

# Joint Statements

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JS2 Bugs table:

Extract	Comments	Coyne XX
Bugs table – recovery issues (row 8)	<p>acha959T</p> <p>If a T1 recovery request times out at the counter, recovery is abandoned and no second attempt is made to get the recovery information. This is as designed; it was decided to keep recovery simple and not have too many error paths. The priority is to get the User working again, so in this sort of error path we just mark the recovery as failed and leave it for SSC to sort out.</p>	
Bugs table – reversals (row 9)	<p>PSteed2847N (2003) Remming issue but error notices, rather than TCs, at the time. Obvious DEA failure.</p> <p>(I said TC – should have said error notice)</p>	
Bugs table – data tree build (row 10)	<p>MScardifield2219S says ‘nothing gets lost in the end’ ‘the declare cash problem clears itself overnight’ (2007) – but is much later and probably not connected to the 2000 incident.</p> <p>F/22 PC0033128 (Dungannon) ‘immediate impact of this week’s balance has been addressed’; ‘seen as a one off’; error trapping introduced. Then Yate Sodbury £52K, Appleby £9K; appeared fixed by July 2000 – so why the much later Peak?</p> <p>Coyne 3.109 says other Peaks are ‘likely related’ but there is no analysis in his table to support this.</p> <ul style="list-style-type: none"> <li>F/29 PC0046811 June 2000 RP mismatch £37.40 – not clear what the link is between the two Peaks. No mention of data trees, or Riposte.</li> <li>F/66 PC0055964 Oct 2000 RP mismatch. No mention of data trees. No Riposte fault.</li> <li>F/76 PC0058161 Nov 2000 another RP mismatch, £3K. No mention of data trees. Riposte system calls failing with no error logged.</li> </ul>	<p>Coyne could be asked – how are the Peaks he cites in row 10 of the table JS2 related to data tree build? I have found no obvious relation.</p> <p>He seems just to have picked up three RP mismatch Peaks in 2000, which were fairly common in 2000-2001</p> <p>The KEL from 2005-2007. Mentions a possible Riposte failure, but no mention of data trees</p>

	<p>Next Peak cited is 2006, PC0132133 and references the KEL. Mentions data trees, but not data tree build problems – and nobody made a link to the earlier problem.</p> <p>Conclusion: my estimate of £10K financial impact was conservative</p>	
Withdrawn stock (row 13)	<p>Although I included this in my table of possible bugs (for impact assessment), my opinion in the bugs table was that it had no lasting effect. This was based on my previous analysis of the KEL (some possible impact) and FJ's analysis of the same KEL (no impact).</p> <p>I was being conservative to include it in the table.</p>	
Bureau Discrepancies (row 14)	<p>F/1679 PC0261541 2017 £200 shortfall from FX. Comms failure during tx.</p> <p>F/1681 PC0261710 - same incident as above – Coyne padding it out.</p> <p>F/1722 PC0265443 - – long and confusing Peak – SAP, Accenture. It is about revaluation of bureau holdings, not a Tx that goes wrong. Took a long time to resolve – included for effect.</p>	
Concurrent Logins (row 18)	Early Riposte problem. Mr Lui left.	Coyne says FJ did not follow up with Escher. How does he know?
Bureau de change (row 23)	Tiny financial impact	
Wrong customer change (row 24)	F/319 KEL AChambers4134R. smartpost – some clerks do it differently. Fix in ref data -on and off. One of the KELs I though in RW1 were bugs	
Lyca top up (row 25)	<p>I said could cause discrepancy through wrong TC</p> <p>F/698 ballantj020J</p>	
TPS (row 27)	I said possible financial impact? FJ said not. Coyne sys net impact zero? Included only in case FJ evidence not accepted	
Drop and go (row 28)	As above – included just in case FJ are wrong. (not challenged in XX, I think)	

Mean impact spreadsheet:

A	B	C	D	E	F	G	H
JS Table row	Bug	KELs	Financial Impact	Probability (SPM compensated) (RW estimate)	Loss to SPMs (RW estimate)	Probability (SPM compensated) (conservative)	Loss to SPMs (conservative)
1	Receipts/payments mismatch	wrightm33145J	20000	0.9	2000	0	20000
2	Callendar Square	JSimpkins338Q	3000	0.7	900	0	3000
3	Suspense account	acha2230K	14000	0.9	1400	0	14000
10	Data Tree Build	MSCardifield2219S	105000	0.9	10500	0	105000
13	Withdrawn stock	pothapragadac4359R	5000	0.7	1500	0	5000
14	Bureau Discrepancies		3000	0.3	2100	0	3000
18	Concurrent logins		9000	0.7	2700	0	9000
23	Bureau de change	ACHambers2252R	300	0.3	210	0	300
24	wrong customer change	ACHambers4134R	300	0.2	240	0	300
25	Lycra top up	ballantj020J	2000	0.3	1400	0	2000
27	TPS	ballantj2547K	2000	0.8	400	0	2000
28	Drop and Go	cardc235Q	2000	0.5	1000	0	2000
	Summed impact on SPMs				24350		165600
	Mean impact/bug on SPMs				2029		13800
	Previous mean estimate				1000		6000
	See explanation of calculations on second sheet.						

JS2 Other:

row	Extract	Comments
0.3	KELs and Peaks together form a useful source of information about bugs in Horizon but are a limited window on what happened. It is sometimes necessary to use evidence from both to try to understand, but even so they are not a comprehensive picture. It is to be expected that both KELs and Peaks are incomplete in various respects.	
0.5 agreed	Peaks assessment	
1.2 agreed	12 rows 'may have financial impact' – note it did not mention 'lasting' impact.	
1.4 agreed	No correlation between likelihood and impact – a weird one. 1.4a says I never assumed it.	

1.7 agreed	RP mismatches evident to SPM	<p>Possible line for Coyne XX:</p> <ul style="list-style-type: none"> <li>• JS2 1.7 talks about Receipts payments mismatches</li> <li>• 1.7 makes it clear that it was not just the one bug – but it happened more frequently?</li> <li>• As in some of the Peaks you have cited? (examples above – bugs table row 10)</li> <li>• Generally , if an RP mismatch happened, it was not the SPM's fault?</li> <li>• It was some system issue?</li> <li>• You have agreed in 1.7 than any RP mismatch is evident to the SPM?</li> <li>• So it is evident to him , and he knows it is not his fault?</li> <li>• He can see the size of the discrepancy? (in his reports – trial balance)</li> <li>• So in these cases, he is likely to call the help line? (which probably leads to a Peak)</li> <li>• And – knowing it is not his fault – he is unlikely to stop calling until the issue is resolved?</li> <li>• Until he knows the discrepancy has no adverse impact on his accounts?</li> <li>• In other words, if ever there is an RP mismatch (especially a large one), the branch is very likely to have been compensated for any discrepancy?</li> <li>• So these Peaks are not really evidence of lasting discrepancies in branch accounts?</li> </ul>
1.9 agreed to disagree	Definition of branch impact	<p>Coyne's definition is pretty meaningless – could XX.</p> <p>My follow ons are 1.10, 1.11</p>
1.12 - JC	PEAKS and KELs are Fujitsu recording tools and a discrepancy would only appear in a PEAK or KELs if a Horizon system problem is suspected	Obviously wrong – could take to counterexamples (eg recovery Peaks)
1.15 agreed	The number of distinct bugs, for which the experts have seen strong evidence of the bug causing a lasting discrepancy in branch accounts, is between 12 and 29.	Coyne's problem is 29; my problem is 'strong' evidence – meaning $P > 0.2$

1.21 RW	What was I not suggesting? 5.284 If Dr Worden is suggesting that there should be no consideration of the number of bugs, then I disagree with this position.	
1.25 RW	Complex recoveries are not bugs. Cite many Peaks.	
1.26 RW	Bugs in reports are not discrepancies	
1.27 RW	Bugs which top branches working	
1.28 RW	Remming bugs are not lasting discrepancies	
1.31 RW	Revision of extent estimate Discusses data tree build bug, whether branches were compensated – factual issue?	
1.34 RW	Coyne has shown no flaws in estimate.	
1.35 – 1.39 RW	Defences against Coyne attacks on extent.	Could use these for XX of Coyne
1.40 RW	Raindrops to lightning strikes	
1.43 RW	Coyne has totally misread the graph.	
1.44 – 1.51 RW	Deep into claimant analysis. Too much.	

If asked: why so much RW here? Apologise if I got it wrong. We tried to do better in later JS. The low level of agreement in JS2 arose partly from our very different approaches to Horizon Issue 1.

(One of the purposes of a joint statement may be to ensure a level playing field - that neither expert gets a 'last word', giving the other expert no chance to reply. Coyne 2 gave him a last word on RW1; I had no last word on Coyne 1. The JS were a level playing field. Coyne could have come back on the RW points. Needs to be used carefully.)

The overall balance of RW and JC points in JS2,3,4 is not that far from even.

JS3:

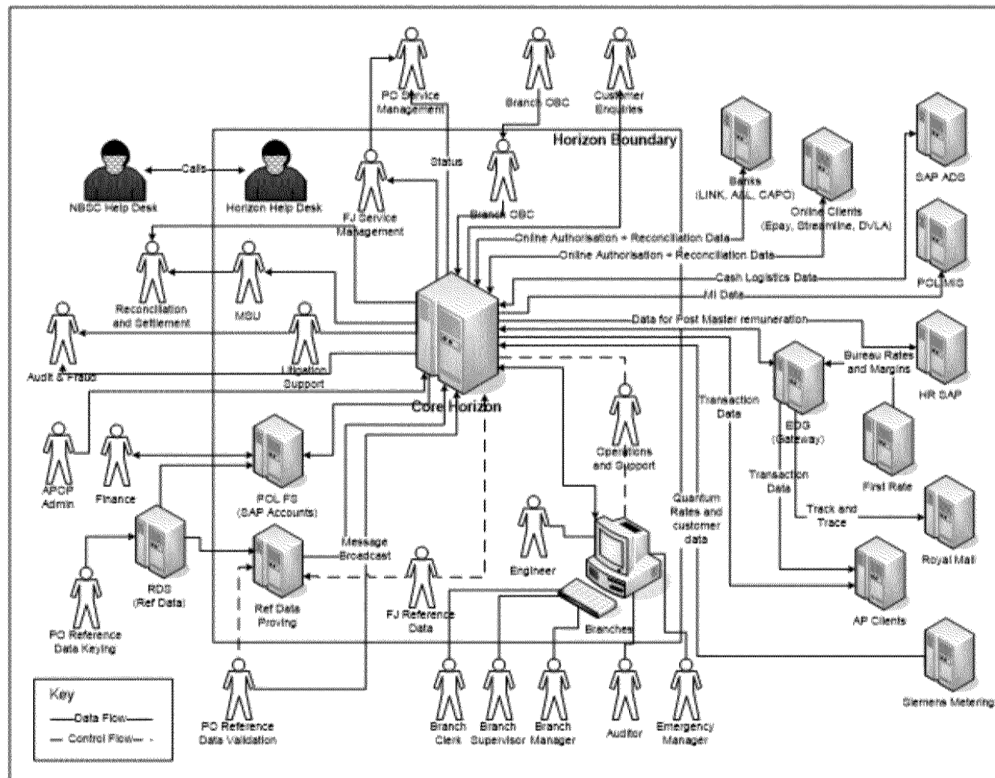
row	Extract	Comments/ points for XX
3.1	Fairly useful agreement on robustness. 'PO' should read 'FJ'	
3.2		
3.5	Post Office does not consult the full audit data (unfiltered ARQ Data) before deciding how to handle discrepancies and issuing Transaction Corrections.	<ul style="list-style-type: none"> <li>• Surely PO processes for creating TCs are out of scope?</li> <li>• So the experts have effectively agreed that the effects of such processes are in scope?</li> </ul>

3.6 JC	More bugs/errors and defects have been shown to impact branch accounts than the initial three acknowledged by Post Office.	<ul style="list-style-type: none"> <li>• Surely this is Issue 1, no issue 3?</li> <li>• Already covered by JS2?</li> <li>• So why were you coming back to have another shot at issue 1?</li> </ul>
3.7 JC		<ul style="list-style-type: none"> <li>• Same point</li> </ul>
3.15 agreed	It is difficult to measure the extent of the robustness of Horizon, apart from how it might limit the extent of impact on branch accounts, as in Issue 1.	<ul style="list-style-type: none"> <li>• If you cannot measure the extent of robustness, how can you comment on how it has changed?</li> <li>• Surely you are jus saying that various facets of robustness have changed over time?</li> <li>• Various countermeasures?</li> <li>• But you can say little about how the net effect of countermeasures has changed over time?</li> </ul>
3.16 agreed	The extent to which these problems were serious, or evaded countermeasures, or caused discrepancies in branch accounts, is not agreed.	<ul style="list-style-type: none"> <li>• This disagreement goes back to 3.15?</li> <li>• You cannot really say anything?</li> <li>• So it is a kind of negative disagreement?</li> </ul>
3.18	The designers of a system should not make unrealistic assumptions about the users of the system.	<ul style="list-style-type: none"> <li>• What unrealistic assumptions are you referring to?</li> </ul>
3.22	Many software bugs can have the same effects as a user error (as illustrated, for instance, by the Dalmellington bug, which produced a remming error).	<p>To make Coyne look evasive:</p> <ul style="list-style-type: none"> <li>• Can you give the court any idea how many user errors occur per year?</li> <li>• You have not looked at it at all? <ul style="list-style-type: none"> <li>○ E.g how often monthly accounts need to be balanced?</li> <li>○ E.g how many remming TCs per year?</li> <li>○ Other TCs? Surely they often correct user errors?</li> </ul> </li> <li>• So you have no opinion about the relative frequency of user errors and software errors?</li> <li>• Or their relative impact on branch accounts?</li> <li>• Is it fair to say that once a software error if fixed, it usually goes away for all time – whereas user errors keep on happening?</li> </ul>

3.23	Tightly run ship – see separate note	<ul style="list-style-type: none"> <li>• What other IT support organisations have you worked with in the last 10 years?</li> <li>• On the same scale as Fujitsu?</li> </ul>
3.25 JC	Therefore, it would be incorrect to say that Horizon was extremely unlikely to be the cause of shortfalls.	<ul style="list-style-type: none"> <li>• Can you define the scope of the word ‘likely’? <ul style="list-style-type: none"> <li>○ During the lifetime of Horizon?</li> <li>○ During one month’s branch accounts?</li> </ul> </li> <li>• Surely these are very different? (by a factor 3 million)</li> <li>• Surely the second sense is what matters to the claimants?</li> <li>• And to get at it, you would have to do some arithmetic?</li> <li>• Have you done any such arithmetic? Where?</li> </ul>
4.4	Reference data proving	<ul style="list-style-type: none"> <li>• Can you tell the court about reference data proving?</li> <li>• Take him to diagram below from TD/ARC/0039 <ul style="list-style-type: none"> <li>○ So you have not looked properly into the processes for managing reference data?</li> <li>○ Or: does not this show that reference data was carefully managed?</li> </ul> </li> </ul>
4.5 JC	However, Peaks and KELs illustrate (by their existence) that errors in data recorded did occur, some with financial impact, some not.	<ul style="list-style-type: none"> <li>• You say ‘illustrate’ and we can agree that</li> <li>• Can you define the scope of ‘did occur’? <ul style="list-style-type: none"> <li>○ During the life of Horizon?</li> <li>○ During one month’s branch accounts?</li> </ul> </li> <li>• As above, for ‘likely’ – 3 million times different</li> </ul>
5.2	PO back office accounting processes	<ul style="list-style-type: none"> <li>• Out of scope – but effects were in scope?</li> </ul>
5.3	TCs – experts have agreed that the effects of TC errors were in scope	<ul style="list-style-type: none"> <li>• ditto</li> </ul>
5.4	3 <sup>rd</sup> party data	<ul style="list-style-type: none"> <li>• ditto</li> </ul>
6.2 JC	Measures and controls that existed to reduce the risk of “c. a failure to detect, correct and remedy software coding errors or bugs” were limited.	<ul style="list-style-type: none"> <li>• Limited = not perfect?</li> <li>• Surely that is saying nothing new? Agreed in any case?</li> </ul>
		<ul style="list-style-type: none"> <li>•</li> </ul>

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There are four main areas within the Horizon Architecture:

1. POL-FS – financial accounting system based on SAP
2. Reference Data Proving – environment in which changes to reference data are proved before releasing into live (reference data controls things such as which products are sold, their price and where in the menu hierarchy they are displayed).
3. Branches – the branches themselves
4. Core Horizon – the central systems that support Horizon

JS4:

row	Extract	Comments
10.1 RW	Bullet 2 – definition of remote access	
10.1 RW	The number of occurrences of remote access for which I have seen evidence is not more than 10.	This was just what I had seen at the time – given the definition. In RW3 I have an updated opinion.
10.1 RW	The Managed Service Change logs are not a useful source of evidence about remote access.	Updated in RW3
10.2 JC	In both Legacy and Online, usage of the Transaction Repair Tool to fix transaction data within the Horizon....	<ul style="list-style-type: none"><li>• Can you describe the TRT to the court?</li><li>• You are aware it was called the TIP TRT?</li><li>• Can you describe the function of the TIP?</li><li>• Can you describe the function of TPS?</li><li>• See 5.1.15 of Ds/APP/HLD/0027 below , and TRT HLD</li><li>• So TRT was used only to repair transaction to be sent on to POL systems?</li><li>• So no direct effect on branch accounts?</li><li>• Only indirect effects, which we will come to?</li><li>• Have you any reason to suppose it did have effect on branch accounts? Evidence?</li></ul>

10.10 JC	<p>The modification from a TRT could provide an erroneous view of a branches' accounting position and therefore Post Office could potentially issue a Transaction Correction to a branch in error.</p>	<ul style="list-style-type: none"> <li>• Does this not apply to any change at all made in a back end system, or a POL system?</li> <li>• Was not the main purpose of the TRT to repair something that had gone wrong?</li> <li>• Typically the 'mode ' of a transaction - not the amount? (cite Peaks)</li> <li>• So the chances of that repair itself going wrong are a second-order effect?</li> <li>• And the chances of that getting back into branch accounts undetected are third-order effect?</li> <li>• A very remote possibility?</li> <li>• And you have made no attempt yourself to estimate the frequency with which this third-order effect might happen?</li> <li>• Whereas RW has at least made an estimate of the financial impact of incorrect TCs?</li> <li>• Which, given what you say here, is a relevant thing to do?</li> <li>• And you have not contested his estimate?</li> <li>• Do you not think that , by dragging in such a remote possibility of a third order impact on branch accounts: <ul style="list-style-type: none"> <li>○ You are allowing yourself to draw in such a wide range of events as to make your conclusions almost meaningless – including almost anything that might go wrong in the back end, or in POL?</li> <li>○ You are diluting the concept of 'remote access' out of any real meaning?</li> <li>○ You are attempting to give an impression that problems may have been more widespread than they actually were – i.e being biased?</li> <li>○ Does this really assist the court?</li> </ul> </li> </ul>
10.12 - agreed	<p>Uncommon types of repair –</p> <p>Therefore, it is usually difficult for the experts to make categorical negative statements of the form: 'X or Y never happened'.</p>	<ul style="list-style-type: none"> <li>• You have agreed that it is rather difficult to make a negative statement like 'X or Y never happened'?</li> <li>• So a statement of the form 'X or Y might have happened' is rather empty? Obvious? Like 'bugs could occur'?</li> <li>• Let us look back earlier in JS4 - 10.6 to 10.9</li> <li>• You have agreed that these are rather empty, obvious statements?</li> </ul>

10.12 - agreed	However, to repair less common issues which arose from time to time, standard tools and procedures might not have been sufficient, and evidence might not persist of what was done at the time.	<ul style="list-style-type: none"> <li>You have agreed there were less common issues, which went beyond the use of standard tools?</li> <li>Which required something out of the ordinary?</li> <li>Off the beaten track?</li> <li>Could this have been what Ann Chambers meant by 'going off piste'?</li> </ul>
10.14 RW	If any malicious person within Fujitsu were ever to alter branch accounts for malign purposes, controls around branch account data were such that any such alteration would be likely leave traces behind. it.	(These controls include the TripWire system – see EY service audit report – to detect and log any unauthorised activity)
10.15 JC	The controls around branch account data do not specifically consider if the monies within the transaction actually go to the correct accounts. It would be possible through simple changes to alter the sort code and account number of the destination account and unless this was spotted by the PM or the client, Post Office system would not detect this.	<ul style="list-style-type: none"> <li>You are aware of Payment Card Industry (PCI) standards?</li> <li>You are aware that Horizon was subject to these?</li> <li>See extract below from EY service audit</li> <li>And that they are designed specifically to prevent things like this from happening?</li> <li>So why did you mention it, when it plainly cannot happen?</li> </ul>
11.4 JC	There is reference to “When we go off piste we use appsup” and “making adhoc changes” in the disclosed material which could suggest that the approved mechanism for modification was not always used, should this be the case then evidence would not be available.	<ul style="list-style-type: none"> <li>See 10.12 above – you have agreed this may have been not what Ann Chambers meant?</li> </ul>
11.13 JC	OCP and OCR records do exist, but these do not directly correspond with Managed Service Change “MSC” entries, where it is stated by Mr Godeseth that audit records should exist.	<ul style="list-style-type: none"> <li>What is the timeframe covered by OCP/OCR (up to about 2010) ?</li> <li>What is the timeframe covered by MSC ? (from about 2008)</li> <li>So why would you expect them to correspond, outside possibly 2008 – 2010?</li> </ul>
12.4 JC	In summary, the existence of multiple audit points for differing actions make it difficult to accurately quantitatively assess how often the abilities and facilities were used. There are no reporting matrices either expert is aware of that record such figures across Horizon’s whole lifespan.	<ul style="list-style-type: none"> <li>Would it be fair to say that you have never tried to ‘accurately quantitatively assess’ any number at all in your reports?</li> <li>Can you point me to one?</li> <li>So why do you specially draw attention to it under Issue 12?</li> </ul>
13.1 JC	Further, transactions within Horizon’s back end systems (POLSAP etc) are subject to fixes performed via the Transaction Repair Tool. These back-end systems are used by Post Office when determining if a TC should be issued to address branch accounts discrepancies. Therefore, any changes made to data within these back end systems could have a consequence on Subpostmaster branch accounts.	<ul style="list-style-type: none"> <li>Have you not said the same thing before, under 10.10?</li> <li>So why say it again here?</li> <li>As before, are you not trying to cast your net so widely as to be meaningless?</li> </ul>

JS4 generally		<ul style="list-style-type: none"><li>• After JS2, were the experts not instructed by the court to look for agreements, not to take up further JS with their disagreements?</li><li>• Yet in this JS, there are vast screeds of 'JS thinks'</li><li>• Much more than the agreed parts? (maybe do a word count)</li></ul>
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From DES/APP/HLD/0027:

### 5.1.15 TIP Transaction Repair Tool

#### Function

The TIP Transaction Repair Tool is an ORACLE Forms application that runs on the TPS workstation. SSC uses it to correct records that were rejected when the Branch Database tried to load them into the TPS tables. The records are rejected because they fail the check constraints on the tables into which they should be loaded. The corrected records are loaded into the 65<sup>th</sup> partition of the relevant table.

From POL-0032939.docx:

<b>Document Title:</b>	TPS - EPOSS Reconciliation - TIP Transaction Repair
<b>Document Type:</b>	HLD Specification
<b>Release:</b>	Release 16.40
<b>Abstract:</b>	This document describes details of a maintenance tool that will assist SSC to repair EPOSS transactions processed at the Counter but are unable to copy from BRDB into the TPS Host. These transactions are saved within the Host in a table holding Harvester Exceptions. SSC require to process these transactions and have them sent to RECIPIENT SYSTEMS as quickly as possible. POCL require that these transactions be sent using the current electronic interface (TPS to TIP).
<b>Document Status:</b>	APPROVED
<b>Originator &amp; Dept:</b>	Wing Pang
<b>Contributors:</b>	

From EY service audit , about PCI standards:

## 4.6 Monitoring

Fujitsu utilises a variety of systems, processes and tools to help ensure that operations are efficient, effective and ethical, including:

- ¶ Performance Dashboards.
- ¶ Standard Reporting Packs.
- ¶ Audits and Health Checks.
- ¶ Reviews and Lessons Learned.
- ¶ Customer Satisfaction Scores.

Audits by Fujitsu Business Assurance Teams, Fujitsu External ISO Accreditors (the POL account is itself accredited to ISO 27001) and POL or its agents (including PCI DSS and Link Auditors) are used to support the design, implementation and post implementation review of the controls in place and to help ensure that the relevant governance, strategy and needs and requirements of both POL and Fujitsu are met.

		Results in data corruption or unrecoverable data loss.
B	Major	<ul style="list-style-type: none"> <li>¶ BUSINESS RESTRICTED, a Post Office restricted in its ability to transact business e.g., 50% of counters unable to trade or trading with restricted business capability.</li> <li>¶ Has an adverse impact on the delivery of service to a number of end users.</li> <li>¶ Causes a financial loss that impacts POL and / or POA reputation (as agreed between POL and POA Customer Services).</li> <li>¶ If a PCI Major Incident process is invoked.</li> </ul>
C	Medium	<ul style="list-style-type: none"> <li>¶ NON-CRITICAL, a Post Office working normally but with a known disability, e.g., an interim solution (workaround) has been provided.</li> <li>¶ If a PCI Minor Incident process is invoked.</li> <li>¶ Has a minor adverse impact upon the delivery of service to a small number of end users.</li> </ul>
D	Low	¶ Minor impact on service delivery.