UK Link Performance Update

Xoserve Executive Team

DSC CoMC – 18th September 2019

Executive Summary

- We came to customers in July'19 to raise a **system performance risk** based on a spike in major incidents against a background of ongoing issues and a technical audit report which identified areas of improvement.

- We have identified and **prioritised a number on mitigations** which can be supported through existing funding and initiatives this FY.

- We have **identified two opportunities to further accelerate risk reduction** based on additional or pull forward funding of c.£600k. We can provide more details on these options if customers have an appetite to do so.

Background

July'19 CoMC

Stability risks to UK Link

- Recent trend of excessive P1/P2 incidents
- High impactful customer issues persist (AML/ASP, AQ's, DES etc.)

Balancing Change and Platform Maintenance

- Change has been consistently prioritised over rigorous system housekeeping
- Insufficient system monitoring. Not measuring the right things has led to rear view mirror and reactive issue management
- Stretched resources, particularly within IS Operations

Continual fire fighting

- Nexus went live without any code control, or run-time performance monitoring
- Nexus went live without a persistent E2E performance test platform
- New issues continue to be identified, largely driven by functional and poor infrastructure management

Technical and Commercial Audit Findings

- Xoserve recently commissioned independent audits of the UK Link AMS/ASP/AML design (KeyTree) and its effectiveness of support contracts (KPMG)
  - Conclusion 1: UK Link has not been well maintained in terms of basic infrastructural housekeeping.
  - Conclusion 2: 3rd party support contracts are not specific or enforceable enough to provide a consistent exceptional service

August'19 CoMC

Mitigation Initiatives *(Latest thinking)*...

BP19/20 Opportunities

- Address Technical Audit Housekeeping findings
- Review, and where available enhance, Partner Contracts
- Build in-house application monitoring capabilities (tools and skills)
- Re-baseline performance and platform KVI/KPI metrics
- Issue Root Cause Analysis improvement review
- UK Link Capacity planning (Class 3)

BP20/21+ Opportunities

- Movement to the Cloud
- Provision of an E2E Performance Test environment
- Greater in-house design and development expertise
- Decouple DES from BW
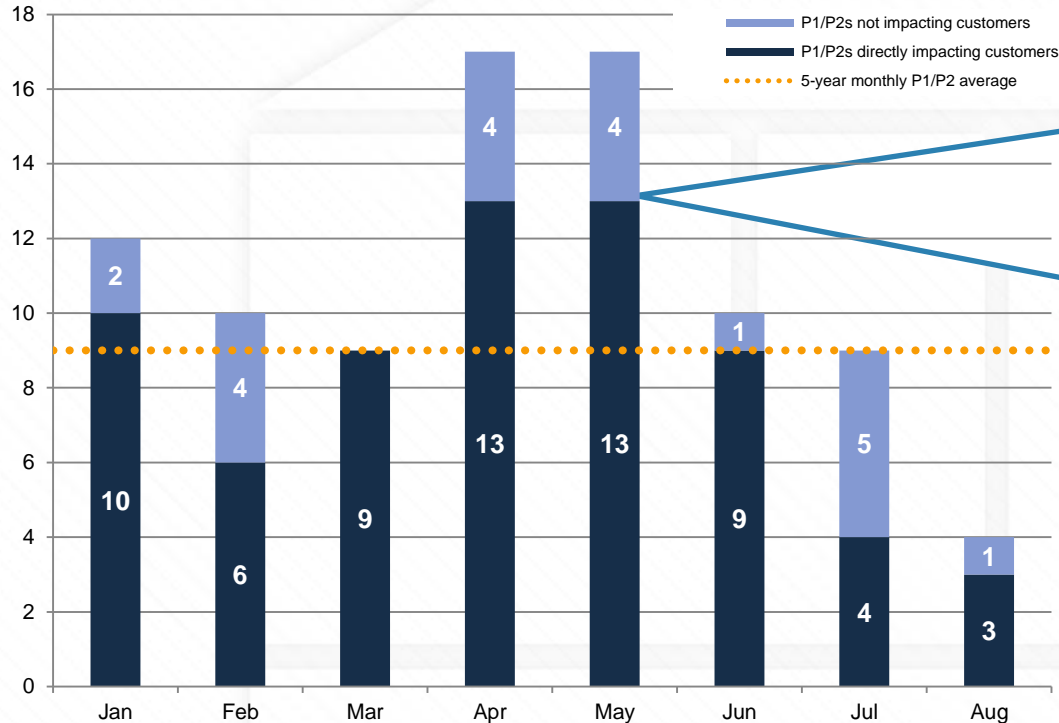- Automated Code Quality and Monitoring tooling

Agree expectations for Sept'19 CoMC

- Present options to customers, with associated risks levels, funding options, and timescales for mitigating UK Link platform stability / performance fears
- Share further detail on audit findings
- Share any Nexus descoped items that we think have had an impact on current UK Link platform stability / performance worries

A spike in P1/P2 incidents caused us to come to you in July'19

P1/P2 Major Incident Trend 2019 YTD

Legend:
- P1/P2s not impacting customers
- P1/P2s directly impacting customers
- 5-year monthly P1/P2 average

Chart values by month:
- Jan: 10 (directly impacting), 2 (not impacting) — total 12
- Feb: 6 (directly impacting), 4 (not impacting) — total 10
- Mar: 9 (directly impacting)
- Apr: 13 (directly impacting), 4 (not impacting) — total 17
- May: 13 (directly impacting), 4 (not impacting) — total 17
- Jun: 9 (directly impacting), 1 (not impacting)
- Jul: 4 (directly impacting), 5 (not impacting)
- Aug: 3 (directly impacting), 1 (not impacting)

There are various reasons for the spike in P1/P2 during April and May 2019, however all 34 incidents can broadly be attributed to the following four categories:

1) **Prioritisation of Change over System Maintenance** (32%)
   - Balancing resources between change demand vs. rigorous housekeeping
   - CMS out of support
   - Electronic File Transfer and Validation Application tuning of queries and table indexing

2) **Reduced System Monitoring** (29%)
   - Electronic File Transfer and Validation Application performance issues causing file transfer delays
   - SAP BW (DES) batch job overruns
   - Scheduler outages impacting Portal restarts

3) **Network Faults** (26%)
   - 3rd party network outages causing file transfer delays between Gemini and UK Link
   - Loss of network services at multiple Vodafone connected sites causing Gemini and file flow disruptions

4) **Project / Change Delivery** (12%)
   - DWDM link introduced by recent Gamma network upgrades caused faults on multiple systems including the Electronic File Transfer and Validation Application and SAP PO
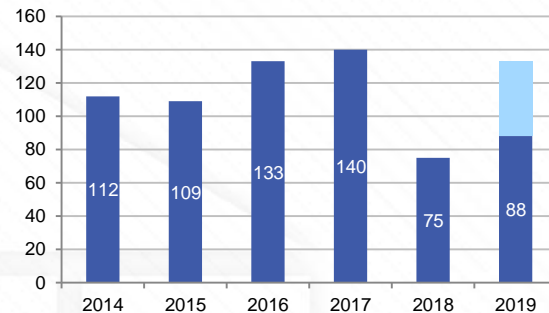
P1/P2 incidents...what do we now know?

Over the past 5 years, Xoserve witness an average of **9 major incidents (P1/2s) per month**

YTD 2019 has seen this average rise to 12 major incidents per month, with 88 encountered thus far.

The majority of the 88 P1/P2s incurred YTD can be attributed to the **UK Link (47%)** and **Gemini (36%)** platforms.

CMS (9%), EFT, IX, Service Desk (8%)

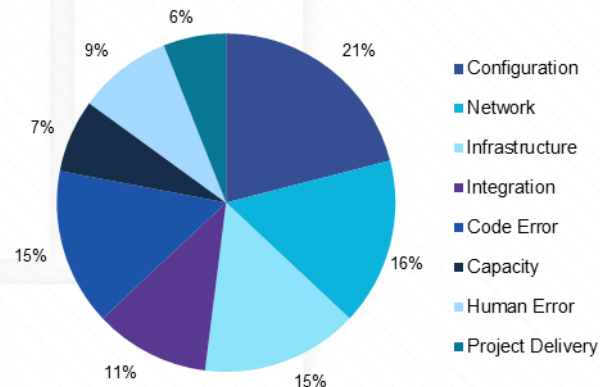There is **no common theme as to the root cause** for the 88 P1/P2s incurred YTD.

Almost **75%** of all UK Link P1/P2 incidents incurred so far this year have impacted **Portal/DES** or **Electronic File Transfer and Validation Application** .

Xoserve's **Service Management procedures require continuous improvement** to remove the potential for repeating incidents, whilst also importantly allowing greater insight into system behaviour and performance.
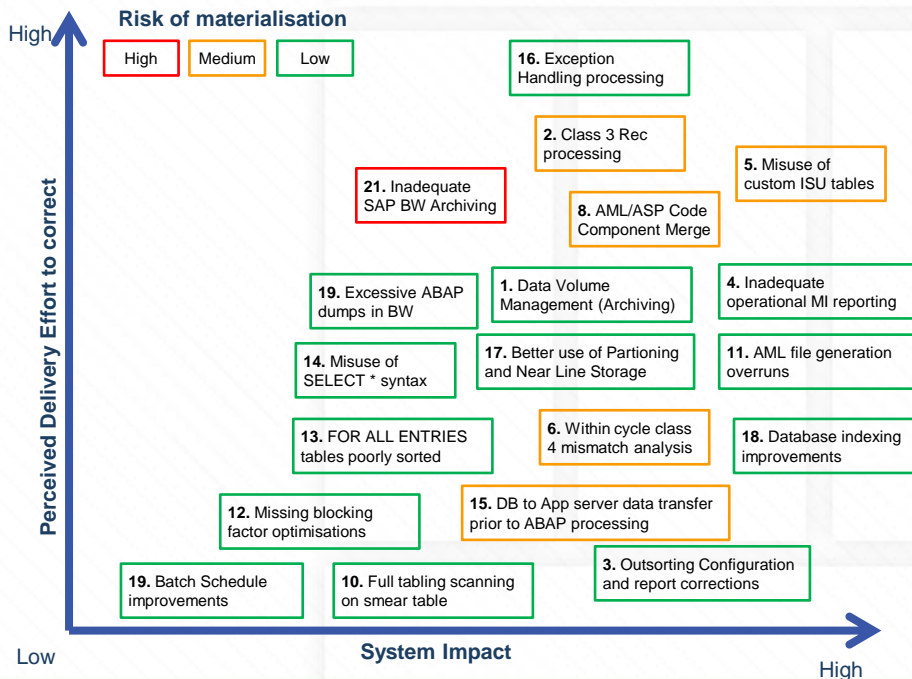
Xoserve remain wholly committed to achieving service level provision that exceed customer expectations, especially by minimising any direct impact to customers whenever a P1/P2 major incident arises.

Annual Trend of P1/P2 Major Incidents recorded at Xoserve

Year	Value
2014	112
2015	109
2016	133
2017	140
2018	75
2019	88

Assuming the 5-yearly average of 9 major incidents per month, it can be forecasted that a further c.45 P1/2s will be incurred this year, leading to 133 overall for 2019

P1/P2 Incidents incurred 2019 YTD by root cause categorisation

- Configuration — 21%
- Network — 16%
- Infrastructure — 15%
- Integration — 11%
- Code Error — 15%
- Capacity — 7%
- Human Error — 9%
- Project Delivery — 6%
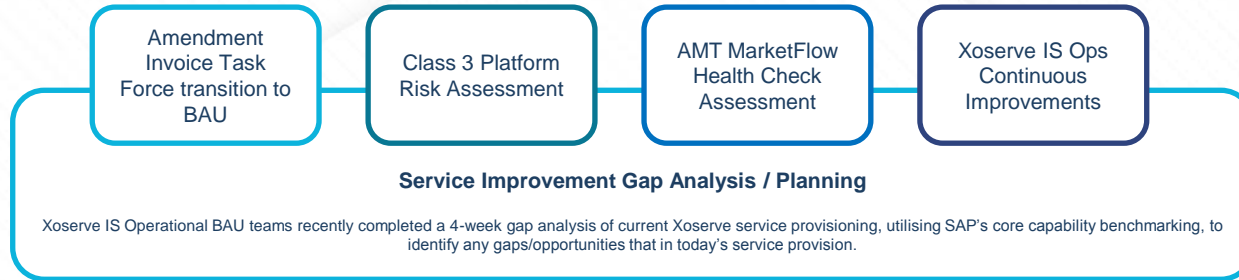
Technical Audit Findings

- As part of the Amendment Invoice Taskforce, and as first highlighted to customers during the dedicated AML/ASP issue workshops held in April and May, Xoserve engaged with Keytree, a SAP specialist consultancy, to commission an independent audit upon the UK Link design and solutioning of the Amendment Invoice process.

- Due to the scope of their findings, insight was naturally obtained into the UK Link platform as a whole.

Risk of materialisation

| High | Medium | Low |

High

Perceived Delivery Effort to correct

16. Exception Handling processing

2. Class 3 Rec processing

5. Misuse of custom ISU tables

21. Inadequate SAP BW Archiving

8. AML/ASP Code Component Merge

19. Excessive ABAP dumps in BW

1. Data Volume Management (Archiving)

4. Inadequate operational MI reporting

14. Misuse of SELECT * syntax

17. Better use of Partioning and Near Line Storage

11. AML file generation overruns

13. FOR ALL ENTRIES tables poorly sorted

6. Within cycle class 4 mismatch analysis

18. Database indexing improvements

12. Missing blocking factor optimisations

15. DB to App server data transfer prior to ABAP processing

19. Batch Schedule improvements

10. Full tabling scanning on smear table

3. Outsorting Configuration and report corrections

Low

System Impact

High

- The Keytree AMS design audit concluded with 35 low-level technical findings, which following a review with Xoserve teams, led to the identification of **19 core improvement possibilities** (recommendations).

- Naturally, the outcomes of this AMS/AML/ASP audit identified UK Link platform improvement opportunities wider than just that of the AMS monthly process. As a result, **Xoserve IS Operational teams instigated further 'Service Improvement" investigations** .

- Xoserve includes general administration budget for managing its technology estate. This budget line was used to fund the audit, which is shared proportionally among all funding parties and did <u>not</u> trigger any increased charges.

# What have we done to identify the root cause issues?

Amendment Invoice Task Force transition to BAU

Class 3 Platform Risk Assessment

AMT MarketFlow Health Check Assessment

Xoserve IS Ops Continuous Improvements

Service Improvement Gap Analysis / Planning

Xoserve IS Operational BAU teams recently completed a 4-week gap analysis of current Xoserve service provisioning, utilising SAP's core capability benchmarking, to identify any gaps/opportunities that in today's service provision.

BAU/Continuous Improvement

- Service Improvement opportunities will be actioned by Xoserve IS Operational teams funded from MTB cost centres signed-off via the annual business planning process.

- Current assumption is that no additional investment funding will be required to proceed with the implementation of any improvement initiative within this category.

All Service Improvement opportunities
(104)

Dedicated Delivery Mechanism

- Service Improvement opportunities will require dedicated resources / project teams mobilised to implement.

- Where possible, any investment funding needs will be obtained via the annual business planning process through dedicated investment / MTB risk contingency budget line items.

- Circa. 23 improvements are already in delivery (*C3 T1 and MarketFlow improvements*) that don't require any additional funding over and above those signed off in BP19.

Xoserve IS Operations BAU & Continuous Improvement
(75)

Dedicated Delivery Mechanism Required
(27)

Resourcing

(2)
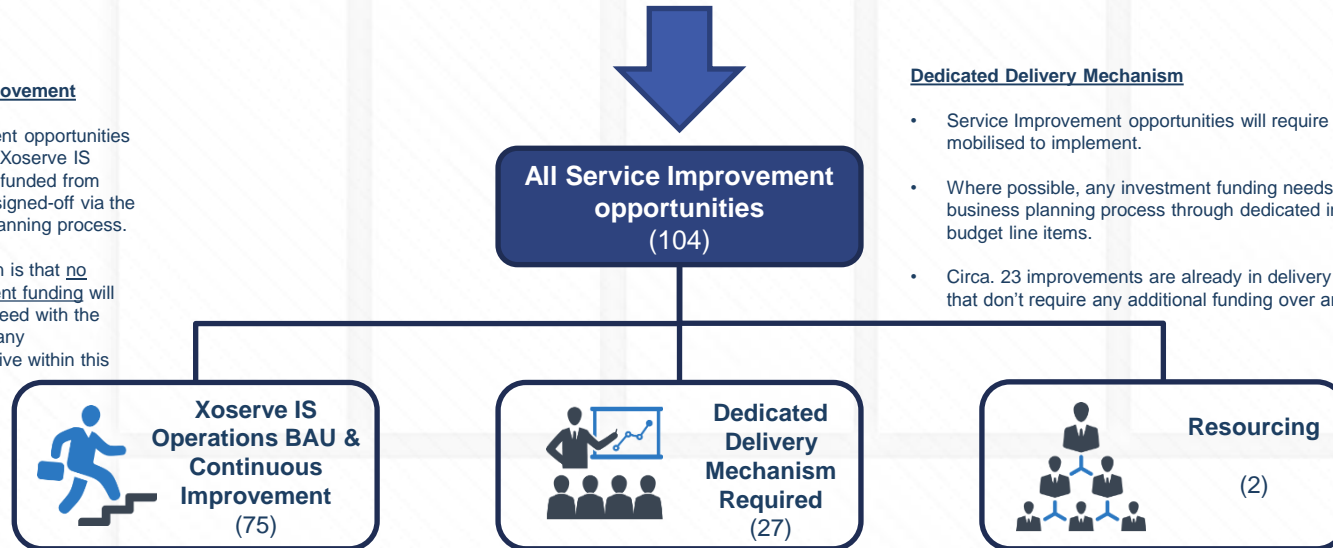
Resourcing

- Service Improvement opportunities are deemed to require the recruitment of additional headcount to enact improvement initiative.

High-level Areas of Focus

	Area of Focus	Target State	Mitigating Actions
	UK Link Performance	• Monthly P1/P2 volumes below the current 5-year rolling average • Continual downward trend of system defects • RCA and continuous improvement approach in place	• Enhancements to platform monitoring • Performance metrics revisited to reflect true system health • Root causes of all system issues identified and mitigated
	Balancing Change and Platform Maintenance	• Platform maintenance activities do not impact or constrain customer change • Level of change does not limit platform maintenance activities	• Identify platform constraints to change and present options to customers to mitigate • Build Xoserve SME knowledge , in all aspects of change delivery and system maintenance, across the wider organisation
	Continual fire fighting	• No Issue related Task Forces • Platform risks identified and proactively manged with customers before they become issues	• Task Forces issue resolution replaced with BAU preventative activity based on rigorous partner contracts • Proactive platform risk register created and embedded in customer governance
	Technical Audit Findings	• All Audit findings closed or proven to be non-impacting	• Quantifying impact of audit findings • RCA and fix plan in place for all impactful findings

What have we completed so far?

Focus Areas	Improvement Item	Perceived Risk to System Stability / Health	Mitigating Actions Taken	Expected Benefit
	E2E Service Provision Gap Analysis	**HIGH** Limited documented understanding of Xoserve's service provision maturity against industry best practice methodologies.	4-week gap analysis of current Xoserve service provisioning, utilising SAP's core capability benchmarking, that resulted in 100+ gaps/opportunities in today's service provision.	✓ Identification of an holistic Service Improvement plan ✓ Incremental improvements to customer service provision ✓ Incident reductions
	Meter Read Processing Optimisation	**HIGH** The impending Class 3 migration and associated read volumes present risks to UK Link performance / capacity	Targeted analysis identified a defect which resulted in inconsistent utilisation of system resources when processing class 3 jobs. A fix was implemented resulting in a c.35% processing improvement. Work continues to further optimise overall read processing.	✓ Reduction to Class 3 risk (system capacity)
	UK Link system defect reductions	**HIGH** Average fix turnaround times for functional defects prior to 1st June'19 tracked largely around the 58-day mark, with overall defect volumes rarely below 60 on any given day	40% reduction in open UK Link defects since the 1st June'19, owing largely to the concerted efforts of application resolver teams following commercial variation agreements with relevant system integrators. Average fix turnaround times down to 41 days.	✓ Increased reliability of automated UK Link processes ✓ Fewer customer impacting issues (AML/ASP, AQ's, etc.)
	Electronic File Transfer Health Check Remedial Actions	**MEDIUM** 75% of all UK Link P1/P2 incidents incurred so far this year have impacted Portal/DES or AMT MarketFlow.	Xoserve IS Operations instigated a health check which resulted in a number of AMT application database performance and configuration enhancements.	✓ Reduction to Class 3 risk (system capacity) ✓ Reduction in P1/P2 AMT related major incidents
	Transition of AMS Task Force in BAU operations	**MEDIUM** Task Force approach has proved useful in adding control and rigor around high profile issues, but the knowledge and expertise that it creates can become stranded.	Amendment Invoice business and IS staff all transitioned back into BAU teams, with project management resources realigned to Class 3 and UK Link Performance initiatives.	✓ Knowledge transfer growth between BAU Xoserve teams ✓ Issue handling resilience

All of the above initiatives have been completed without the need for any additional customer investment funding, with all tasks/actions funded from existing Xoserve BP19 'manage the business' cost centres
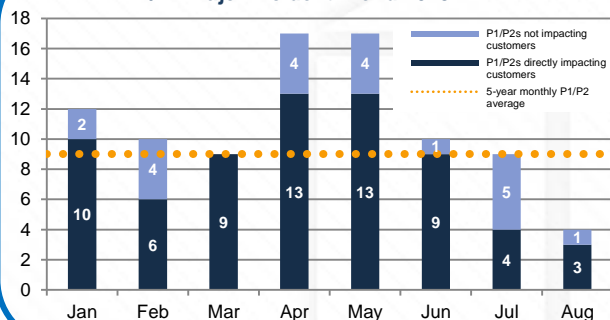
Plan for the remainder of FY19/20...

Focus Areas	Improvement Item	Perceived Risk to System Stability / Health	Mitigating Actions Taken	Expected Benefit
	Class 3 Tranche 1 Improvements *(Target Completion: Nov'19)*	**HIGH** Changes to the UIG weighting factors for the 19/20 gas year, as introduced by the independently appointed AUGE, are presenting a significant commercial benefit to shippers holding their sites in Class 3 as opposed to Class 4. As a result, assumptions made in the run up to Nexus go-live regarding inbound transaction volumes for Class Changes and Meter Read Submissions are expected to be exceeded, presenting capacity risks upon the UK Link platform.	Dedicated work package created to address a combination of the Keytree audit findings and service improvements proactively identified off the back of the growing Class3 Migration risk, with ringfenced resources, mobilised to implement the following initiatives between Sept'19 and Nov'19: 1) Data Volume Management (SAP ISU) 2) SAP ISU & BW Archiving (Near Line Storage) 3) Electronic File Transfer Database Upgrade (Oracle 11g to 12c) 4) Meter Read Code Optimisations 5) Additional application servers for ISU and BW	✓ Greater ISU database insight that will permit the identification of performance tuning ✓ Greater application (ISU and BW) stability and supportability ✓ Reduction in P1/P2 BW and Electronic File Transfer incidents
	Batch Job Monitoring inc. SAP Early Watch Alerts *(Target Completion: BAU)*	**HIGH** Large volumes of post-Nexus P1/P2s are borne out of overrunning/failed batch jobs, with high database wait times frequently observed between 5pm to 9pm and 1am to 5am.	Whilst Xoserve awaiting approval from its customers with BP20 to invest in market leading application performance monitoring tools, a period of "heightened state of alert" will remain, which will be labour intensive but will be designed to recognise any system threats to performance before they materialise into an issue that could impact customers.	✓ Greater application (ISU and BW) stability ✓ Reduction in P1/P2 UK Link incidents ✓ Preventative/proactive issue management
	Performance Metrics re-baseline *(Target Completion: Dec'19)*	**HIGH** Inadequate measurement of systems leads to rear-view mirror / reactive issue management. Both the Keytree audit and our own recent Service Improvement gap analysis concluded that we're not measuring the correct platform health indicators.	Following the initial communication to our DSC Contract Managers in July'19, Xoserve has now embedded a new organisation structure which has seen IS Ops transition into the CTO department. An initiative already underway is that of re-baselining all existing performance metrics to ensure suitability and appropriateness.	✓ Reduction in P1/P2 UK Link incidents ✓ Preventative/proactive issue management
	Provision of E2E Performance Test Env *(Target Completion: Mar'20)*	**HIGH** Such an environment was not included in the scope of Project Nexus, because it was felt that one would not be needed for several years post go-live. The growing risk presented by Class 3 combined with the significant volume of change delivered onto UK Link since 2017 requires a the determination of the current system performance limits.	Interim measures underway to create environment availability for a dedicated performance test environment track, whilst we awaiting the movement of our infrastructure to the cloud.	✓ Greater application and database insight that will permit the identification of performance tuning
	Problem Management process improvements	**MEDIUM** Current outsourcing of key service management processes incurs risk of ownership and transparency of issues, particularly in determination root causes of system faults.	Process review underway to ensure quality standards are raised within the Problem Management space to ensure failings are addressed to prevent reoccurrence, not just point fixes.	✓ Reduction in P1/P2 UK Link incidents ✓ Preventative/proactive issue management

# We believe we're heading in the right direction....

Our **short-term improvement initiatives** are expected to contribute to greater UK Link platform stability levels, over the course of the next 6-months, whilst we await the mobilisation and deployment of the **longer-term strategic projects** that will drive significant step changes to today's performance

P1/P2 Major Incident Trend 2019 YTD

Legend:
- P1/P2s not impacting customers
- P1/P2s directly impacting customers
- 5-year monthly P1/P2 average

Data (directly impacting / not impacting):
- Jan: 10 / 2
- Feb: 6 / 4
- Mar: 9
- Apr: 13 / 4
- May: 13 / 4
- Jun: 9 / 1
- Jul: 4 / 5
- Aug: 3 / 1

Whilst we've seen a month-on-month reduction in P1/P2 incidents since the Apr/May'19 spike, there's still a number of 'big ticket' service improvement initiatives that require realisation, as part of BAU/Continuous Improvement work, to demonstrate the necessary levels of control and stability in the UK Link platform as a whole.

Open Defects since Nexus go-live
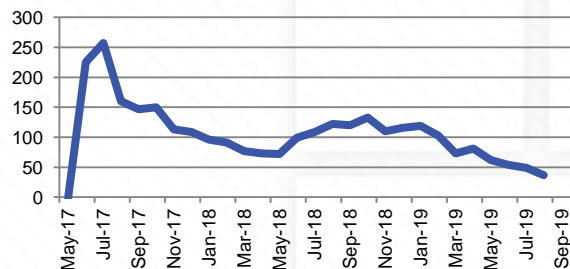
UK Link defect volumes continue to trend downwards, with the overall number being at its lowest since Nexus go-live. Revisions agreed to our partner contracts, stemming from the work conducted from within the AML/ASP Task Force have helped, but the focus must continue to remain on the timely and accurate resolution to all system defects.

Positive Observations from Technical Audit

✓ Service desk is performing well according to SLA agreements and timely resolution of incidents

✓ Major incident management function response times and incident closure of P1/P2 incidents exceeds targets

✓ Gemini updates such as Supplier Consumption Balance (used for Nomination vs Used Trade) are consistently performed accurately

✓ Bandwidth between Xoserve's customers and Vodafone IX MPLS is wide enough (Outside of UK Link)

✓ APIs between EFT-AMT-PO files are working in acceptable times

✓ SAP PO converts AMT messages to IDOC with high performance without any impact on SAP IS-U

✓ Inbound/Outbound IDOC processing has high success rates even though processing duration is higher than normal

✓ IS-U master data structure is configured in adherence with SAP Best Practices.

Long-term strategic initiatives that we expect will drive step changes in UK Link performance and stability

Focus Areas	Improvement Item	Expected Benefit	BP20 Funding Proposal		
			20/21	21/22	22/23
	Moving our infrastructure to the Cloud *(Proposed in BP20)*	• Will transform our technical ability to support multiple projects in parallel • Provides scalable capacity and the ability to quickly performance test the end-to-end application estate • Supports and sustains our business as SAP support for older versions ceases • Will support the decoupling of DES from SAP BW, in turn offering greater stability to both applications compared to today's performance.	£6m	£6m	£4m
	Service Management Transformation *(Proposed in BP20)*	• Greater Xoserve operational control, reducing reliance on third partner vendors/suppliers • Provision of consistent capability and core expertise that supports industry wide best practices • Supports the need for increasingly fast paced change delivery	£300k	£200k	
	Enhanced Application Performance Monitoring *(Proposed in BP20)*	• Better proactive monitoring of services leading to improved customer experience and system availability • Reduction/removal of reactive issue management • Increased operational control and visibility of the end-to-end service we are providing to our customers • Increased capability of forecasting performance constraints ensures early industry notification where change is required to support future industry demands	£400k	£200k	£100k
	Automated Code Quality and Testing Tools *(Proposed in BP20)*	• Greater code adherence to SAP best practice subsequently generating a more supportable application, building its resilience whilst more importantly driving up code quality levels. • Improved testing quality of all UK Link changes by developing an enterprise test strategy and framework that embeds best practice and standardises testing activities, measures and assurance • Increasing speed and efficiency of testing	£200k	£100k	
	CMS Re-write *(Proposed in BP20)*	• Automation enhancements to this aging application that does require manual intervention and frequent monitoring to ensure customer usability levels are maintained.	£200k	£300k	
	Greater in-house design, development and testing expertise	• Greater Xoserve competence and capability in both the delivery of customer demanded UK Link changes but also IS Operational Service Management procedures. • Long-term cost reductions given the lower reliance upon third party vendors/suppliers for skills and capability.			

Customer Input Sought

Ask #1

- **Are you comfortable with our approach?**

- Are you happy with what we've implemented over the last 8-weeks and those improvement initiatives that we're targeting during the remainder of BP19?

Ask #2

- Xoserve believes that a fundamental component to help alleviate the large proportion of current risks associated with UK Link performance and stability inefficiencies is that of the introduction of **Enhanced Application Performance Monitoring**, as proposed in BP20.

- **What is our customers' appetite for fast-tracking this proposed initiative**? Either via utilisation of the current DSC Change Budget or via a pull forward of £400k funding proposed in BP20?

Ask #3

- Xoserve's IS Operational teams continue to be stretched. To de-risk the chances of the reoccurrence of those P1/P2 major incident spikes as witnessed in Apr/May'19, we believe its crucial that we deliver as many of the 75 currently identified BAU/Continuous Improvement iniatitives as quickly as possible.

- To do so quicker ultimately requires **the bolstering of current headcount in Xoserve IS Operations**. Current assumption of c.£200k additional investment funding required to mobilise a dedicated IS Ops continuous improvement function to fast-track the delivery of all known BAU/C.I initiatives before year end.

- **What is our customers' appetite for such a proposal, of 'manage the business' funding injection to FY19/20, being brought to a future DSC CoMC?**

Proposed Next Steps

Is there anything else that you, our customers, expected / would like to see as part of this presentation?

Contract management committee acceptance of any newly proposed metrics (KPI/KVIs) designed to measure system performance.

Should you or your colleagues have any further questions from today, please can you reach out to your designated Xoserve Advocacy Representative in the first instance.

Appendix A: Nexus Descoped Items

Item	Descope Decision	Has this contributed to today's system instability risks?
c.70 functional change requests	c.70 functional change items were agreed with DSC Change Management Committee to be descoped from the June 2017 go-live. All such changes were tracked via the 'Nexus Change Demand	<u>Unlikely</u>. The vast majority of these changes have either been delivered into Production or descoped entirely. Analysis YTD suggests that the root cause of just 6% of P1/P2 incidents incurred were caused as a result of a project delivery of major/minor change.
System Archiving	Despite not being treated as a necessity for Nexus go-live, it's clear from the Keytree AMS audit and the wider Service Improvement gap analysis that we haven't invested enough operational focus on system archiving within the UK Link platform.	<u>Unlikely</u>. Notwithstanding the recent emergence of the Class3 migration risk upon our UK Link estate, analysis conducted YTD on all P1/P2 incidents suggests that only 7% were as a result of application capacity constraints.
Dedicated E2E Performance Test environment	A persistent performance testing platform was not included in the scope of Project Nexus, because it was felt that one would not be needed for several years after go-live. *Initiative underway this year to provision an E2E Performance test environment whilst we await the implementation of our longer-term strategic intent to move our infrastructure to the cloud, which will enable the quicker and easier provision of all environment types.*	<u>Unlikely</u>. Notwithstanding the recent emergence of the Class3 migration risk upon our UK Link estate, analysis conducted YTD on all P1/P2 incidents suggests that only 7% were as a result of application capacity constraints.
Automated Code and Performance Monitoring Tools	Our UK Link Replacement design was based on a 'black-box' outsource model. This means Xoserve does not have direct access to code quality and run-time performance tools, instead relying solely on the perspective of performance provided by our partners. *Initiatives to overcome this are underway both within the restructuring of our commercial 3rd party arrangements, and also via BP20 investments.*	<u>Possible contributor</u>. Whilst our latest analysis demonstrates a variety of causes for the recent YTD spike in P1/P2 incidents, it's clear that in the absence of such tools Xoserve has subsequently been reacting to the majority of system issues over recent months, more often that not identified in the first instance by our customers.

Appendix B: Commercial Audit Findings / Next Steps

Following an independent audit conducted by KPMG, Xoserve undertook a line-by-line review of the contractual obligations which its partners are to deliver as part of the UK Link service provision.

This exercise has highlighted that generally our partners are undertaking the majority of their contractual obligations and there are very few areas where they are not performing obligations at all (less than 10 obligations). There were a number which we considered between us that although our partners were undertaking the work, it was not to the level expected.

Findings broadly fall into two categories:

Service improvements
- Generally performing the basics and reporting green on service levels but not undertaking proactive 'best in class' or 'good industry practice' levels of service.
- We are working with them and their senior management teams to address the issues identified and how they can improve their services.
- Also reviewing how we commercially measure their service performance and change what we are measuring to better reflect business outcomes rather than service inputs.

Technological best practice
- Keytree found a number of recommendations and there is a working group in place to turn these into service improvements.