



Mr Nick Ramsay AM  
Chair, Public Accounts Committee  
National Assembly for Wales  
Cardiff Bay  
Cardiff  
CF99 1NA

Wednesday, 29 August 2018

Dear Mr Ramsay

**RE: WAO Report on Informatics in NHS Wales**

**I agreed to send a note on the total number and sorts of outages that have occurred from 1 January 2018 to the current date.**

There were a total of 21 outages - i.e. incidents logged via the NWIS service desk that meant that users were unable to access CaNISC, WLIMS or the National Data Centres (affecting access to WLIMS or CaNISC) - between 1st January 2018 and 31st July 2018,

Annex 1 is a table describing details of the outages, shown in relation to the service against which the incident was logged by the Health Board/Trust.

As I outlined in previous correspondence there were specifically three outages related to the data centres as a whole. We appreciate that the issues in the past twelve months, particularly with WLIMS and CaNISC and the three incidents that affected the data centres more widely, are a concern to the service. We are very focused on addressing the remedial actions as well as undertaking a more systematic review of the infrastructure and associated support services.

**I agreed to send a note on how the cloud has been embraced in NWIS.**

Over recent years, the IT industry has been shifting towards providing and consuming cloud computing services. This means that instead of all the computer hardware and software used to deliver IT services sitting inside an organisation's network, some or all elements of the solution are provided to the customer as a service by another company and usually accessed over the internet.

NWIS has been working on the adoption of cloud services for several years. We currently support more than 10,000 staff actively using Microsoft Office 365 cloud service for email, file storage (OneDrive), Skype and other services. This includes all GP staff, all NWIS staff and around 250 users





in the Welsh Ambulance Service Trust. Some LHBs are also working on using PowerBI (Business Intelligence services). In addition, the users in the new Health Education and Improvement Wales (HEIW) will be using Office 365.

One of the suppliers of GP systems for NHS Wales (Microtest) is using 'UKCloud' (<https://ukcloud.com/>) to host the systems for its GP practices. GP practices in Wales will be migrated during 2019 and 2020.

In addition to this, we have been working with Microsoft, our Microsoft reseller and NHS Wales organisations over the past 18 months to put the underpinning systems in place to allow NHS Wales organisations to be able to consume Infrastructure as a Service (IaaS) and Platform as a Service (PaaS) cloud services from Microsoft Azure. This work includes:

- Establishing the necessary governance arrangements around the safe storage and processing of sensitive information (e.g. Patient Identifiable Information) in cloud services. A document entitled "NHS Wales guidance: Cloud services" was developed by NHS Wales, in conjunction with Welsh Government, and approved by the NHS Wales Informatics Management Board (NIMB) in April 2018;
- Designing the structures within the NHS Wales Microsoft Azure tenancy to allow individual NHS Wales organisations to have control over their own servers/services that they use;
- Billing arrangements – to enable individual NHS Wales organisations to pay for Azure services they consume;
- Establishing secure network links from the NHS Wales Wide Area Network into Microsoft Azure. Establishing these links has required the re-engineering of parts of the network infrastructure and this has been completed.

The use of cloud services offers some significant benefits for NHS Wales. However, there are some key challenges that need to be considered, including:

- Funding – cloud services are revenue funded and IT hardware is currently mostly purchased from capital monies. This would require a significant change in funding profile, which forms part of our assessment of any future use;
- Increased management. Unless actively managed, cloud infrastructure services can result in higher overall costs than on-premises equivalents. This also requires that applications are designed and built to be able to support this requirement;
- Some systems are not suitable for hosting in cloud services because of the technologies being used, for example, older database systems that are not optimised and applications that have not been designed to take advantage of the cloud and the way the applications have been designed; Performance, resilience and availability requirements for some systems do not make them suitable for hosting in cloud services

As mentioned above, NWIS is currently building the required underpinning infrastructure services in Microsoft Azure and will be piloting some Infrastructure-as-a-Service (IaaS) within the next 12 months. More generally, cloud services will be actively considered as options for future



projects/procurement, but this will require the shift of capital expenditure into revenue as well as the readiness of suppliers to offer Software as a Service in the future.

The pace of adoption of cloud services will reflect a measured response to the risks and issues above.

**I agreed to send a note on the analysis undertaken for the costs involved in replacing the CaNISC infrastructure and software currently being run together with the updating of the physical infrastructure.**

### Costs of replacement for CaNISC

The Velindre Cancer Centre's "Welsh Patient Administration System in Velindre" Business Case and the Welsh Cancer Network's "Cancer Information System" Business Case (in development) support the replacement for CaNISC. The figures in the table below have been extracted from these Business Cases; they indicate the anticipated costs at this stage and will be subject to refinement as the projects progress.

		18/19	19/20	20/21	21/22	22/23	Total
Phase 1	VCC WPAS	1,115	736	0	0	0	1,851
Phase 2	Electronic Patient Record**	0	1,099	456	399	0	1,954
Phase 3	Development of Increased Functionality	TBC	TBC	TBC	TBC	TBC	TBC
<b>Total</b>		<b>1,115</b>	<b>1,835</b>	<b>456</b>	<b>399</b>	<b>0</b>	<b>3,805</b>

\*\* Early indicative costs

The Cabinet Secretary has approved the Velindre Cancer Centre's "Welsh Patient Administration System in Velindre" Business Case and NWIS is working with the Wales Cancer Network and the Cancer Implementation Group to finalise the business case for the Electronic Patient Record before submission to Welsh Government..

Costs in the table shown as 'TBC' will be developed as the specifications for these services are confirmed by the stakeholders and a full assessment of the options to deliver them can be undertaken.

**Costs of updating data centre infrastructure backlog**

NWIS estimates that the cost of updating the ageing infrastructure in the two data centres, would be in the region of £5.5 to £6million. This includes the cost of the kit itself, plus updating the services required to run it, for example cyber security.

Yours sincerely



Andrew Griffiths

Chief Information Officer NHS Wales  
Director of NHS Wales Informatics Service

# Annex 1

Call	Logged	Title	Type	Service	Status	Summary of Cause
3903631	06/01/2018 18:35	OOH LIMS Support	Service Unavailable	Laboratory Information Management System (LIMS)	Closed	A combination of defragmentation, synchronisation and purging occurred at the same time causing the servers to freeze. A restart of the affected servers restored access
3941086	24/01/2018 15:50	Data centre issue	Service Unavailable	Network Services	Closed	An error in the configuration of the network firewalls was the root cause, triggered by a routine application of a firewall rule. The supplier implemented a number of changes to the configuration which restored service
3955814	31/01/2018 13:30	canisc	Functionality Issue	Canisc	Closed	A number of issues with the configuration of the Citrix environment were identified as the root cause to this outage.
3957025	01/02/2018 08:42	Canisc - unable to launch	Functionality Issue	Canisc	Closed	A number of issues with the configuration of the Citrix environment were identified as the root cause to this outage.
4058623	21/03/2018 15:47	ESC Email/intranet unavailable	Service Unavailable	Hosted Messaging Services	Closed	The suppliers investigated the log files to try to identify the root cause of this incident, and were unable to determine or recreate in their environments. The impacted devices were stopped and restarted which restored service
4074744	29/03/2018 15:43	TCL unresponsive	Service Unavailable	Laboratory Information Management System (LIMS)	Closed	There was insufficient capacity in the Citrix environment to be able to successfully manage a manually run backup. This caused the system to freeze and users to lose access. A reboot of the impacted servers, and the supplier issuing a number of thaw commands to the backup restored service
4106391	17/04/2018 12:21	Storefront unavailable	Service Unavailable	Canisc	Closed	An issue with the Citrix configuration meant that some user sessions failed as one from a pair of servers was unavailable. A restore of the correct configuration was applied which restored access
4123288	24/04/2018 16:54	Unavailability of Network	Functionality Issue	National Data Centres	Closed	It was identified that there was a corruption of the configuration of a switch which prevent access to systems. The configuration was restored which resolved the issue
4134166	30/04/2018 13:20	ESC Canisc - General Issue	Functionality Issue	Canisc	Closed	An unexpected shutdown of a server was identified as the root cause. When the server restarted automatically, manual intervention was then required to restore service
4134837	30/04/2018 15:25	TrakCare LIMS	Service Unavailable	Laboratory Information Management System (LIMS)	Closed	A 'Write Daemon' issue with the WLIMS servers caused the system to freeze. A reboot of the servers was required, which restored service
4141650	03/05/2018 07:45	starts up then closes down straight away	Functionality Issue	Canisc	Closed	Following a planned failover, a number of configuration issues were identified with the secondary servers which prevented access to the system for some users. Changes to the configuration were made to mirror the production service which restored access.
4161255	14/05/2018 12:10	ESC Functionality Issue	Functionality Issue	Laboratory Information Management System (LIMS)	Closed	The services failed due to a temporary storage location being filled up after a change was made against a biochemistry test set. A removal of all of the reference ranges applied as part of the change was undertaken which restored service.
4166115	16/05/2018 07:40	canisc down? message telling me file doesn't exist	Service Unavailable	Canisc	Closed	A failure of a number of Citrix servers following a SQL blip were identified as the root cause, which caused some users to be unable to access the system. Disconnecting those affected users, and getting them to reconnect restored access
4167272	15/05/2018 11:25	ESC LIMS has reached concurrent application limit	Service Unavailable	Laboratory Information Management System (LIMS)	Closed	The Citrix servers ran out of capacity meaning the the servers were running at 100%, and subsequently failing. All users sessions were ended on the impacted servers, and the servers were restarted which restored access
4169168	17/05/2018 08:36	Canisc slow and appears unstable	Functionality Issue	Canisc	Closed	An ongoing issue with storage, and the rollout of a security patch, impacted the system, causing performance issues and loss of access. Re-applying the security patch across the entire Canisc infrastructure, and undertaking changes identified by the supplier on the storage network restored service
4229394	17/06/2018 05:35	OOH LIMS Support	Unclassified	Laboratory Information Management System (LIMS)	Closed	Following a planned failover of the WLIMS system, an issue with the Journal which impacted the WLIMS database. A fix was applied by the supplier which restored access
4232870	18/06/2018 18:10	OOH LIMS Support	Unclassified	Laboratory Information Management System (LIMS)	Closed	Following a planned failover of the WLIMS system, corruption of an index master table impacted user access. A rebuild of the master table by the supplier restored access
4271736	07/07/2018 08:35	OOH LIMS Support	Unclassified	Laboratory Information Management System (LIMS)	Closed	A configuration issue was identified by the supplier where the server settings in one data centre did not match those in the second data centre. These were reconfigured to match and access to the service was restored
4283261	13/07/2018 09:19	Canisc - General Issue	Functionality Issue	Canisc	Closed	The deployment of an anti-virus patch which blocked access to around 200 servers across the National Data Centres was identified as the root cause. The patch was uninstalled and access to service was restored
4284620	13/07/2018 13:25	CANISC ERROR HANDLER	Functionality Issue	Canisc	Closed	The SQL database failed over to the secondary server. Root Cause investigations identified that this was mistakenly failed over, following maintenance work which was being undertaken on a similarly named management server. Restoration of the server and a failover was undertaken to restore service
4303277	24/07/2018 07:20	Users cannot access Canisc	Functionality Issue	Canisc	Closed	It was identified that the Citrix Listener was offline, causing the SQL databases to lose synchronisation. A reboot of the node restored access to the listener, and then a manual synchronisation of the databases restored access to users



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Mr Nick Ramsay AM  
Cadeirydd Pwyllgor Cyfrifon  
Cynulliad Cenedlaethol Cymru  
Bae Caerdydd  
Caerdydd  
CF99 1NA

Dydd Mercher, 29 Awst 2018

Annwyl Mr Ramsay,

**Cyf: Adroddiad WAO ar Wybodeg yn GIG Cymru**

**Rwyf wedi cytuno i yrru nodyn o'r nifer a'r mathau o ddifodiadau sydd wedi digwydd rhwng Ionawr y 1af a'r presennol.**

Roedd yno gyfanswm o 21 diffodiad - h.y. digwyddiadau cafodd eu nodi gan y ddesg wasanaeth oedd yn golygu nad oedd defnyddwyr yn gallu cael mynediad at CaNISC, WLIMS nac at Ganolfannau Data Cenedlaethol (yn effeithio mynediad at WLIMS neu CaNISC) - rhwng y 1af o Ionawr 2018 a 31ain o Orffennaf 2018.

Tabl yw atodiad 1 yn disgrifio manylion y difodiadau, yn cael ei ddangos yng nghyd-destun y gwasanaeth gafodd y digwyddiad ei gofnodi yn ei erbyn gan y Bwrdd Iechyd/ Ymddiriedolaeth.

Fel yr amlinellais mewn gohebiaeth flaenorol, roedd yno dri diffodiad penodol yn perthyn i'r canolfannau data yn gyfan gwbl. Rydym yn gwerthfawrogi fod y problemau dros y deuddeg mis diwethaf, yn enwedig gyda WLIMS a CaNISC a'r tri digwyddiad wnaeth effeithio'r canolfannau data yn fwy eang, yn bryder i'r gwasanaeth. Rydym yn barod i ganolbwyntio ar y gweithredoedd adferol yn ogystal â chymryd adolygiad mwy trefnus o'r rhwydwaith mewnol ac unrhyw wasanaethau cynnal cysylltiol.

**Roeddwn wedi cytuno i yrru nodyn ynglŷn â sut mae'r 'cloud' wedi cael ei dderbyn gan NWIS/ GGGIG.**

Dros y blynnyddoedd diwethaf, mae'r diwydiant TG wedi bod yn troi tuag at ddarparu a defnyddio gwasanaethau cyfrifiadurol y 'cloud'. Mae hyn yn golygu, yn lle fod yr holl feddalwedd a chaledwedd cyfrifiadurol sydd yn cael ei ddefnyddio er mwyn darparu gwasanaeth TG yn eistedd tu mewn i rwydwaith sefydliad, bydd y cwsmer yn cael cynnig atebion yn rhannol neu yn gyfan gwbl gan gwmni arall ac fel rheol yn cael mynediad ato dros y we.



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Angerddol am wneud gwahaniaeth  
Darparu gwybodaeth a thechnoleg ar gyfer gofal gwell  
Passionate about making a difference  
Delivering information and technology for better care



Mae NWIS/ GGGIG wedi bod yn gweithio ar ddefnyddio gwasanaeth y 'cloud' am nifer o flynyddoedd. Rydym ar hyn o bryd yn cefnogi dros 10,00 o aelodau o staff drwy ddefnyddio gwasanaeth y cloud ar gyfer e-bost gyda Microsoft Office 365, cadw ffeiliau gyda OneDrive, Skype yn ogystal â gwasanaethau eraill. Mae hynny yn cynnwys holl staff Meddygon Teulu, holl staff NWIS/GGGIG a hefyd o gwmpas 250 o ddefnyddwyr yn yr Ymddiriedolaeth Gwasanaeth Ambiwylans Cymru. Mae rhai LHBs hefyd yn gweithio gyda PowerBI (Gwasanaeth Cyd wybodaeth Busnes). Yn ychwanegol, mi fydd y defnyddwyr Addysg a Gwella Iechyd Cymru yn defnyddio Office 365.

Mae un o ddarparwyr systemau meddygon teulu GIG Cymru (Microtest) yn defnyddio 'UKCloud' (<https://uk.cloud.com/>) er mwyn cynnal systemau ar gyfer ei feddygyfeydd. Mi fydd meddygyfeydd meddygon teulu yn cael eu mudo yn ystod 2019 a 2020.

Yn ychwanegol i hyn, rydym wedi bod yn gweithio gyda Microsoft, ein hail werthwyr Microsoft a sefydliadau GIG Cymru dros y 18 mis diwethaf er mwyn rhoi systemau craidd yn eu lle i alluogi GIG Cymru i ddefnyddio'r gwasanaethau 'cloud', Infrastructure as a Service (IaaS) a Platform as a Service (PaaS) gan Microsoft Azure. Mae'r gwaith hwn yn cynnwys:

- Sefydlu'r drefn lywodraethol angenrheidiol ar gyfer cadw a phrosesu gwybodaeth sensitif (e.e. Gwybodaeth Adnabod Cleifion) o fewn y 'cloud'. Mae yno ddogfen o'r enw "NHS Wales guidance: Cloud Services" wedi cael ei ddatblygu gan GIG Cymru, yn gysylltiedig gyda Llywodraeth Cymru, ac wedi ei gymeradwyo gan Fwrdd Rheolwyr Gwybodeg GIG Cymru yn Ebrill 2018.
- Dylunio'r strwythur o fewn y denantiaeth Microsoft Azure GIG Cymru i alluogi sefydliadau unigol GIG Cymru gael rheolaeth dros rwydwaith eu hunain a'r gwasanaethau maent yn eu defnyddio.
- Trefniadau bilio- i alluogi sefydliadau unigol i dalu am eu defnydd o wasanaeth Azure.
- Sefydlu cysylltiadau rhwydwaith cadarn o Rwydwaith Lleoliadau Eang GIG Cymru i mewn i Microsoft Azure. Er mwyn sefydlu'r cysylltiadau yma roedd rhaid ail beiriannu rhannu o isadeiledd y rhwydwaith, ac mae'r holl waith yno wedi ei gwblhau.

Mae defnyddio'r gwasanaethau 'cloud' yn fuddiol iawn i GIG Cymru. Ond, mae yno rhai heriau sydd angen eu hystyried, yn cynnwys;

- Ariannu - mae gwasanaethau 'cloud' yn cael eu hariannu gan refeniw, a chaledwedd TG yw un o'r prif bethau sydd yn cael ei brynu gyda chyfalaf busnesau yn bresennol. Bydd hyn yn golygu fod angen newid sylweddol yn y proffil ariannu, sydd yn rhan o'n hasesiad ni ar gyfer unrhyw ddefnydd yn y dyfodol.
- Cynnydd mewn Rheolwyr. Os nad yw'n cael ei reoli yn drefnus, gall gwasanaethau isadeiledd 'cloud' greu costau uwch na'r costau bysai'n cael eu creu wrth redeg systemau ar safle. Mae hyn hefyd yn gofyn i raglenni cael eu creu er mwyn gallu cynnal y gofyniadau.





- Nid yw rhai systemau yn addas ar gyfer cael eu rhedeg o fewn y 'cloud' oherwydd y dechnoleg sydd yn cael ei ddefnyddio, er enghraifft, hen systemau cronfeydd data a rhaglenni sydd ddim wedi cael eu dylunio i allu cael eu defnyddio o fewn y 'cloud'; hefyd mae lefel perfformiad, hydwythdedd ac argaeledd rhai rhaglenni yn eu gwneud yn anaddas ar gyfer cael eu defnyddio ar y 'cloud'.

Fel y soniwyd uchod, mae GGIG wrthi yn adeiladu'r isadeiledd craidd angenrheidiol yn Microsoft Azure ac yn llywio rhan o 'Infrastructure as a service' (IaaS) o fewn y 12 mis nesaf. Yn fwy cyffredinol, allai defnydd o'r cloud gael ei ystyried fel opsiwn ar gyfer prosiectau/ meddiannau yn y dyfodol, ond fydd hynny yn gofyn am symudiad o gyfalaf i mewn i gyllid, yn ogystal â pharodrwydd darparwyr i gynnig meddalwedd fel gwasanaeth yn y dyfodol.

Bydd dechrau defnyddio gwasanaethau'r cloud yn adlewyrchu ymateb mesuredig i'r problemau a risgiau uchod.

**Wnes i gytuno i yrru nodyn ynglŷn a'r dadansoddiad gafodd ei wneud ar gyfer y costau oedd yno i newid y meddalwedd CaNISC a'i redeg ochr wrth ochr â ddiweddarau y caledwedd materol.**

### Costau newid CaNISC

Achos busnes "System Gweinyddu Cleifion Cymraeg yn Velindre" Canolfan Cancr Velindre ac achos busnes Rhwydwaith Cancr Cymru "System Gwybodaeth Cancr" (yn datblygu) yn cefnogi amnewidiad CaNISC. Mae'r ffigyrau yn y tabl isod wedi cael eu tynnu o'r achosion busnes yma; mae nhw'n dynodi y costau disgwylidig presennol a byddent yn cael eu newid wrth i'r prosiect ddatblygu.

		18/19	19/20	20/21	21/22	22/23	Cyfanswm
Cyfnod 1	VCC WPAS	1,115	736	0	0	0	1,851
Cyfnod 2	Cofnodion Electronig Cleifion**	0	1,099	456	399	0	1,954
Cyfnod 3	Datblygiad gallu gweithredol	TBC	TBC	TBC	TBC	TBC	TBC
<b>Cyfanswm</b>		<b>1,115</b>	<b>1,835</b>	<b>456</b>	<b>399</b>	<b>0</b>	<b>3,805</b>

\*\* Costau dangosol cynnar

Mae Ysgrifennydd y Cabinet wedi cymeradwyo achos fusnes "System Gweinyddu Cleifion Cymraeg yn Velindre" Canolfan Cancr Velindre ac mae GGIG/ NWIS yn gweithio gyda Rhwydwaith Cancr Cymru a'r Grŵp Gweithredu Cancr er mwyn gorffen yr achos fusnes ar gyfer y Cofnod Cleifion Electronig cyn ei anfon i Lywodraeth Cymru.







Mi fydd costau sydd yn cael eu dangos yn y tabl fel TBC yn cael eu datblygu wrth i fanylion ar gyfer y gwasanaethau gael eu cadarnhau gan hapddalwyr a pan fod modd i asesiad llawn o'r opsiynau er mwyn eu cwblhau gallu cael ei wneud.

### Costau tagfa diweddarau rhwydwaith y ganolfan ddata

Mae GGIG/ NWIS yn amcangyfrif mai cost diweddarau hen rwydweithiau yn y ddwy ganolfan fydd oddeutu £5.5 - £6 miliwn. Mae hynny yn cynnwys cost y pecynnau eu hunain, a hefyd gwella'r gwasanaethau sydd eu hangen er mwyn eu rhedeg, er enghraifft diogelwch ar lein.

Yn gywir,

Andrew Griffiths  
Prif Swyddog Gwybodaeth  
Cyfarwyddwr Gwasanaeth Gwybodeg GIG Cymru

# Atodiad 1

Call	Logged	Title	Type	Service	Status	Summary of Cause
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