

BERR Perspective on Internet addressing and the likely IPv4/IPv6 Migration

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Introduction

- Health warning:
 - We're developing policy themes leading to our final policy line
- Problem
 - Business needs
 - Public policy considerations
 - Potential implications for Digital Britain
- What BERR has done so far
- What BERR is doing
- Likely next steps

IPv4 is running out...

- IANA runs out of /8s in April 2011
 - RIRs run out of IPv4 blocks by July 2012
- Then what?
 - Lots more NAT and ALGs
 - Likely market in IPv4 address space
 - Widespread IPv6 adoption/migration
- Probably a combination of all 3

Public Policy Considerations

- Impact on national competitiveness
 - Can UK organisations get enough address space?
 - Convergence trends: telephony/TV
- Fairness of any emerging market solutions
 - Consumer confidence, competition issues, etc.
- How best to achieve a transition to IPv6?
 - Least user/institution costs & confusion

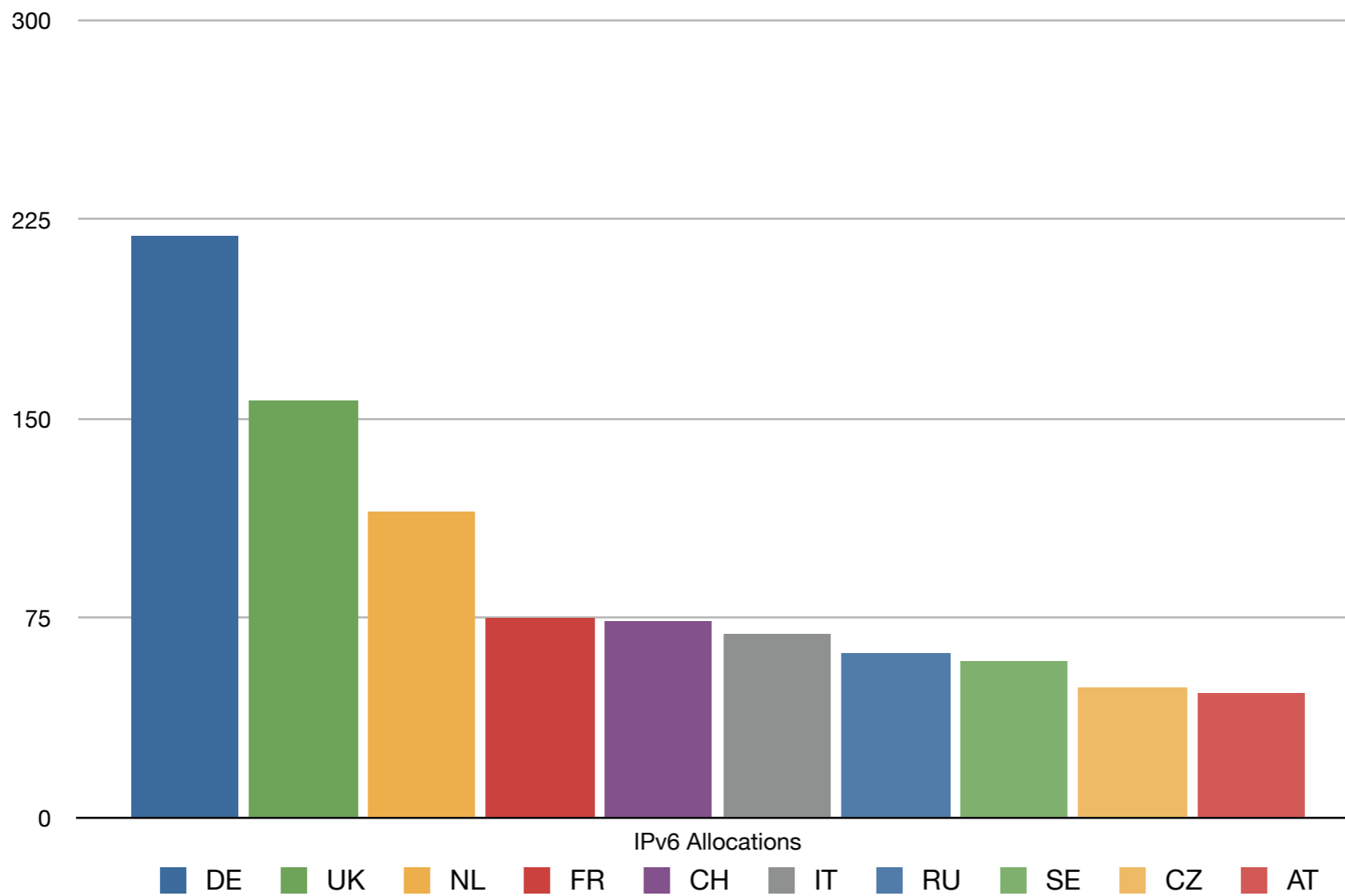
International Aspects

- RIR/Industry statements
 - Migration to IPv6 is the best way to proceed
- OMB memo requiring US Federal government to be IPv6-ready by June 30 2008
- OECD report in Summer 2008
 - Echoes industry statements for IPv6 migration
- May 2008 EU Communication
 - At least 25% of EU Internet users should be able to use IPv6 by 2010

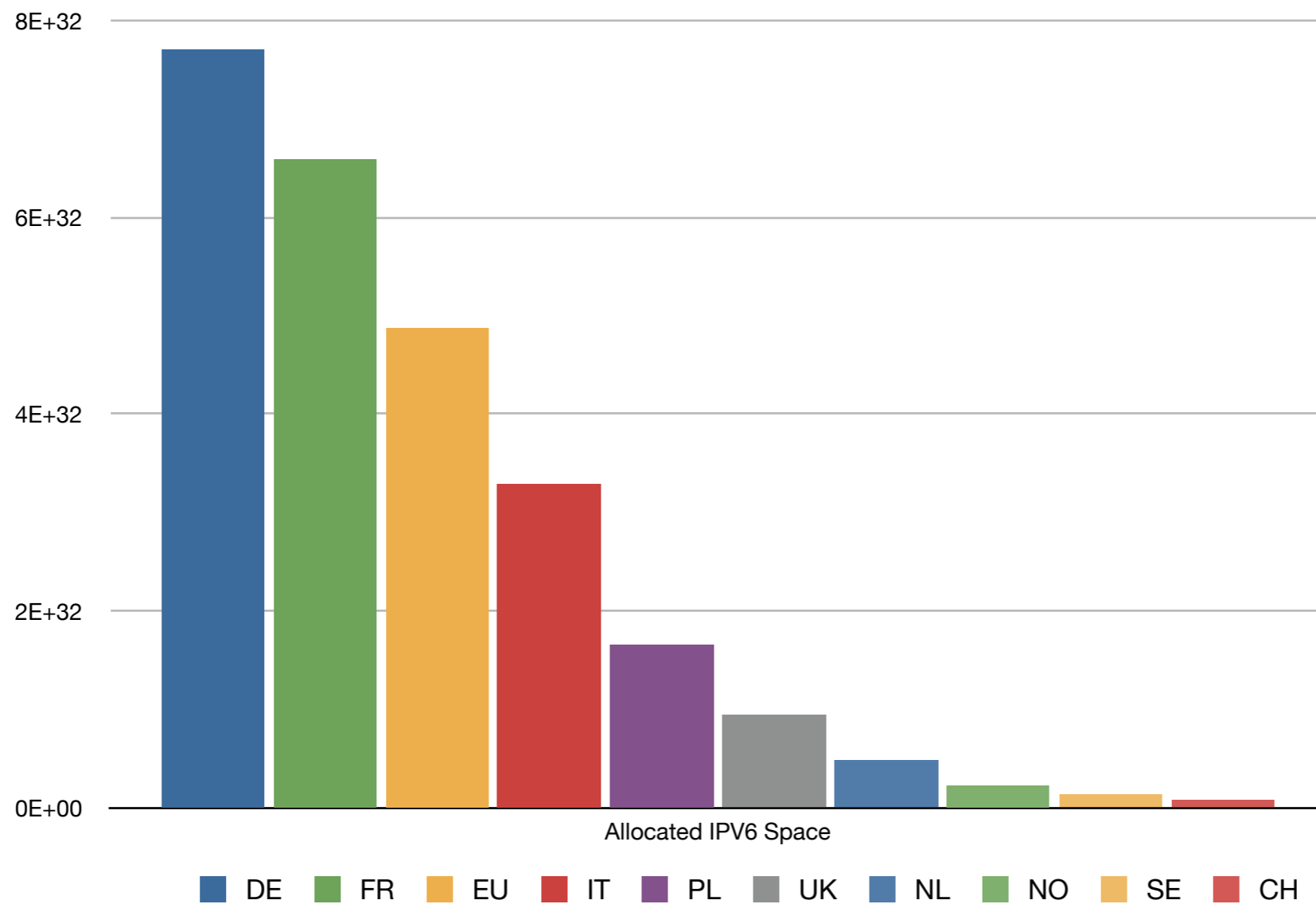
Catch 22

- Negligible IPv6 deployment and usage to date
- Almost no IPv6 content, so few users/applications
- Few users/applications because little IPv6 content
- IPv6 perceived as being “experimental”
 - Hardly any mass-market CPE supports IPv6
 - How many ISPs offer IPv6 connectivity?

IPv6 Allocations in RIPE NCC Service Region



Allocated IPv6 Space in RIPE NCC Service Region



What BERR has done

- Industry soundings from workshops in 2008
 - Business: CBI, FSB, ISPA, Development Agencies
 - ISPs: sample of LINX and ISPA membership
 - Telcos and others
- Gauged state of national IPv6 readiness
 - Guided thinking/planning for next steps
- Internal discussions: government IT planning

Workshop Responses

- Mixed:
 - Some saw little business justification for IPv6
 - No killer app or customer/user demand
 - First mover advantage for others
 - General wait and see attitude
 - “Drivers for IPv6 won’t emerge until lack of IPv4 starts to hurt”
- IPv6-ready tick box for CPE?

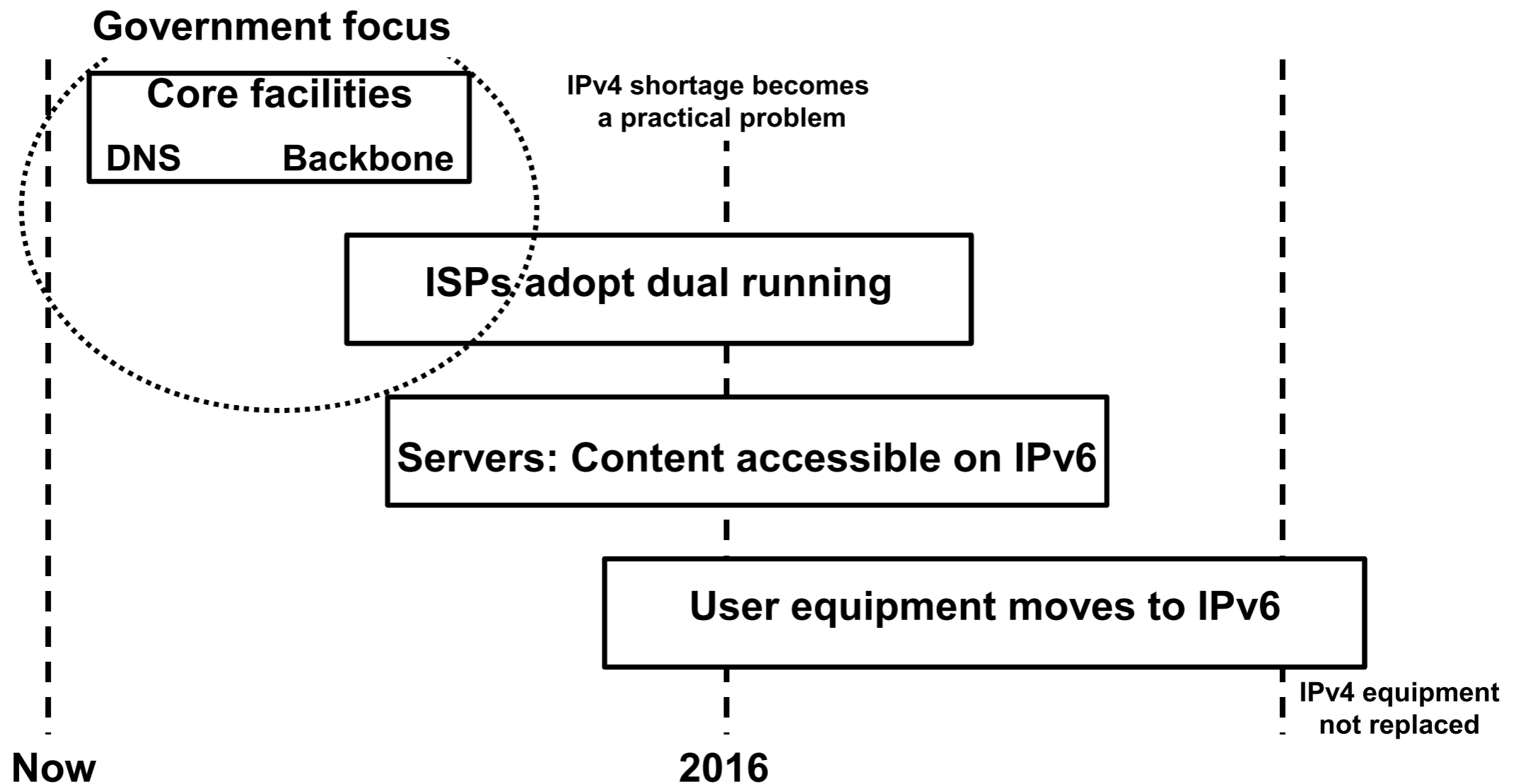
Workshop Findings

- No real surprises....
 - Not much usage of IPv6
 - Awareness of IPv4 run-out largely confined to ISPs and telcos
 - More education and awareness needed
 - Focus of IPv6 uptake is avoiding future problems
- Intend to create some sort of forum to raise awareness, suggest migration paths, educate, encourage IPv6 adoption and so on

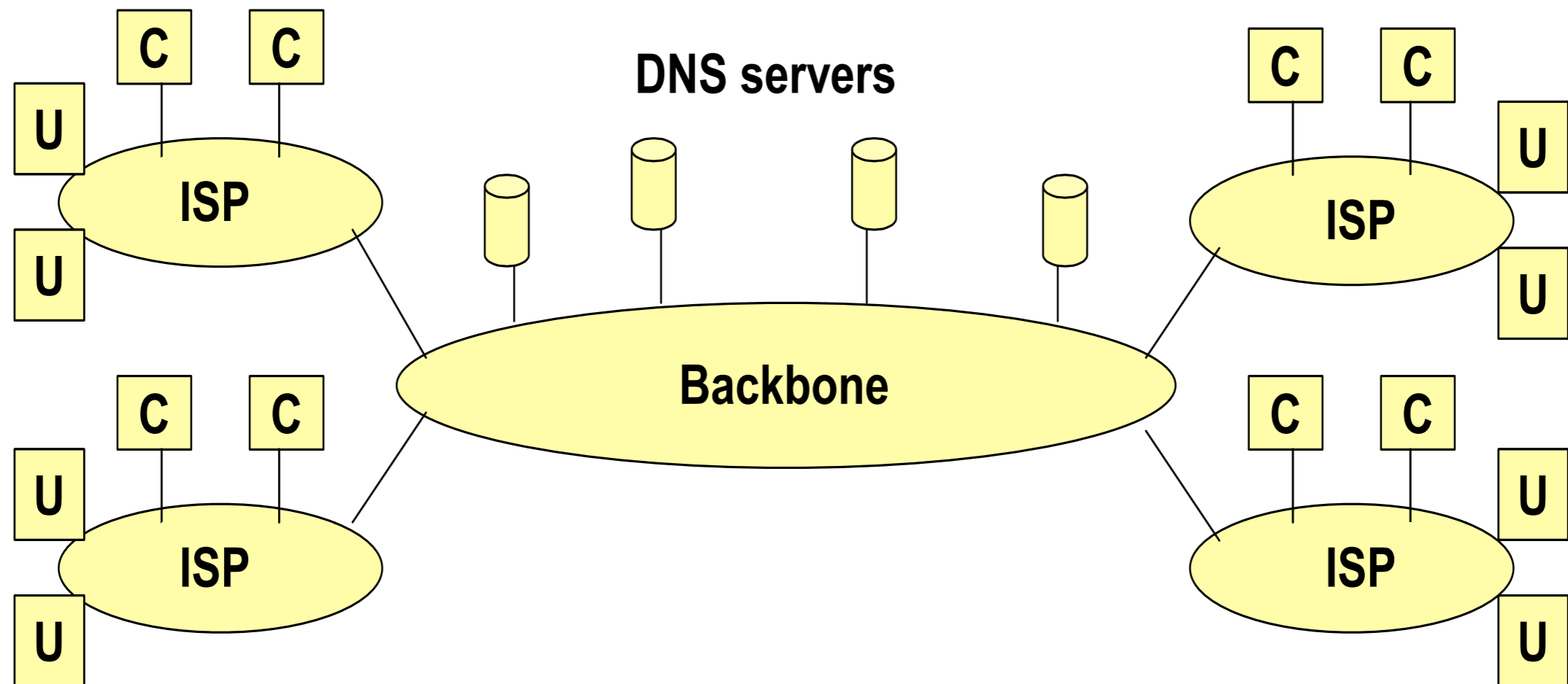
Probable Migration Plan

- Start at the core of the network and build out to the edge:
 - IXes, major carriers, backbone routers, etc.
 - “Important” DNS servers
 - Key web and mail servers
 - Open question: how to get more IPv6 content?
- Regional and local ISPs
 - Organisations and end users

Tentative Timeline

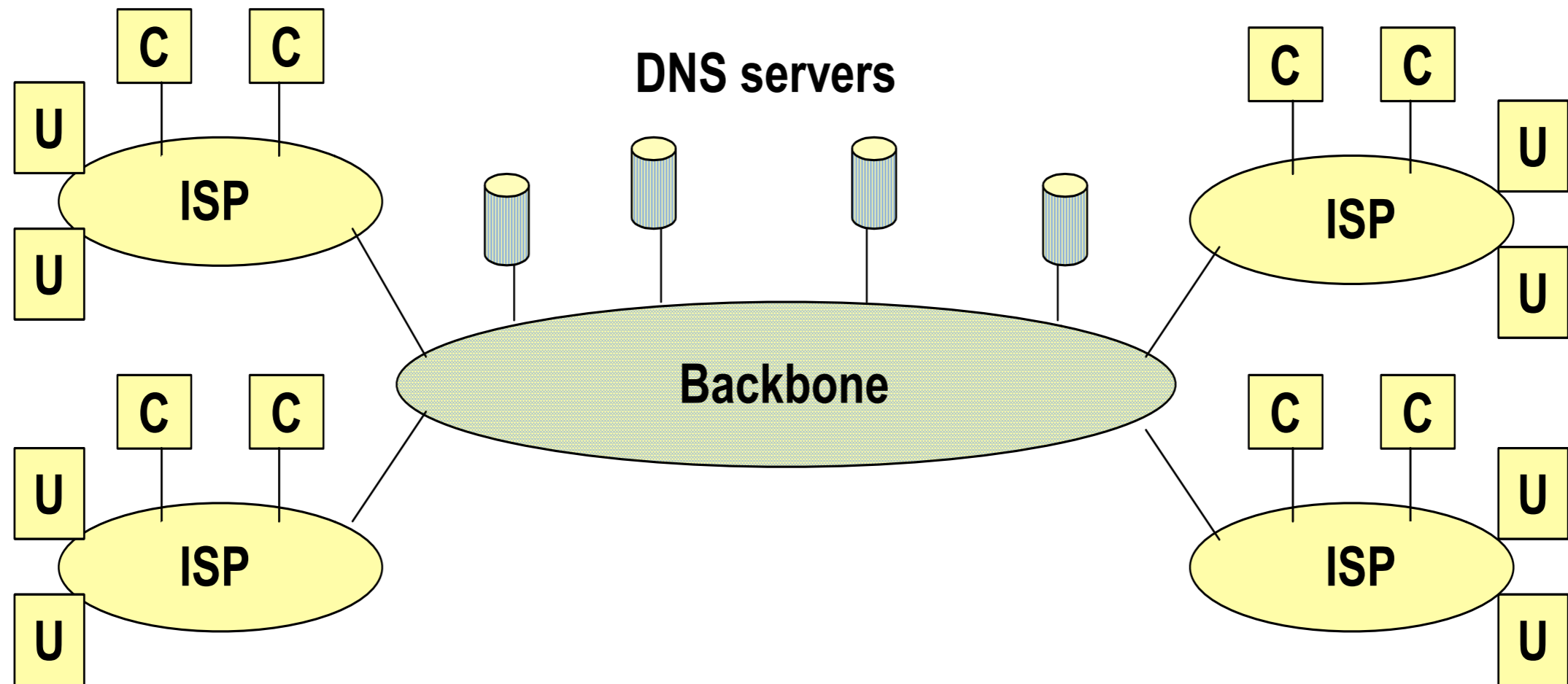


The Transition: Step 1



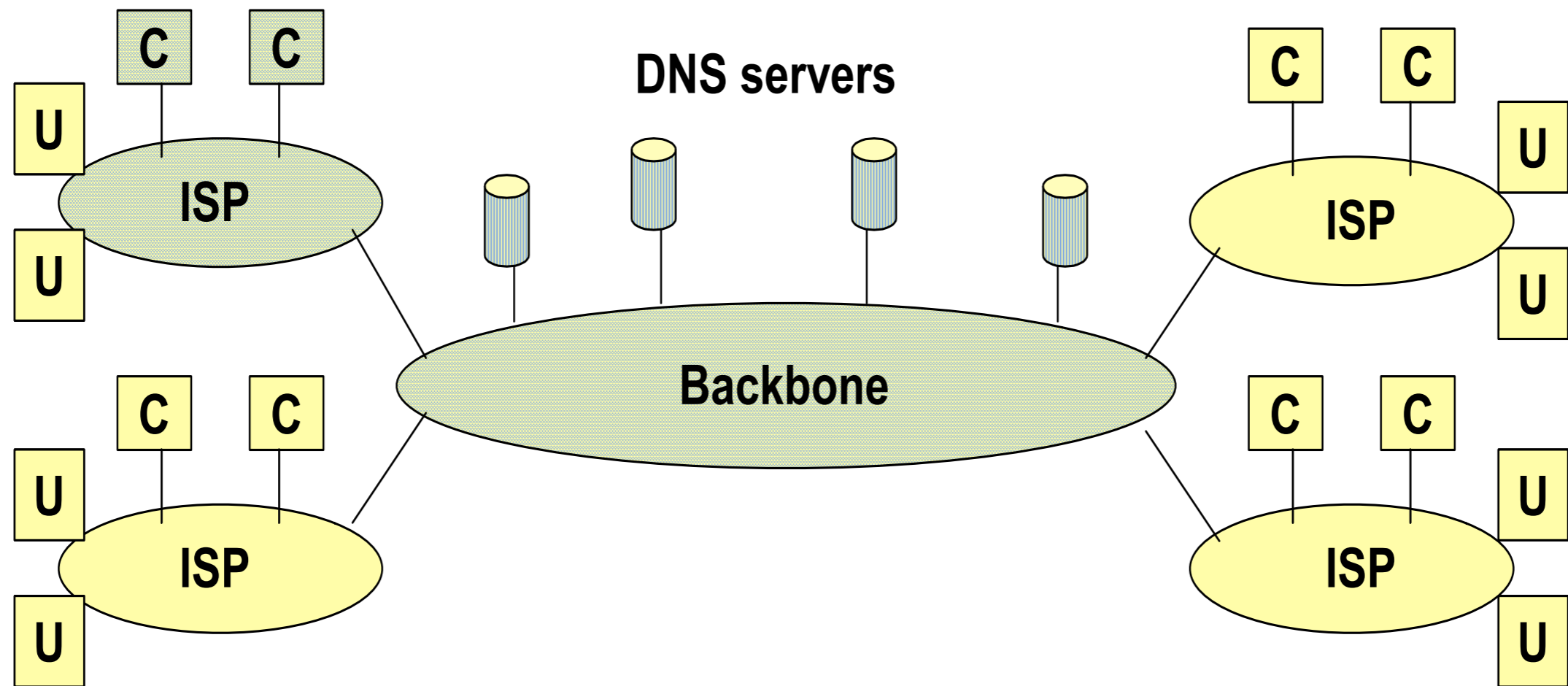
An all IPv4 Internet

The Transition: Step 2



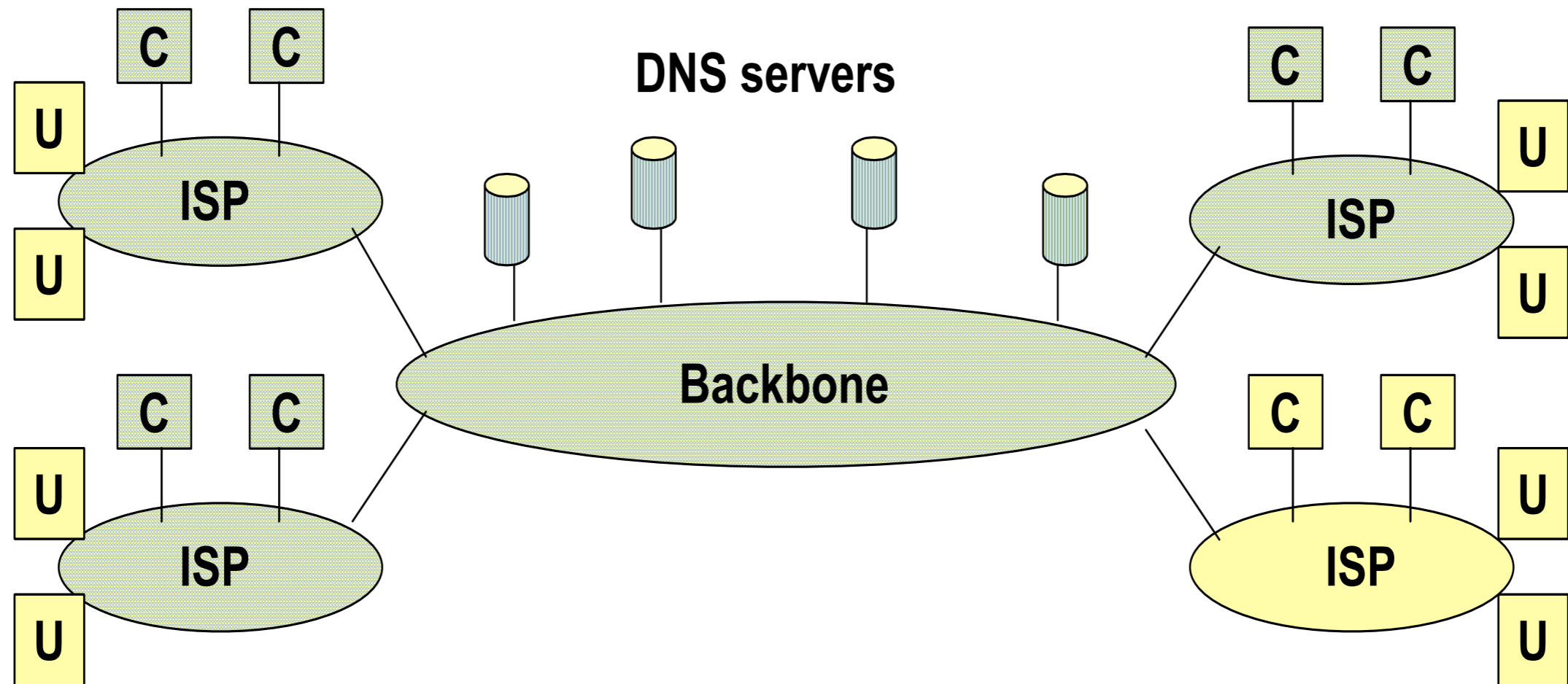
A mostly IPv4 Internet but a dual stack core

The Transition: Step 3



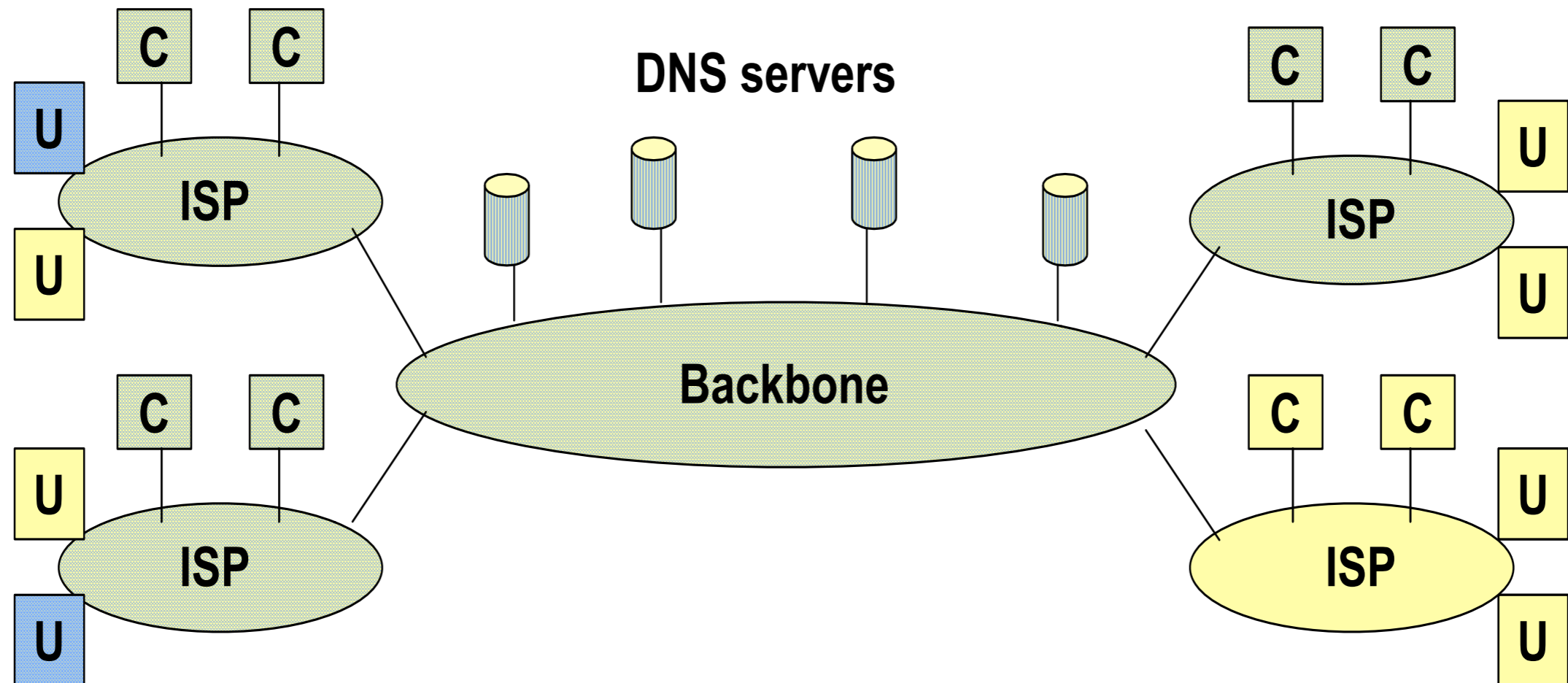
Still largely IPv4, some dual stack IPv6 at ISPs

The Transition: Step 4



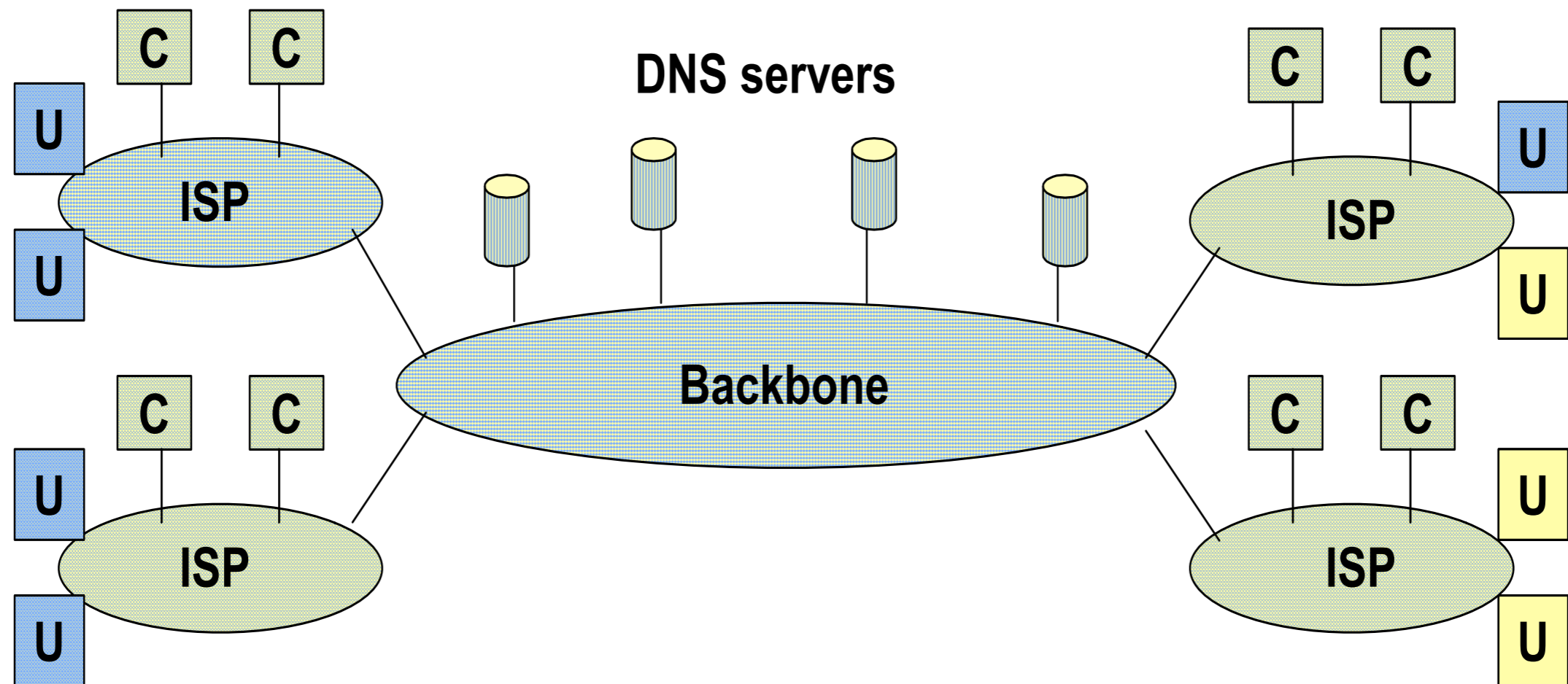
Wider availability of IPv6, but low IPv6 traffic

The Transition: Step 5



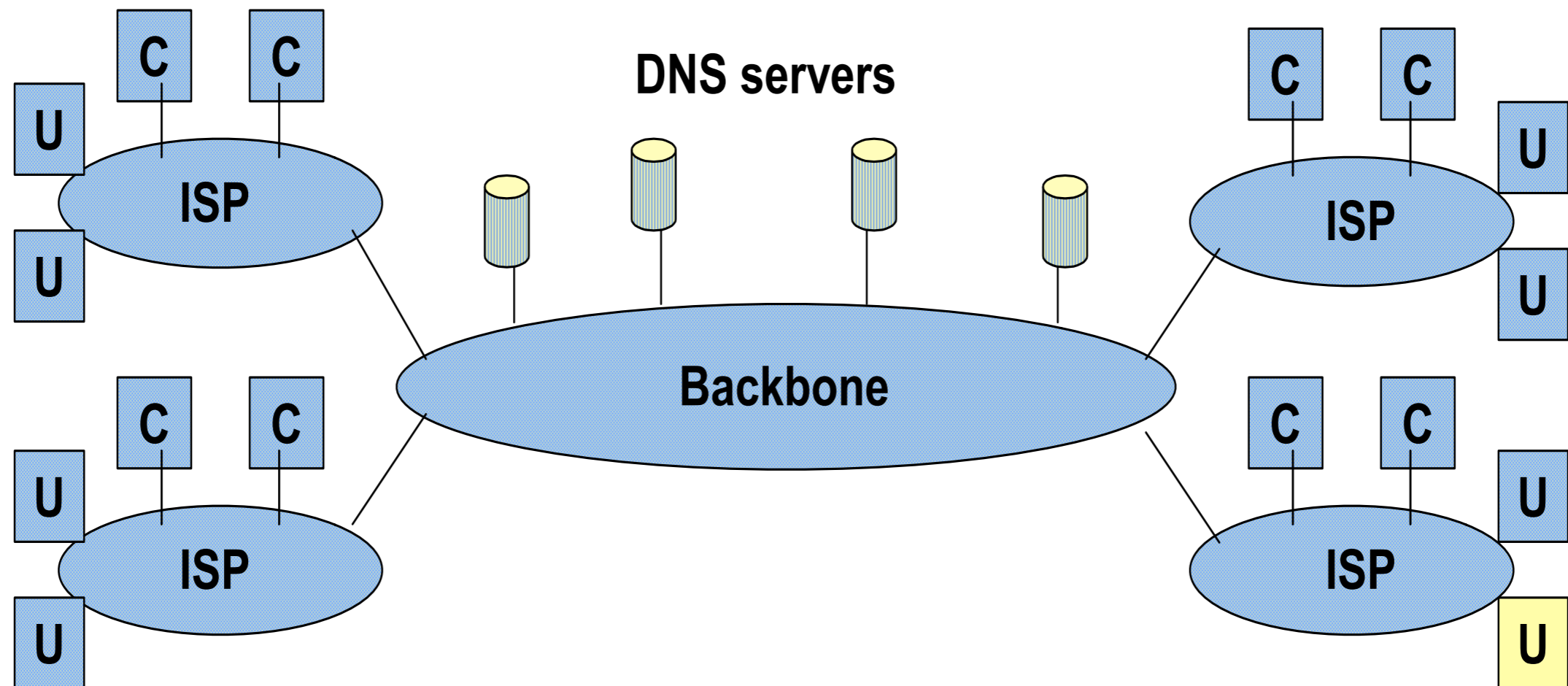
Start of IPv6 uptake by end users and customers (where available)

The Transition: Step 6



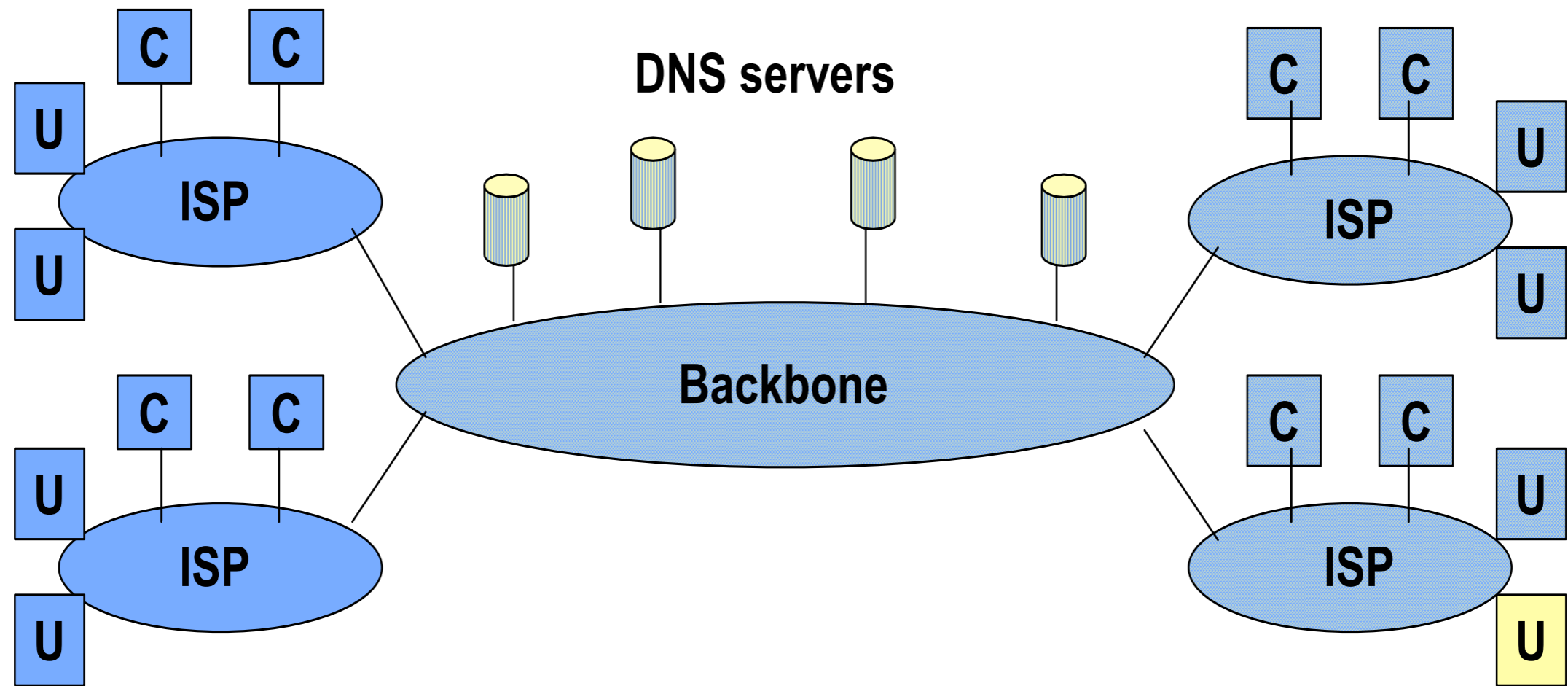
IPv6 traffic gradually displacing IPv4
Some users/customers only on IPv6

The Transition: Step 7



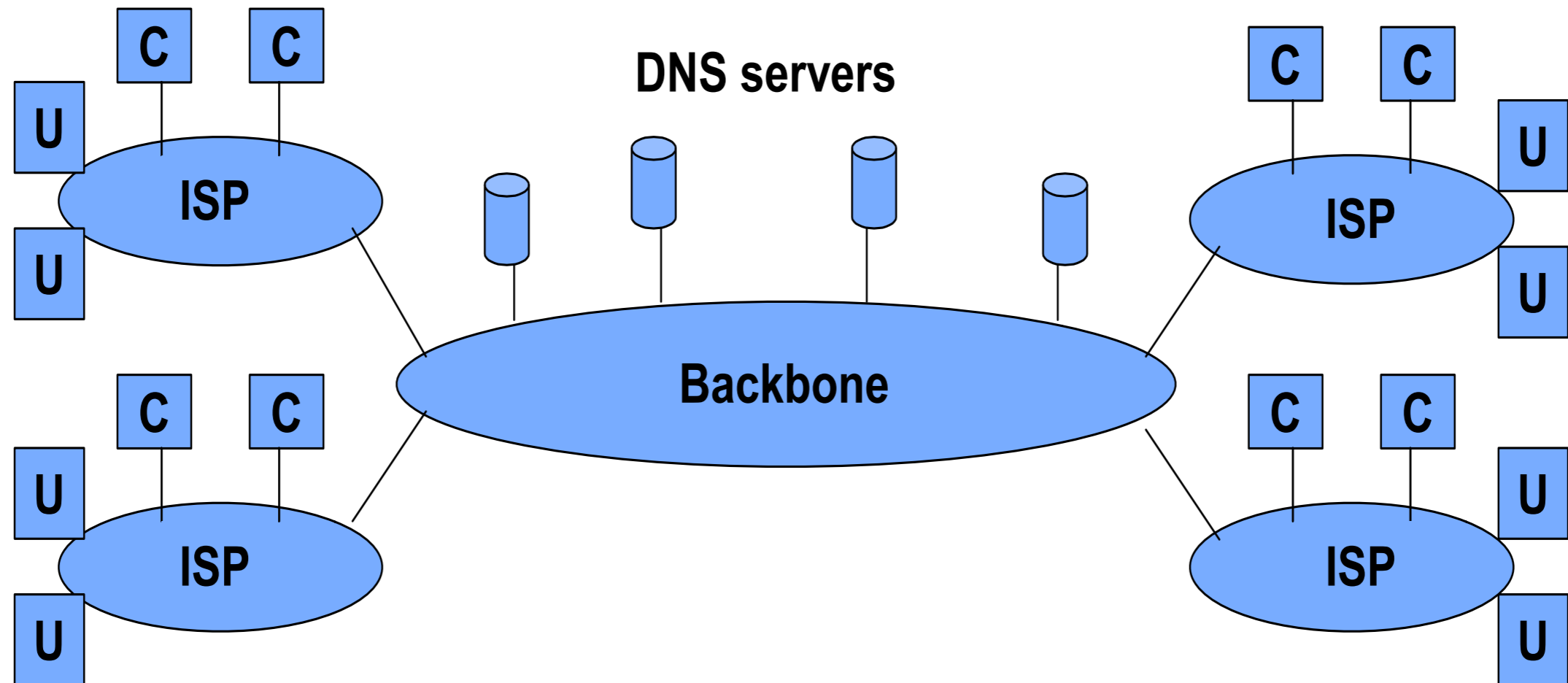
Most users on IPv6: a few IPv4 diehards remain
Still largely a dual-stack Internet

The Transition: Step 8



Some ISPs withdraw IPv4

The Transition: Step 9



An all IPv6 Internet

Next Steps

- BERR preparing a paper
 - On-going industry consultation
 - Policy of business-led IPv6 adoption
 - Seek input from a range of external bodies
 - Internal discussion within government
- BERR supported IPv6 Forum to raise awareness and encourage uptake

General Principles - I

- Government isn't going to fund an IPv4-IPv6 migration
- Migration/transition activity should begin at the core of the Internet and gradually move outwards
- Intention is to remove bottlenecks and blockages inhibiting market-led uptake of IPv6
- Organisations can deploy IPv6 when they are ready
 - Suitable products and services are available from the market

General Principles - 2

- Migration/transition activity should be market-led
- Up to service & equipment providers to offer IPv6 solutions commercially
 - Assumes core infrastructure is IPv6 ready
- Organisations deploy IPv6 when it suits them
- Public sector uptake will proceed in tandem with UK industry/business
- BERR will work with governments and others to identify migration milestones

QUESTIONS?