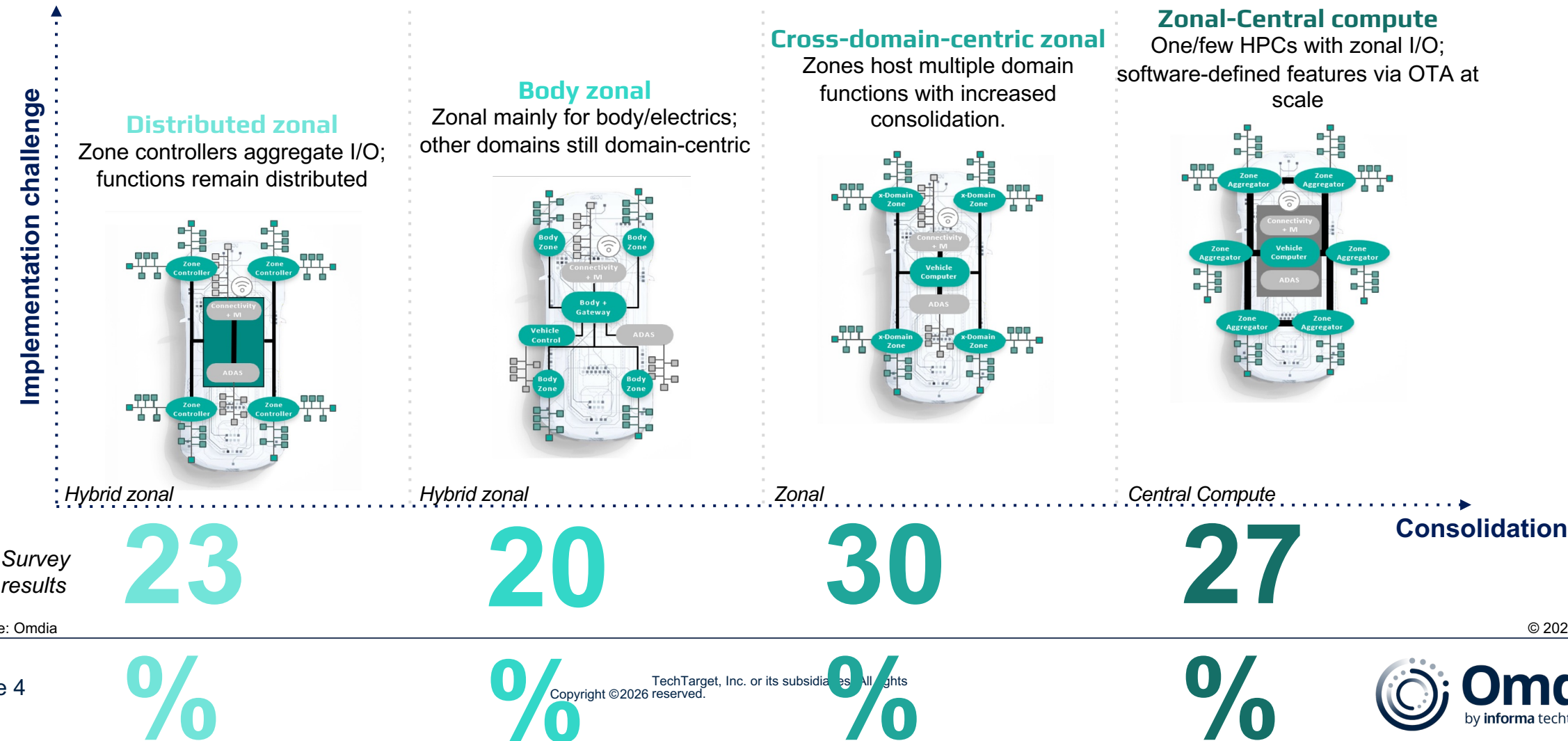
- Evolution will be gradual, not a "cliff edge" leap from <100 ECUs to <30 in one step
- Advanced, flexible, scalable MCUs will dominate for a significant period, not monolithic application processors
- An AI-Defined Vehicle needs more than a centralised intelligence
- This gradual path mirrors the broader Physical AI revolution where intelligence operates directly within physical devices rather than purely cloud-based systems
 - Physical AI is a subtype of EdgeAI with minimal latency that always fails safely

The SDV User Experience Journey



Zonal architecture archetypes

Omdia 2026 SDV Survey: Which E/E architecture archetypes are OEMs planning to adopt for SDVs entering production between 2026 and 2029?



The ongoing transition to SDV

- No cliff edges where you suddenly design out dozens of MCUs all at once
- Shift to ethernet, digital components
- IVI is a headfake but a good lesson

The tyranny of the staircase

- Assuming stages are steps
- Assuming the end is the destination
- Compare with ADAS
- SDV L2+++++++



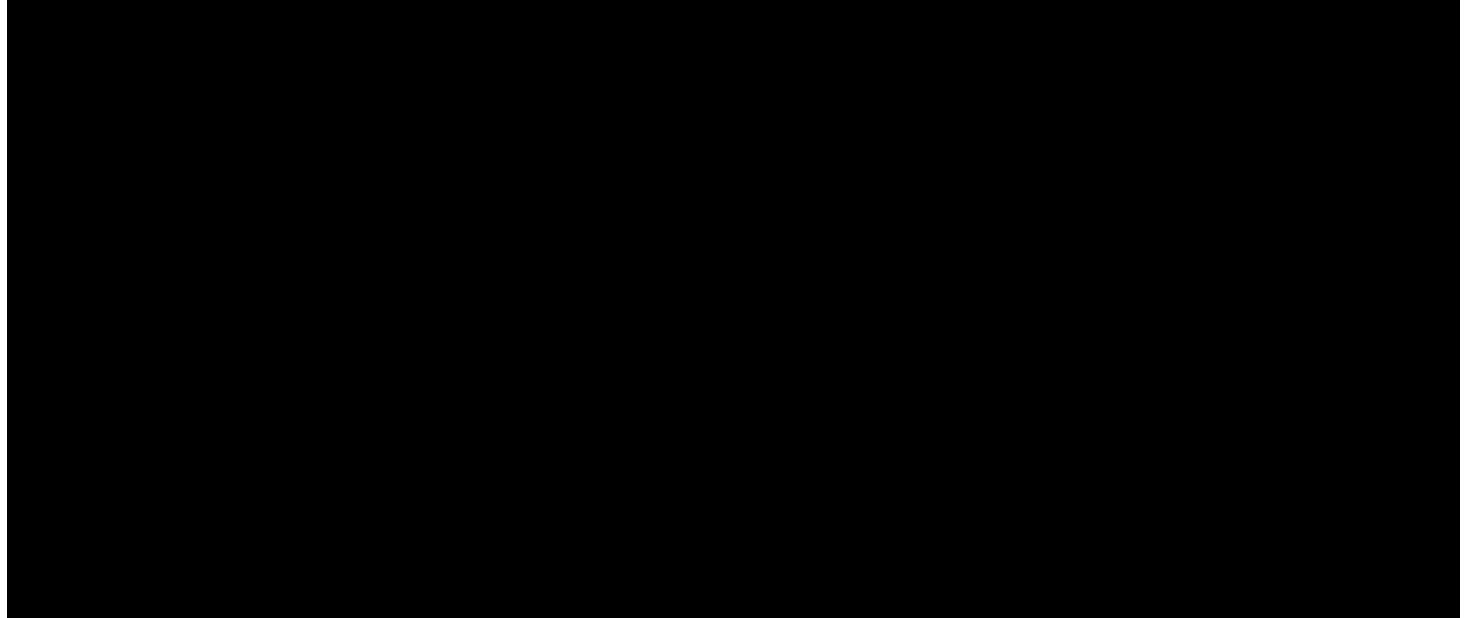
The ongoing transformation of MCUs (con't)

- MPU vs MCU
- Volume fairly steady for MCUs while MPUs grow
- MCU revenue outpaces volume



The ongoing transformation of MCUs

- MCUs don't get the credit they deserve
- Ongoing transformation, added intelligence
- While It might have made sense to design out a previous generation, if the next generation can give you speed, safety, capability—why centralise when you don't have to?
- **Don't do it if it doesn't solve a problem**



Everyone needs to talk to everyone

- Organisational shape and readiness is more important than architectural choices
- We assume the optimal solution will be tidy, but there's no reason to assume symmetry



And now add a dash of AI

- AI-defined Vehicles will build upon the structure of the SDV
- AI will allow learning, coordination, etc
- No need to be central for this—Agentic patterns throughout the device
 - AI will help mitigate the mess

Where we are and where we're going

- Assume hybrid, centralise what makes sense
- Deploy what fits
- Think of the different systems as overlays
- MCUs will become more important not less—should be the star of the PhysicalAI era
 - Need will be for flexible, scalar hardware with software options
 - More collaboration between teams
- Requires comprehensive capability development across technical and organizational dimensions
- Crossover MCUs need to cross over a little bit more here--latency & intelligence will be crucial.