

What You Need to Do to Protect Yourself Against z/OS and z/VM Hacks

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IBM Lab Poughkeepsie, NY

3/6/2015

Session # 16996



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Speaker



Linux for System z Security Strategy/Architecture/Design
Security Focal Point for System z
IBM System Integrity Competency Center



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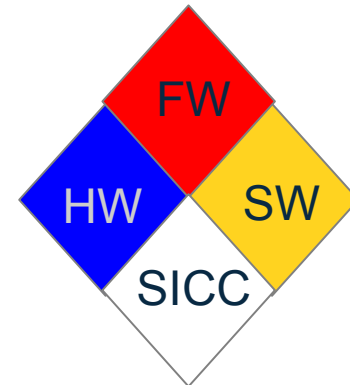
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Agenda

- Introduction to System Integrity
- Need for a Security Strategy
- z Systems Security Policy
- Security and Integrity APARs
- z Systems Security Portal
- CVSS → urgency and applicability...
- Registration and Security Portal Example
- Q & A / Open Discussion

System Integrity Competency Center

- First System Integrity Statement -1973
- Center started mid – 1970s
- Mission:
 - Guidance & Education
 - Own Process / Policy / Data
 - Code Inspection
 - Tooling and Testing
 - z Systems Security Portal
 - Secure Engineering Initiative
 - Security Focal Point for z Systems / SMEs
 - External Consultation
 - Researcher / Hacker liaison



Portal Information and System Integrity Statement

Overview

- http://www-03.ibm.com/systems/z/solutions/security_integrity.html

z/OS + System Integrity Statement

- http://www-03.ibm.com/systems/z/solutions/security_zosintegrity.html

z/VM + System Integrity Statement

- http://www-03.ibm.com/systems/z/solutions/security_zvmintegrity.html

z/VSE

- http://www-03.ibm.com/systems/z/solutions/security_zvseintegrity.html

Linux & z/TPF

- Separate process

z/OS System Integrity Statement

z/OS “System Integrity” is defined as the inability of any program not authorized by a mechanism under the installation’s control to circumvent or disable store or fetch protection, access a resource protected by the z/OS Security Server (RACF®), or obtain control in an authorized state; that is, in supervisor state, with a protection key less than eight (8), or Authorized Program Facility (APF) authorized. In the event that a z/OS System Integrity problem is reported to IBM, IBM will always take action to resolve it in the specified operating environment for releases that have not reached their announced End of Support dates.

Notes:

1. Information about end of support dates is available at http://www.ibm.com/software/support/lifecycle/index_z.html
2. End of Support dates are the last dates on which IBM will deliver standard support services for a given version or release of a product.

Why a Security Strategy Is Needed

Explosion of attacks – of increasing sophistication and persistence

- Concerns of privileged insider abuse
- Mis-configuration, down-level maintenance, and defects in privileged code create exposures and potential attack vectors
- Revenge / Publicity / Notoriety / Political / etc.
- Data and workloads hosted on z Systems represents a target for attacks
 - Paranoia is warranted

Increasingly rigorous compliance and regulatory requirements

- Lacking skills -- not familiar with z Systems -- raises the difficulty and expense of audits
 - Auditors look for proof that z Systems and client environments are compliant
- Complexity and scale present challenges in proving compliance

Security standards and regulations accelerating

- In part driven by the attack activity
- Availability of inexpensive computing power fosters brute force attacks – which drives strengthening of crypto primitives
 - What was strong is no longer considered strong -- arms race

Security/Integrity Vulnerabilities

Most z System Security/Integrity APARs are found internally through use of Secure Engineering tools and processes

IBM monitors and tracks Security investigations

- z System products follow corporate PSIRT process except for publishing external Security bulletins
 - System z Security Portal is the communication method
- Cross platform products and common code considerations
 - External security bulletins published for other platforms
 - z/OS clients are referred to the System z Security Portal
 - No confirmation or denial of exposure in public bulletin

Clients may report security/integrity product experiences through IBM Support

- Customer reported incidents and SEC/INT APARs are also treated as IBM Confidential
- Only limited details of the exposure will be updated in the PMR

All information is provided through the System z Security Portal

- To ensure the person is authorized to receive the information and will keep it confidential
- Recent heavily publicized vulnerabilities have generated questions and inquiries that are addressed on the portal as soon as information is known
- There is no additional information to provide

System z Security Portal – Best Practice

As a **best practice**, IBM strongly recommends that clients obtain **access** to the System z Security Portal and **subscribe** to the Security Portal's automatic notification process to get access to the latest service information on security and system integrity APARs for z/OS and z/VM. Note that IBM treats vulnerability information in connection with System z as IBM Confidential and by accessing the Security Portal you agree to treat such information as confidential in accordance with the terms set forth at

http://www-03.ibm.com/systems/z/solutions/security_subintegrity.html

System z Security Policy

Unique policy for System z (z/OS and z/VM)

- Exploits potentially devastating to our client's business and reputation
- Existence and details of security/integrity exposures are kept confidential
- Minimizes risk of known exposures until fixes can be installed
- Best way to protect ALL System z clients worldwide

Controlled access to Security/Integrity APAR fix information

- Managed through the IBM System z Security Portal
- Access requires client management approval and agreement to keep the information confidential
 - Requires authorized IBM ResourceLink ID

Security fixes are not secret to our customers. Details on how one might exploit, or potentially exploit a vulnerability is what is protected.

System z Security/Integrity APARs

- Special Security **or** Integrity flagging (SEC/INT = Y)
 - APAR is IBM Confidential
 - Restricted access (even within IBM)
 - Restricted information
- SEC/INT different and distinct from HIPER (system outage, data loss, major function loss, severe performance impact)
- No Red Alerts for Security APARs
- APARs are not viewable or searchable RETAIN
- SEC/INT PTFs shipped with preventive maintenance
 - Including HIPER and PE fixes on Monthly and Quarterly RSUs

About System z Security Portal

- Only available to IBM System z clients
- Clients must **register** to gain access
- Recommend clients **subscribe** for email notification
- Contains APAR/PTF numbers for all applicable exposures
 - Customers are considered exposed if they run affected product/component
 - No other details that could be used to potentially exploit are provided
- Industry standard scoring for risk assessment
- APAR/PTF fix information posted when fix is available
 - z/OS → SMP/E SECINT ++HOLDDATA and ++ASSIGN statements
 - Look for possible updated format later in 2015
 - z/VM → APAR/PTF/COMPID
- Security Notices for higher visibility vulnerabilities or issues
 - Including non-SMP/E products and general security communications

Addition of Security Notices

- **Security Notices** are text (bulletin-like) documents provided on the Security Portal used to communicate information for highly publicized vulnerabilities that may generate many inquiries.
 - Introduced in 2014
 - Updated as investigation progresses and whenever new information is available
 - May include mitigations when available

- Concerns with responding to individual vulnerability requests in a PMR:
 - investigation may still be in progress potentially making the response **incomplete or inaccurate**
 - information may be **updated** several times throughout the course of the investigation. Portal subscribers are notified each time there is an update.
 - confirming an exposure with **no mitigation** puts all our z/OS clients at risk
 - there are **many security fixes** identified on the Security Portal and reacting only to the highly publicized vulnerabilities is not a good/complete security process

Example: z/OS CVSS Data

Not really...

```
* * IBM Confidential * *  
Date      APAR      Bas Tmp  Vector  
-----  
...  
2012/07/11 OA12345 6.8 5.9 (AV:N/AC:M/Au:N/C:P/I:P/A:P/E:ND/RL:OF/RC:C)  
2012/07/11 OA23456 7.2 6.3 (AV:L/AC:L/Au:N/C:C/I:C/A:C/E:ND/RL:OF/RC:C)  
2012/07/17 PM34567 3.3 2.9 (AV:L/AC:M/Au:N/C:P/I:P/A:N/E:ND/RL:OF/RC:C)  
...
```

APAR numbers have been changed

Example: z/VM CVSS Data

Still not...

```
* * IBM Confidential * *
```

YrDay	COMPID	APAR	Rel	PTF	CVSS Base/Temporal/Vector
...					
14159	568411201	VM12345	R630	UM54321	4.3/3.7/ (AV:N/AC:M/Au:N/C:N/I:P/A:N/E:ND/RL:OF/RC:C)
14159	5735FAL00	PI23456	R630	UI65432	6.4/5.6/ (AV:N/AC:L/Au:N/C:P/I:N/A:P/E:ND/RL:O/RC:C)
14159	5735FAL00	PI34567	R630	UI76543	7.5/6.5/ (AV:N/AC:L/Au:N/C:P/I:P/A:P/E:ND/RL:OF/RC:C)
14159	5735FAL00	PI45678	R630	UI87654	2.6/2.3/ (AV:N/AC:H/Au:N/C:P/I:N/A:N/E:ND/RL:OF/RC:ND)
...					

PTF numbers have been changed

APAR numbers have been changed

Common Vulnerability Scoring System

Base Metrics – Capture the characteristics of the vulnerability

Temporal Metrics - Represent the characteristics of the vulnerability throughout its life cycle

Environmental Metrics - Represent the characteristics of the vulnerability in a particular environment

Information on CVSS

<http://www.first.org/cvss>

CVSS Decoded – Base Metrics

Metrics		Values		
		<i>Bad</i>	<i>Worse</i>	<i>Worst</i>
AV	Access Vector	Local	Adjacent Network	Network
AC	Access Complexity	High	Medium	Low
Au	Authentication	Multiple	Single	None
C	Confidentiality Impact	None	Partial	Complete
I	Integrity Impact	None	Partial	Complete
A	Availability Impact	None	Partial	Complete

CVSS Decoded – Base Metrics

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Sample Vector: (AV:L/AC:L/Au:N/C:C/I:C/A:C/E:ND/RL:OF/RC:C)

Base: (7.2)

AV = Local

AC = Low

Au = None

C = Complete

I = Complete

A = Complete

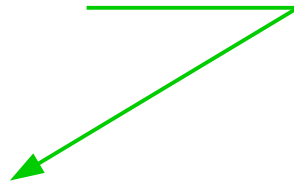
CVSS Decoded – Temporal Metrics

	Metrics	z Values
E	Exploitability	Not Defined
RL	Remediation Level	Official Fix
RC	Report Confidence	Confirmed or Not Defined

CVSS Decoded – Temporal Metrics

	Metrics	z Values
E	Exploitability	Not Defined
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Sample Vector: (AV:L/AC:L/Au:N/C:C/I:C/A:C/**E:ND/RL:OF/RC:C**)



Environmental Score

Temporal: (6.3)
 E = Not Defined
 RL = Official Fix
 RC = Confirmed

Common Vulnerability Scoring System (CVSS)

APARs scored from 1 to 10 based on characteristics and impact of vulnerabilities

Example 1 of CVSS values:

CVSS/B=10.0

CVSS/T=8.7

CVSS/V=(AV:N/AC:L/Au:N/C:C/I:C/A:C/E:ND/RL:OF/RC:C)

Urgency

Example 2 of CVSS values:

CVSS/B=2.1

CVSS/T=1.8

CVSS/V=(AV:L/AC:L/Au:N/C:N/I:N/A:P/E:ND/RL:OF/RC:C)

Applicability

SIA Cross Reference

SIA numbers are used by IBM SO teams to communicate with clients

SIA (Security Integrity APAR) to APAR number cross reference matrix:

SIA number	APAR
-----	-----
...	
SIA-MVS-2014.12-1	PM67890
SIA-MVS-2014.12-2	OA54321
SIA-MVS-2015.01-1	PM56789
SIA-MVS-2015.01-2	OA43210
SIA-MVS-2015.01-3	OA12384
SIA-VM-2015.01-1	VM12456
...	

System z Security Portal Registration (the hard way :)

Note from Client management should be sent to IBM indicating who should have access

- The note can be sent directly to syszsec@us.ibm.com to request registration or sent to local IBM rep to forward
- Multiple people can be registered at the same time

Please provide an IBM ID or Resource Link ID of each individual to be registered

- <http://www.ibm.com/account/profile>
- <https://www-304.ibm.com/servers/resourcelink/svc03100.nsf/pages/zaboutResourceLink>

Access to portal is granted after agreement to Terms and Conditions

Sample note To: syszsec@us.ibm.com CC: Account Rep

As manager of Mainframe Systems (or appropriate title) at (company name), please allow the following access to the System z Security Portal:

NAME 1 ID 1 NAME 2 ID 2 ...

By accessing the System z Security Portal we agree the information contained in it is IBM Confidential, provided AS IS, may be used by us for internal purposes only and may not be disclosed to any third party without IBM's written consent.

System z Security Portal Registration (the easy way :)

Go to: http://www-03.ibm.com/systems/z/solutions/security_subintegrity.html

Click the “Portal Registration” button

- Provide your customer name, your name and IBM ID or Resource Link ID

IBM will follow up with your IBM Rep or Business Partner Rep to get the needed management agreement to the following terms and conditions.

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Validate request for IBM access

IBM Registration User: **barbara.bryant@us.ibm.com** has requested IBM user level access to the Resource Link site.

Do you approve IBM user level access?

Yes

No

Submit

If you have problems or questions, contact Resource Link at reslink@us.ibm.com.



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Hello _____,

Access to the System z Security and Integrity data on the IBM Resource Link website has now been authorized for your IBM ID: _____.

Please keep in mind your agreement to the following:

By accessing the System z Security Portal you agree the information contained in it is IBM Confidential, provided AS IS, may be used by you for internal purposes only and may not be disclosed to any third party without IBM's prior written consent. If you do not agree to the foregoing, you may not access the System z Security Portal and the information contained therein.

To access the data:

1. From a web browser enter <http://www.ibm.com/servers/resourcelink>
2. Select "Sign in" from this page and enter your IBM ID and password
3. Select "Problem solving" on the left hand side
4. Select "Security alerts" under the "Software" column

On the "Security alerts" page you will see links for the System z security/integrity data followed by links for many security related notifications for various platforms. Open the links for "z/OS Security/Integrity Data" or "z/VM Security/Integrity Data", as appropriate, to view the current list of relevant security information.

To receive notification that updates are available, you can Subscribe to this list via the "Subscribe to this page" link on the upper right hand side of the "Security Alerts" page. Select the appropriate notification options on the subscription page and "Submit" the request. For z/OS there is usually some form of update each month. You will then receive notification that the hold data has been updated indicating a new APAR is available.

Keep in mind no data is pushed to you, once notified of an update you will need to log on and retrieve the data. Also, be aware that email notifications are not always reliable, due to various networking and security technologies, and are not a substitute for vigilant checking.

Please see the following link to view a Frequently Asked Questions document:

http://www.ibm.com/common/ssi/cgi-bin/ssialias?subtype=ST&infotype=SA&apname=STGE_ZS_ZS_USEN&htmlfid=ZSQ03054USEN&attachment=ZSQ03054USEN.PDF

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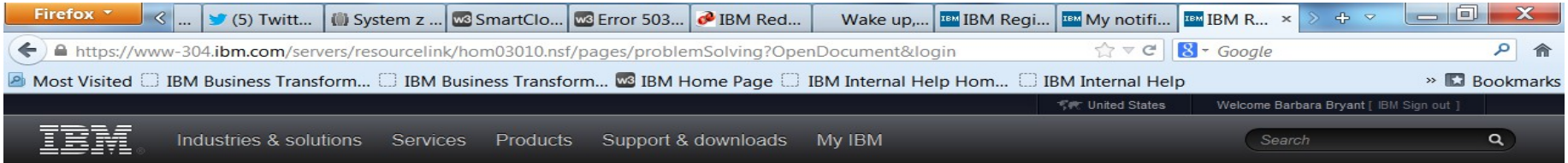


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Hardware

Known defects/problems

- Large Systems Support
- Exception letters

Alerts

- Machine alerts
- Hiper alerts
- Product support alerts
- Red alerts
- Security alerts

Report problems

- Hardware problem reporting

Hardware service activities

- Machine information

Software

Alerts

- Security alerts

Service bulletins

- Service bulletins and advisories

Report problems

- Software problem reporting

Search technical databases

- Troubleshooting
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- VSE forums
- Linux for zSeries

Other resources

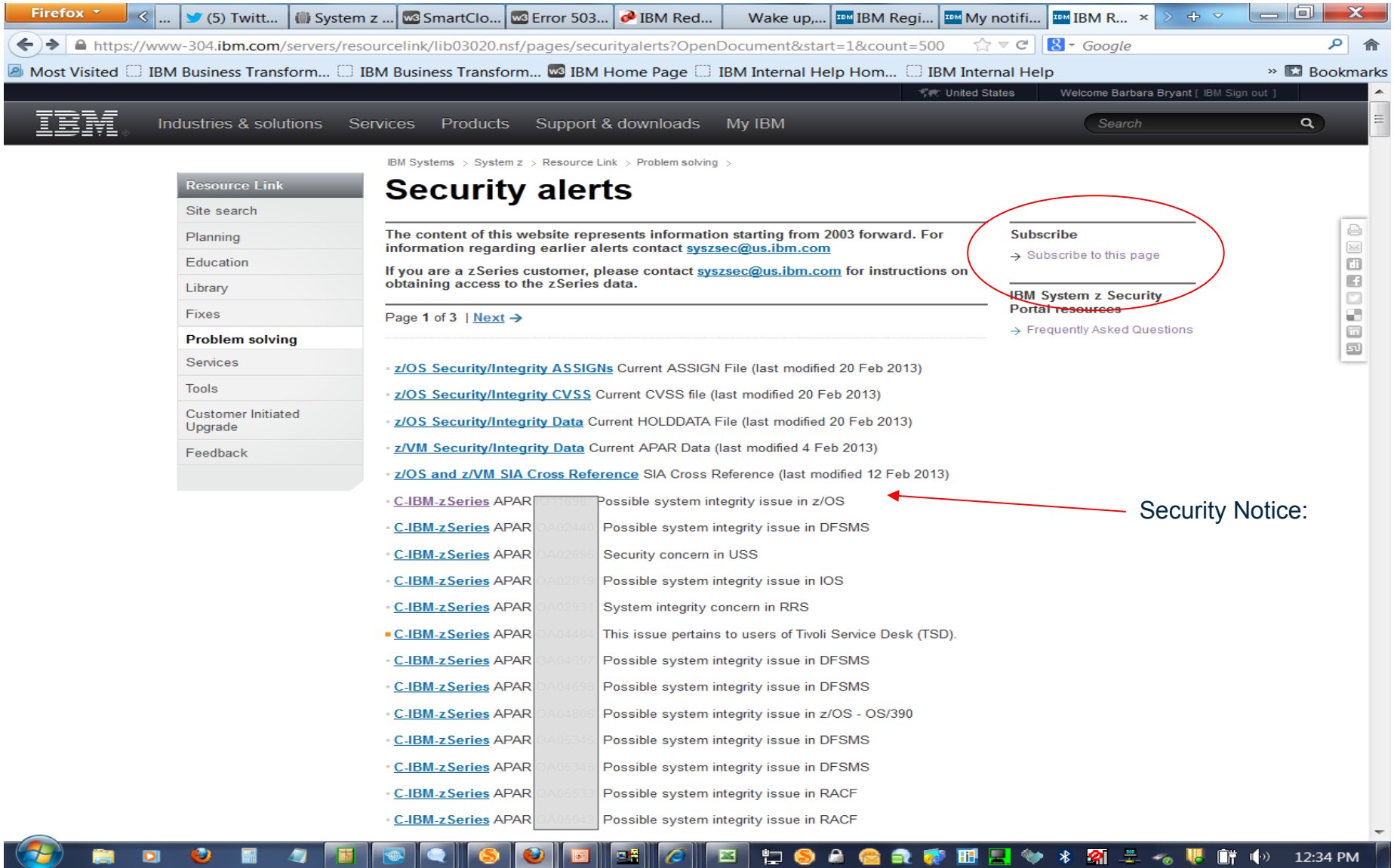
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The content of this website represents information starting from 2003 forward. For information regarding earlier alerts contact syszsec@us.ibm.com

If you are a zSeries customer, please contact syszsec@us.ibm.com for instructions on obtaining access to the zSeries data.

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- [z/OS Security/Integrity Data](#) Current HOLDDATA File (last modified 20 Feb 2013)
- [z/VM Security/Integrity Data](#) Current APAR Data (last modified 4 Feb 2013)
- [z/OS and z/VM SIA Cross Reference](#) SIA Cross Reference (last modified 12 Feb 2013)
- [C-IBM-zSeries](#) APAR [redacted] Possible system integrity issue in z/OS
- [C-IBM-zSeries](#) APAR [redacted] Possible system integrity issue in DFSMS
- [C-IBM-zSeries](#) APAR [redacted] Security concern in USS
- [C-IBM-zSeries](#) APAR [redacted] Possible system integrity issue in IOS
- [C-IBM-zSeries](#) APAR [redacted] System integrity concern in RRS
- [C-IBM-zSeries](#) APAR [redacted] This issue pertains to users of Tivoli Service Desk (TSD).
- [C-IBM-zSeries](#) APAR [redacted] Possible system integrity issue in DFSMS
- [C-IBM-zSeries](#) APAR [redacted] Possible system integrity issue in DFSMS
- [C-IBM-zSeries](#) APAR [redacted] Possible system integrity issue in z/OS - OS/390
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- [C-IBM-zSeries](#) APAR [redacted] Possible system integrity issue in DFSMS
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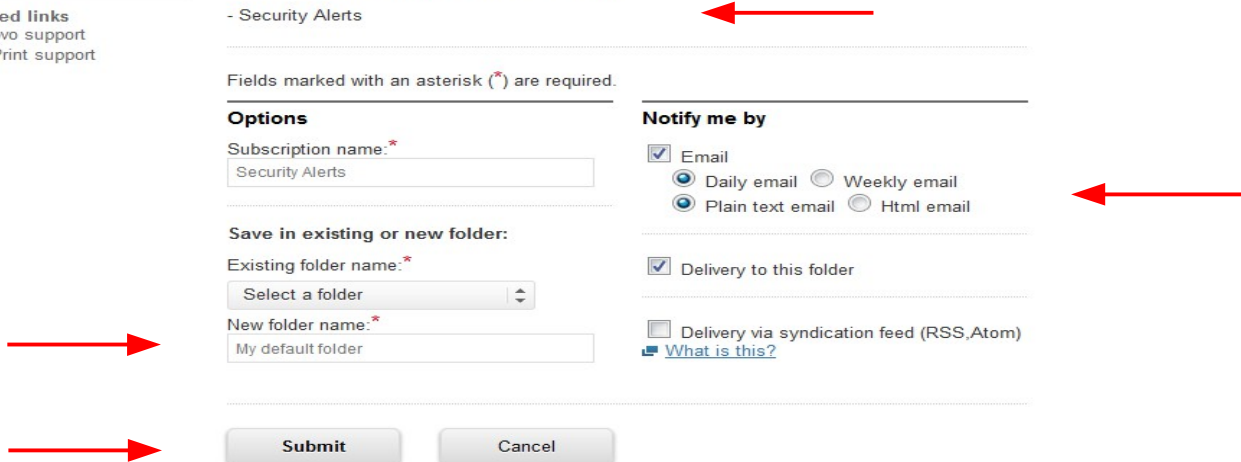
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Resources

System Integrity Statement

http://www.ibm.com/systems/z/solutions/security_integrity.html

IBM 3270 emulation: security considerations

http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?subtype=WH&infotype=SA&appname=STGE_ZS_ZS_USEN&htmlfid=ZSW03276USEN&attachment=ZSW03276USEN.PDF#loaded

Enterprise Tech Journal

October/November 2012

<http://enterprisesystemsmedia.com/article/system-z-security-equals-vigilance>

Frequently Asked Questions:

http://www.ibm.com/common/ssi/cgi-bin/ssialias?subtype=ST&infotype=SA&appname=STGE_ZS_ZS_USEN&htmlfid=ZSQ03054USEN&attachment=ZSQ03054USEN.PDF

Summary

- Establish governance policy for Security updates
- Register trusted individuals to the System z Security Portal
 - Make sure to subscribe for email notification
- Install Security fixes to prevent exposures to known problems or hacks

Q & A and Discussion

Discussion

