



# Using PTC's Single User Baseline Tester (SPT) to Measure Performance



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## How is Windchill Performing?

- **Common question from users and management. Difficult to answer without data.**
- **Data is time consuming to gather manually.**
- **Response is reactionary without automated testing and logging tools.**

- PTC's SPT Description
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- Installing and Configuring SPT
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# PTC's SPT Description



- **The SPT tester was developed by PTC using the Pro/ENGINEER JLink toolkit.**
- **The SPT tester is used to automate performance tests that time the interaction between Pro/ENGINEER Wildfire and a Windchill server.**
- **Test cases can be built to your company's testing requirements.**

# Motorola's Performance Data Goals

- **Establish a baseline and capture daily metrics for user performance at multiple sites around the world.**
- **Monitor metrics for positive or negative trends due to known or unknown changes (Network, Hardware, ProE/Windchill Build Upgrades etc) .**
- **Evaluate SPT data for multiple configurations of “dm\_” config.pro options to optimize system performance.**
- **Evaluate SPT data to determine best Preferred File Server preference for user locations.**

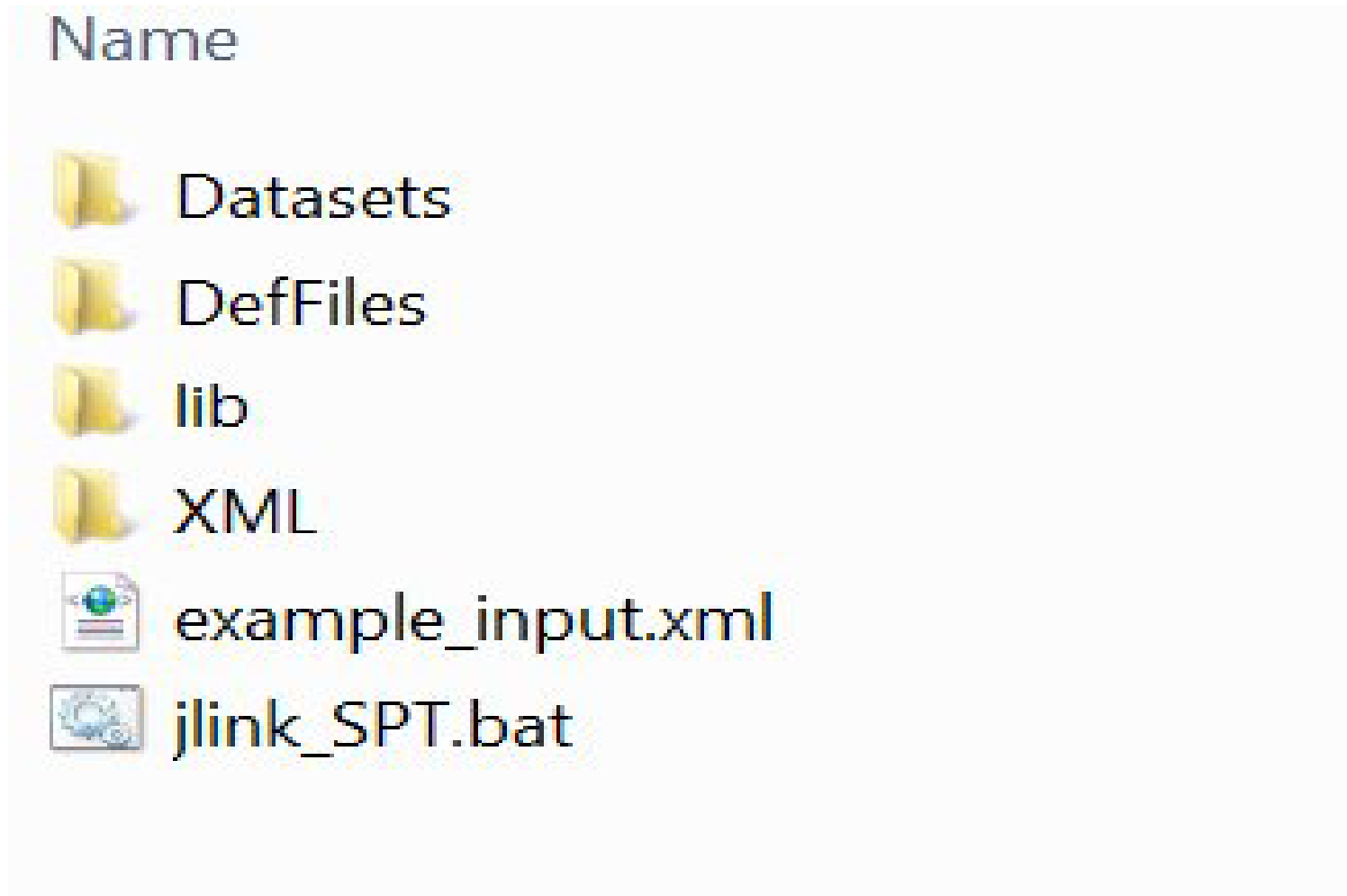
# Installing and Configuring SPT



- **PTC SPT Binaries: [LINK](#)**
- **PTC SPT User Documentation: [LINK](#)**
- **Required: Pro/ENGINEER Wildfire, version 3.0 or higher. When ProE was installed, the following options must have been selected: 1) The Pro/ENGINEER Wildfire Jlink API option. 2) The Java Runtime Environment (JRE)**
- **SPT must be installed on the ProE machine which can be Windows or Unix. The SPT startup file delivered in the PTC package is for a Windows machine.**

# Installing and Configuring SPT (continued)

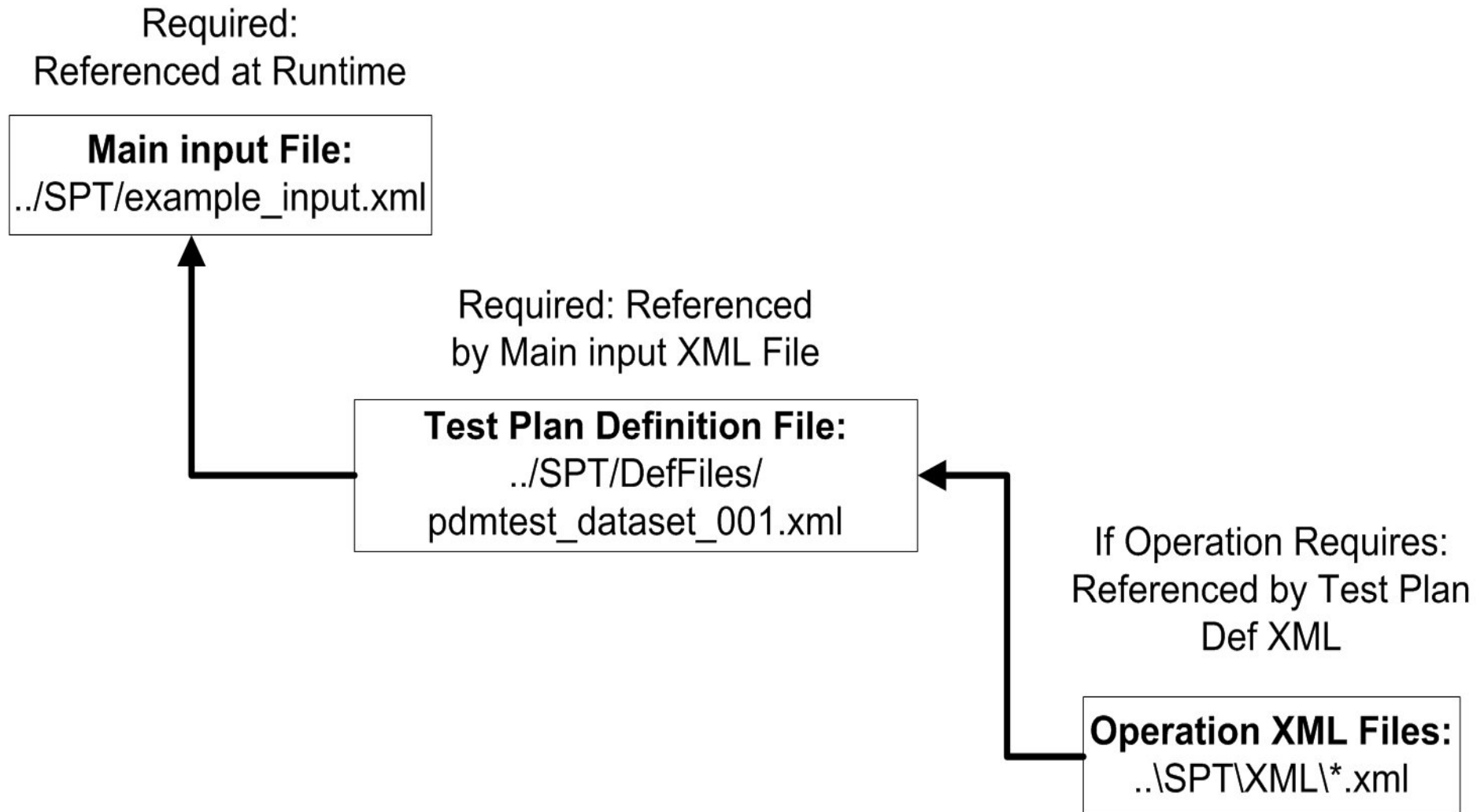
- **Example of Folder Structure created from unzipped SPT Package (jlink\_SPT.zip ):**



# Installing and Configuring SPT (continued)



## XML File Interactions





# Installing and Configuring SPT (continued)



## ➤ Key configuration files and locations:

- 1) `..\SPT\jlink_SPT.bat` - SPT startup script
- 2) `..\SPT\example_input.xml` - Main input XML file.
- 3) `..\SPT\DefFiles\pdmtest_dataset_001.xml` - Test Plan Definition XML file.
- 4) `..\SPT\XML\*.xml` - Operation XML files.
- 5) `..\SPT\lib\jlinktests.jar`
- 6) `..\SPT\Datasets`

# Installing and Configuring SPT (continued)



- **jlink\_SPT.bat – SPT startup script: Used to set env variables and Paths necessary to run ProE and the SPT tool:**

## Default Env Variables that need to be updated:

set SPT\_DIR=

set PROE\_DIR=

set PRO\_MACHINE\_TYPE=

## ENV Variables we added:

set PTC\_WF\_ROOT=

set HOME=

# Installing and Configuring SPT (continued)



- **example\_input.xml - Main input XML file. Some key items defined in this file:**
  - 1) **Windchill Server URL**
  - 2) **Test user name and password (password exposed).**
  - 3) **ProE start command. Note: proe1.bat definition:**  
*<ProE\_Load\_Point>:\..\ProE\bin\proe.exe <ProE\_Load\_Point>:\..\ProE\bin\proewf.psf %\**
  - 4) **Test data set location. Out of the box files located in <INSTALL DIR>\..\SPT\Datasets. You can use provided data or add your own.**
  - 5) **Designate test plan definition xml file:**  
**(ex: ..\SPT\DefFiles\pdmtest\_dataset\_001.xml)**

# Installing and Configuring SPT (continued)



- **pdmtest\_dataset\_001.xml – Test Plan Definition XML**
  - 1) **High level test plan definition file. This file lists all test steps and is referenced by the main input file example\_input.xml.**
  - 2) **SPT documentation lists tests and available config options to set in this file.**
  - 3) **Motorola only tracking upload and checkin data for performance trending currently.**

# Installing and Configuring SPT (continued)



- **..\SPT\XML\\*.xml - Operation XML files. These are detailed test definition files referenced in the test plan pdmtest\_dataset\_001.xml.**

**Example: The create workspace test requires that the “createws\_dataset\_001.xml” from this dir be referenced and configured. See config options in SPT documentation.**

# Installing and Configuring SPT (continued)



## ➤ `..\SPT\lib\jlinktests.jar`

This is a system file that is required to run the tool and is provided in the OOTB binary zip file. The file we downloaded was for WF3 only. When Motorola upgraded to WF5 we had to get a new file from PTC.

**Note:** No user updates are made to this file.

# Installing and Configuring SPT (continued)



## ➤ **..\SPT\Datasets**

- 1) This folder contains the sample Pro/ENGINEER Wildfire parts and assemblies that are used in executing the example test plans.**
- 2) PTC provides test data that can be used or you can use your own test data.**
- 3) Motorola uses internal data sets.**

# Manual vs Automated Execution of SPT



## ➤ Running the SPT:

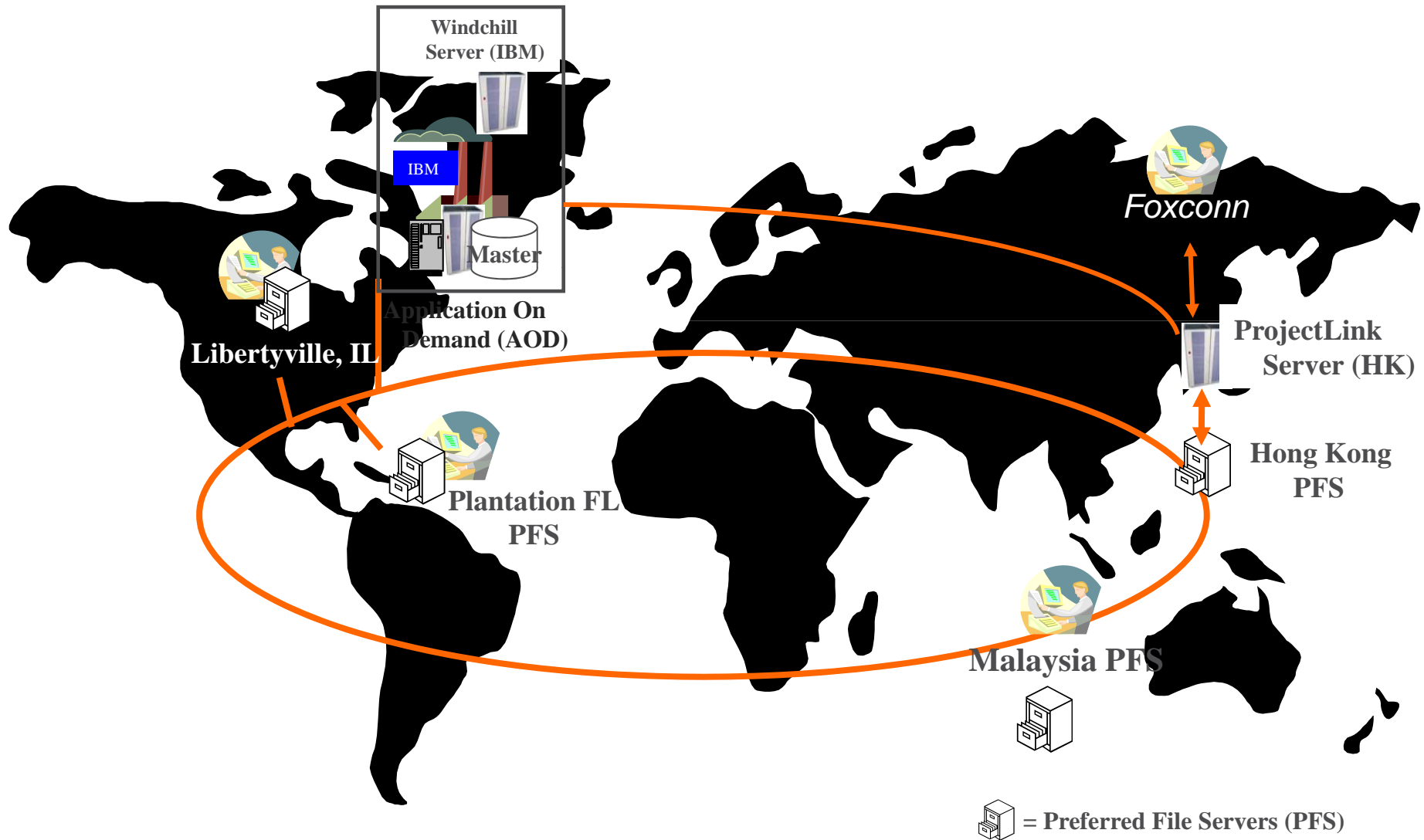
Manually: [LINK](#)

Windows Scheduled Task: [LINK](#)



# Manual vs Automated SPT Test Results

## Motorola Mobility Windchill/PDMLink Global Architecture



# Manual vs Automated SPT Test Results



Test: Single 11mb File Upload

Location	Manual Testing Time (s)	SPT Testing Time (s)	% Difference
San Diego CA – Libertyville IL	90	93	3.2
Plantation FL – Plantation FL	2.1	3	30
Libertyville IL – Libertyville IL	3.5	5	30
Beijing China – Hong Kong	62.2	64	2.8
Seoul S. Korea – Hong Kong	75.3	79	4.7
Singapore – Malaysia	8.2	9	8.9

**Notes: 1) SPT log file reports results that include partial seconds. We strip off partial seconds measurement. 2) ProE “Event Manager” reports results in whole seconds rounded down.**

# Manual vs Automated SPT Test Results



Test: Single 11mb File Checkin

Location	Manual Testing Time (s)	SPT Testing Time (s)	% Difference
San Diego CA – Libertyville IL	1	1	0
Plantation FL – Plantation FL	1	1	0
Libertyville IL – Libertyville IL	1	1	0
Beijing China – Hong Kong	1	1.2	20%
Seoul S. Korea – Hong Kong	1	1	0

**Notes:** 1) SPT log file reports results in partial seconds. We strip off partial seconds measurement. 2) ProE “Event Manager” reports results in whole seconds rounded down.

# Manual vs Automated SPT Test Results



## Disk Space Usage Consideration:

To conserve disk space on the Master while testing against File Servers you can use the following upload test steps:

- 1) Check out file
- 2) Import content
- 3) Upload
- 4) Remove from workspace
- 5) Delete workspace

This will strand the uploaded content on the File Server as unreferenced content. This will prevent the content from being pushed back to the Master.

# Log Information Review



- **Data output results file: ../SPT/Dataset\_001.txt**

**Note: This file is over written during each test run.**

## **Example output:**

**Running...operation number: 8**

-----

**>>>>> Operation START: 19:10:33.649**

**Before Server.Upload**





**After Server.Upload**

**RESULT: WCUploadOperation OPERATION - SUCCESS**

**<<<<< Operation END: 19:10:36.571**

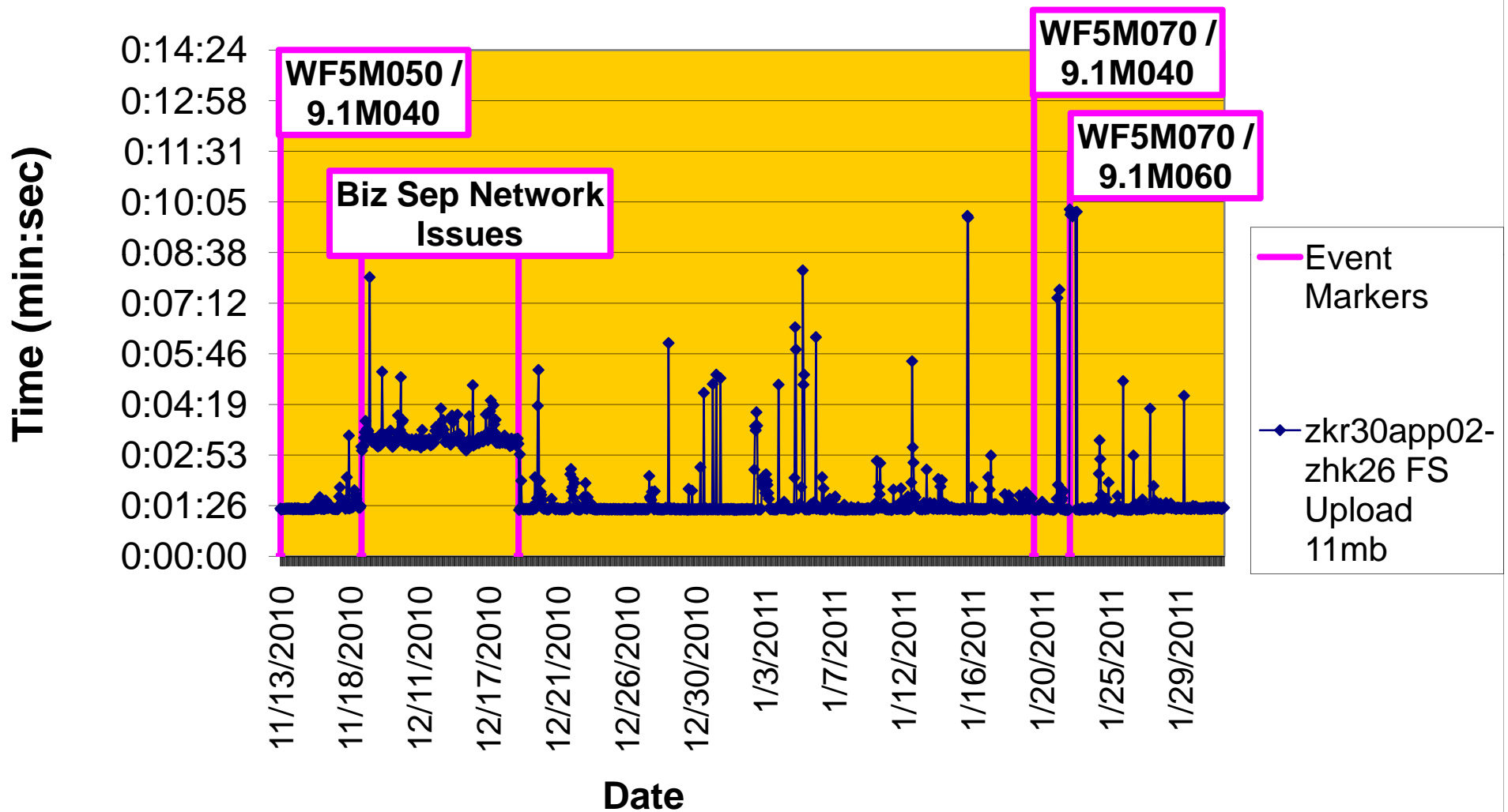
# Log Information Review

- **On going logging: Motorola created scripting to pull necessary log info out of each run from the `../SPT/Dataset_001.txt` log file. A `../SPT/script` folder was created to hold the batch script and the output log files which are appended to when the batch script is run by a manual or scheduled task.**

Name	Size	Type	Date Modified	Attrib
 Upload_Time.txt	74 KB	Text Document	3/29/2011 7:15 AM	A
 Download_Time.txt	75 KB	Text Document	3/29/2011 7:15 AM	A
 Checkin_Time.txt	75 KB	Text Document	3/29/2011 7:15 AM	A
 gather_test_times_script.bat	10 KB	Windows Batch File	10/26/2010 4:52 AM	A

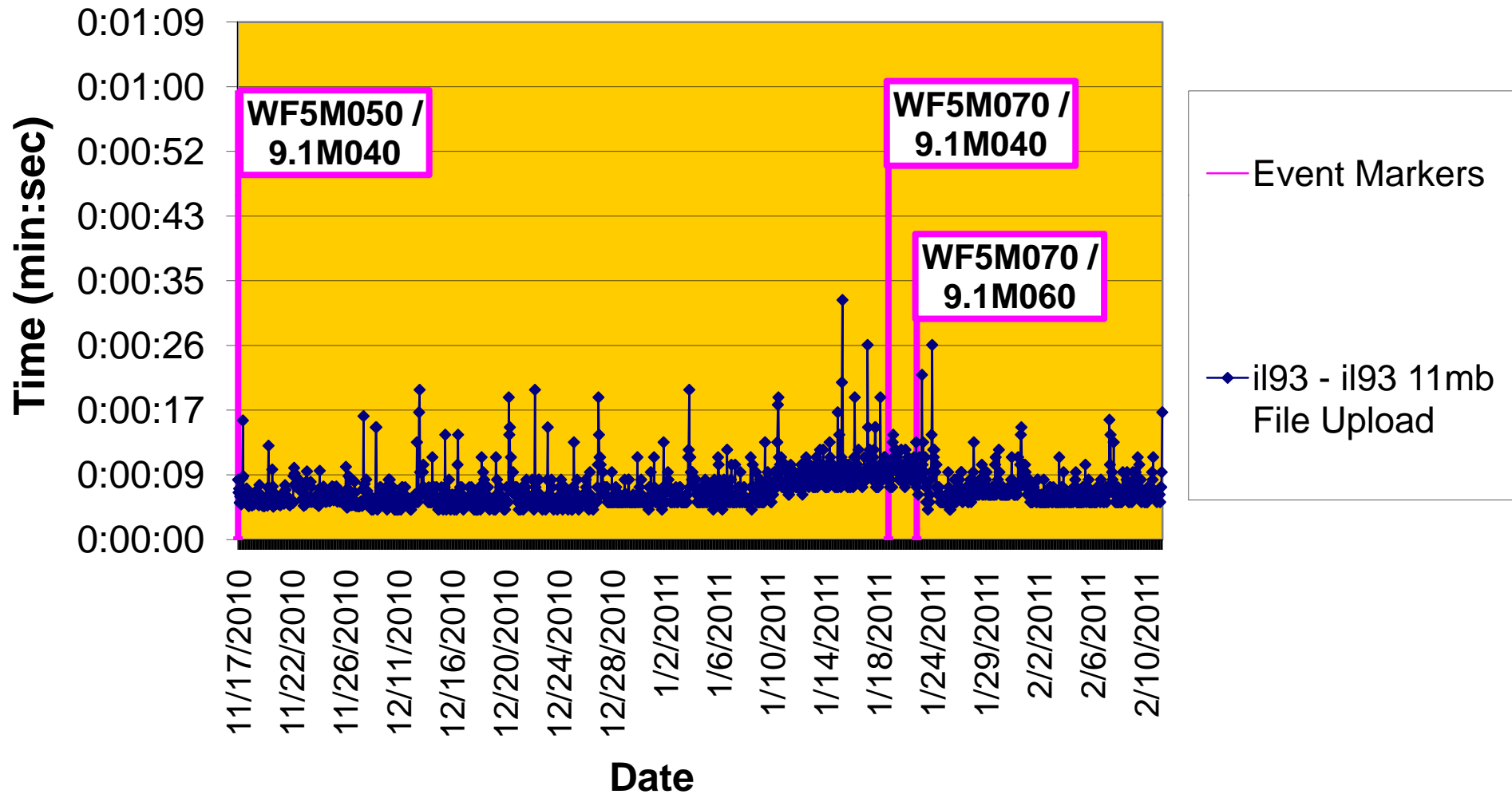
# Graphical Data for Trend Analysis

## Seoul S. Korea – Hong Kong File Server Upload 11mb



# Graphical Data for Trend Analysis

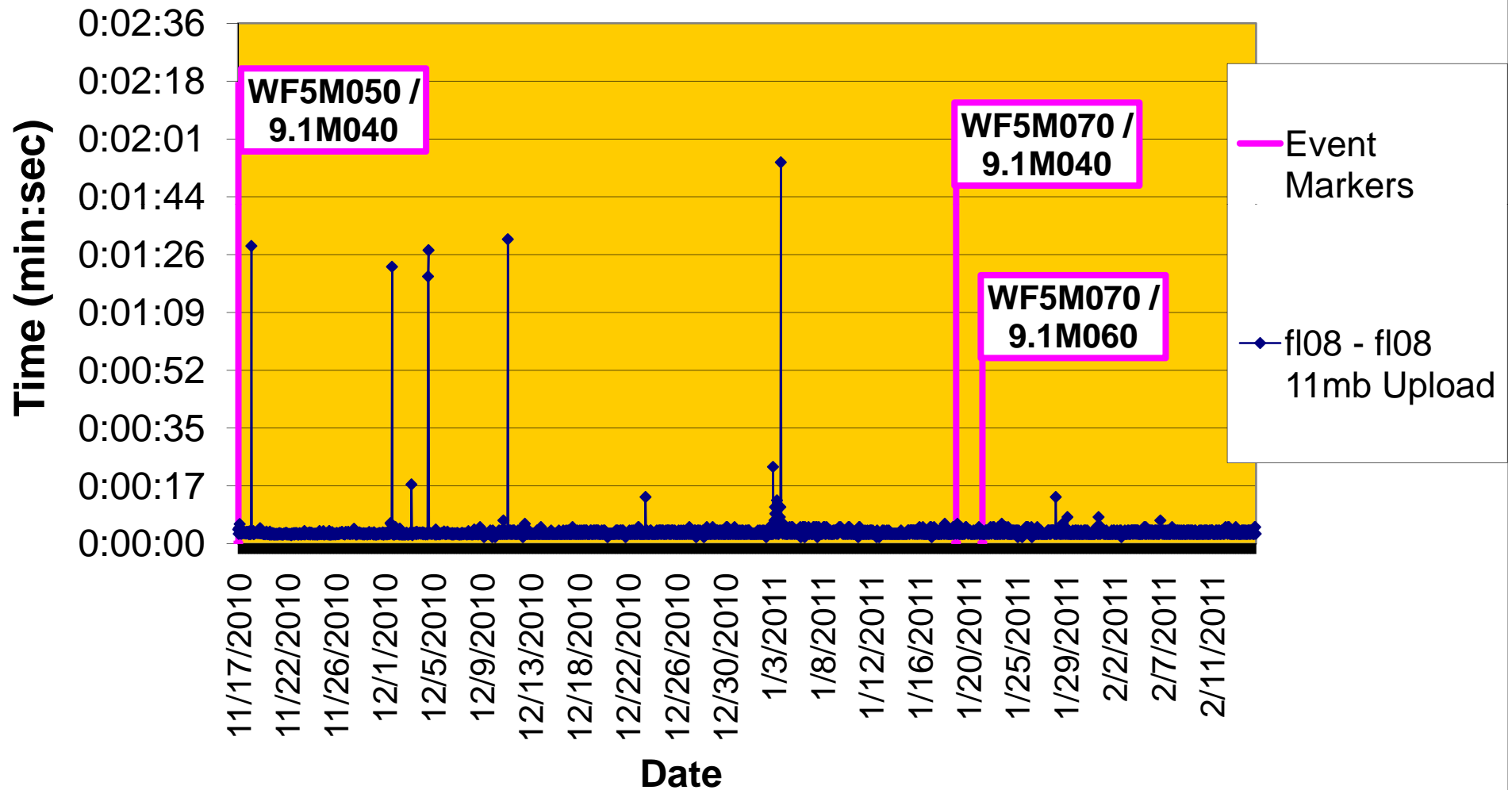
## Libertyville IL – Libertyville IL File Server Upload 11mb





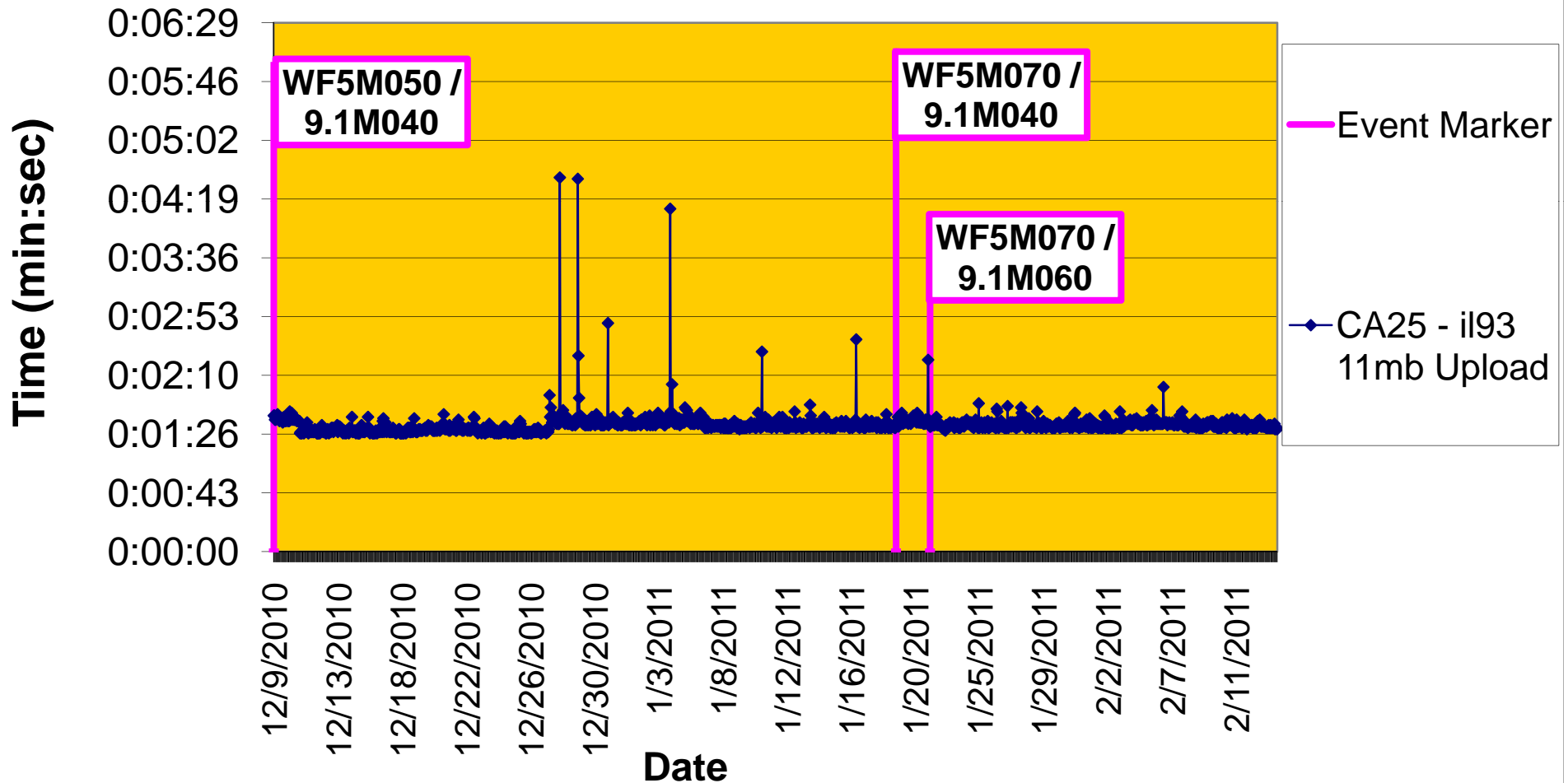
# Graphical Data for Trend Analysis

## Plantation FL – Plantation FL File Server Upload 11mb



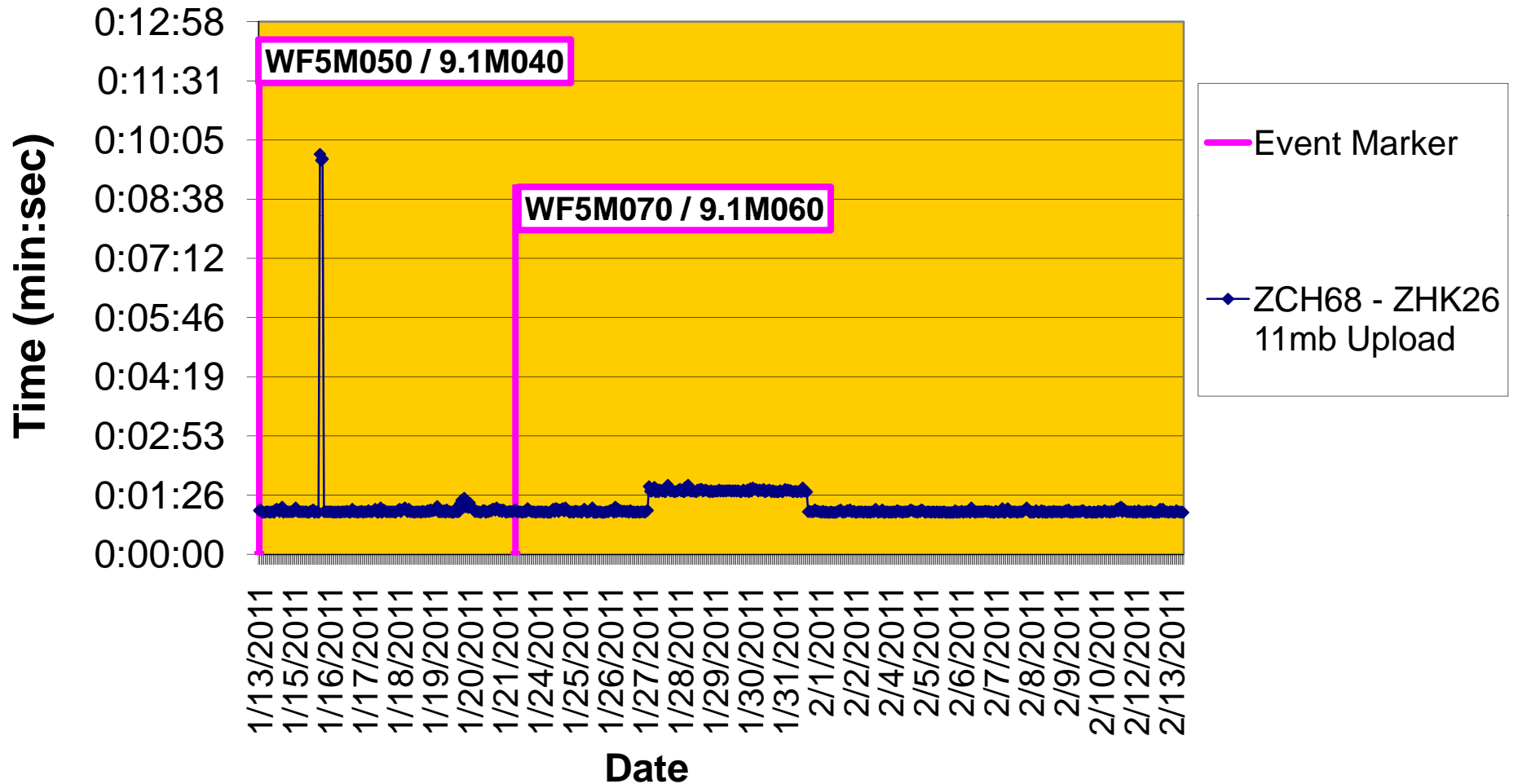
# Graphical Data for Trend Analysis

## San Diego CA – Libertyville IL File Server Upload 11mb



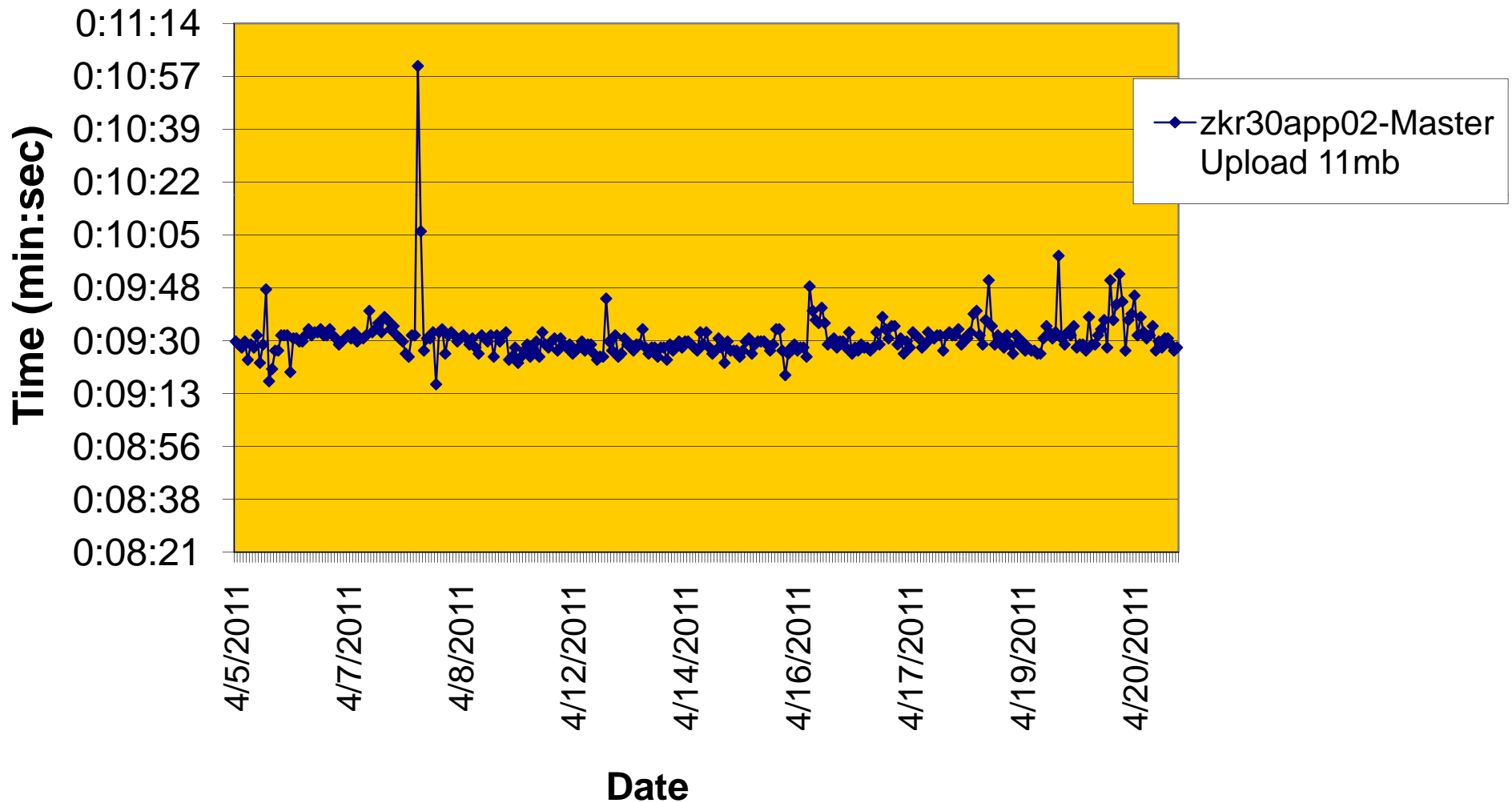
# Graphical Data for Trend Analysis

## Beijing China – Hong Kong File Server Upload 11mb



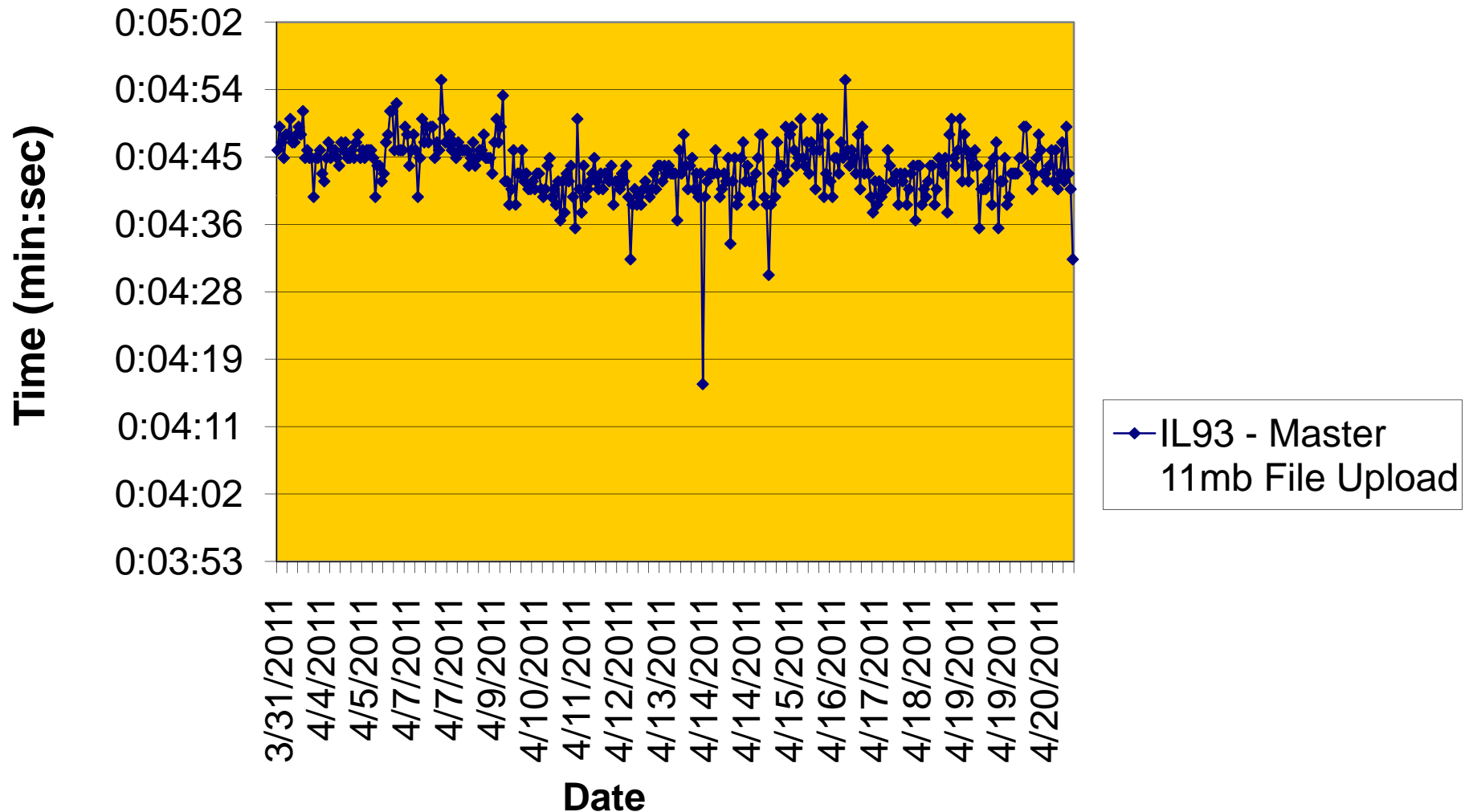
# Graphical Data for Trend Analysis

## Seoul South Korea – Master (Sterling VA) Upload 11mb



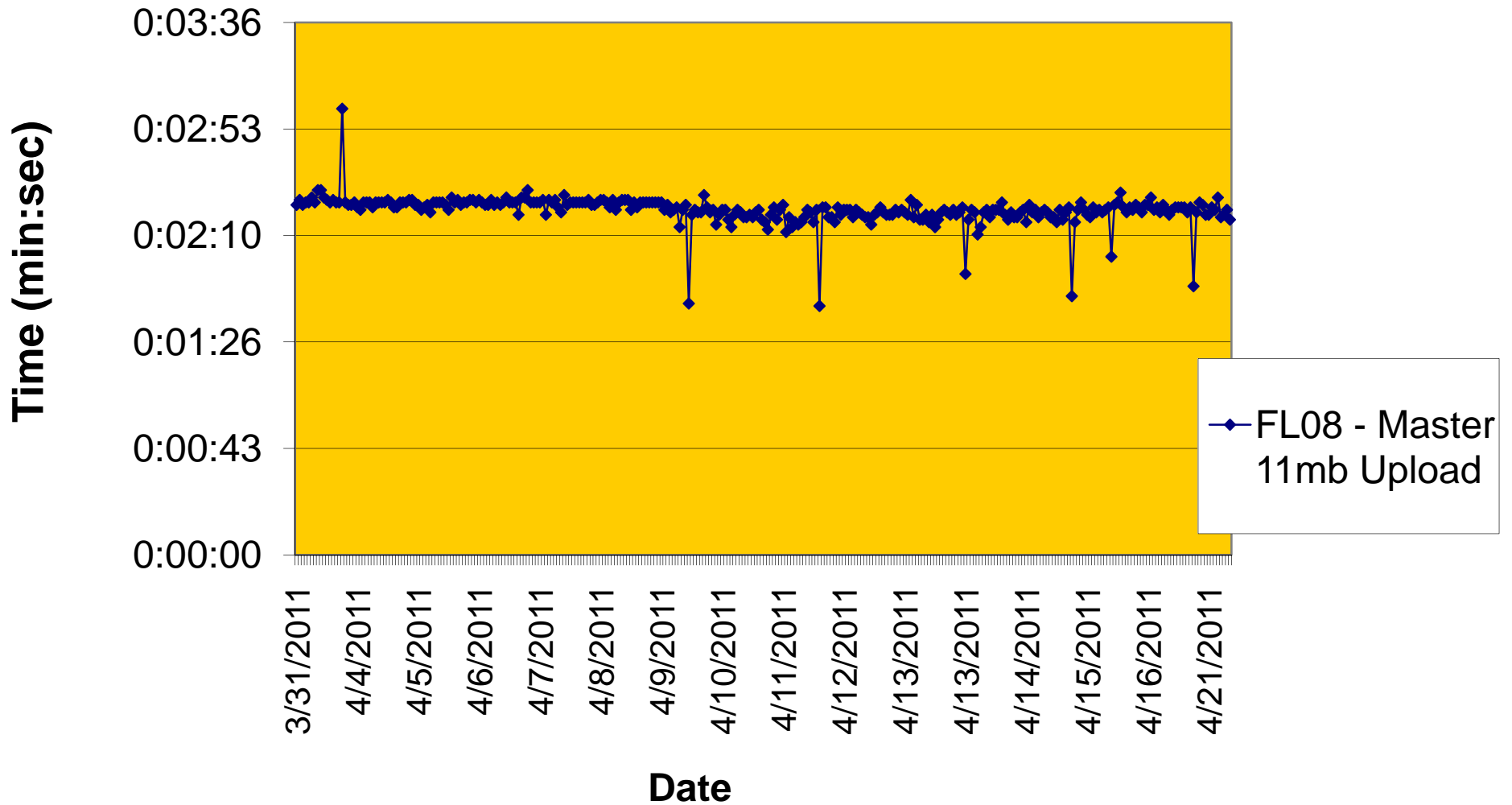
# Graphical Data for Trend Analysis

## Libertyville IL – Master (Sterling VA) Upload 11mb



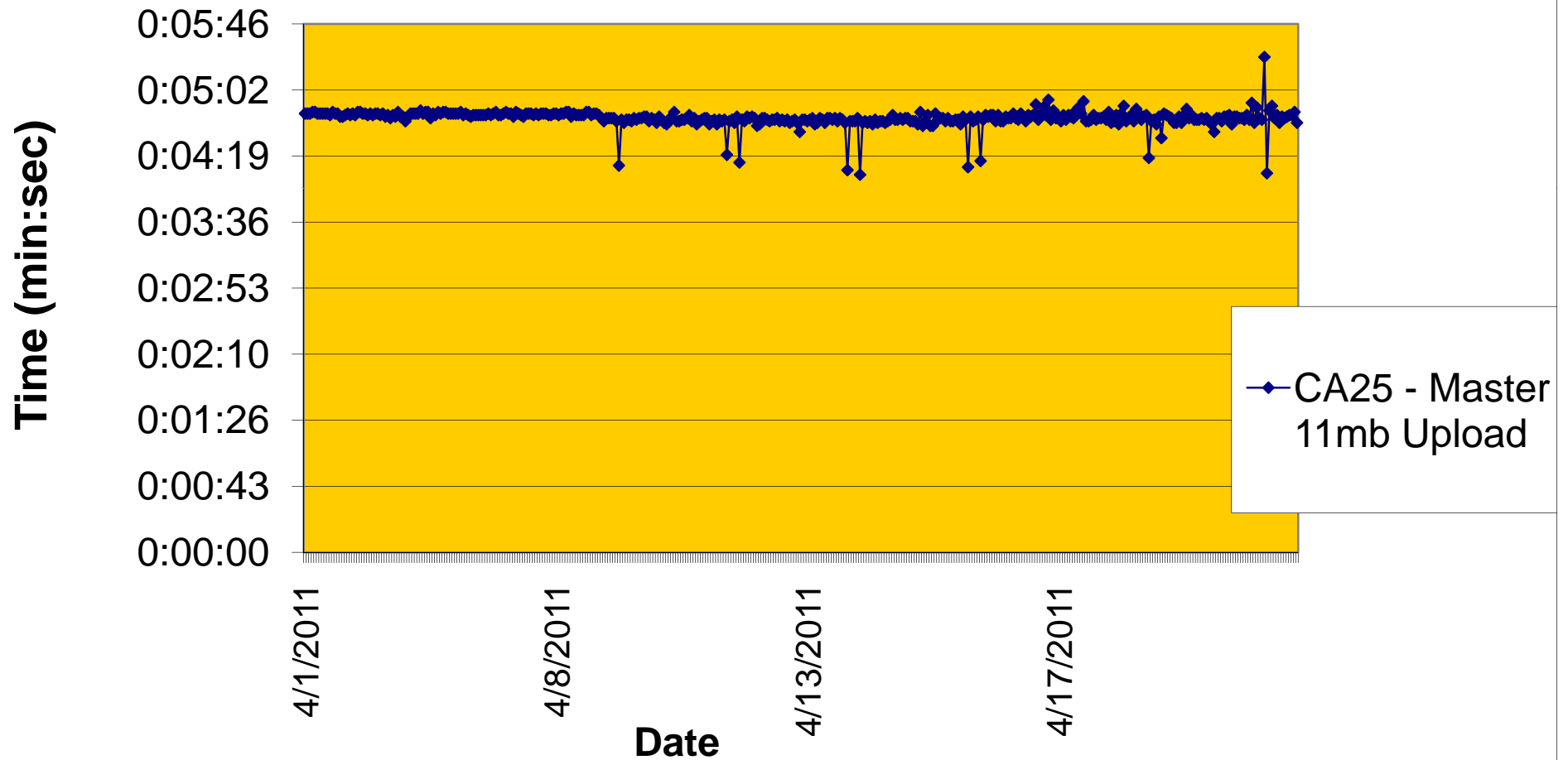
# Graphical Data for Trend Analysis

## Plantation FL – Master (VA) Upload 11mb



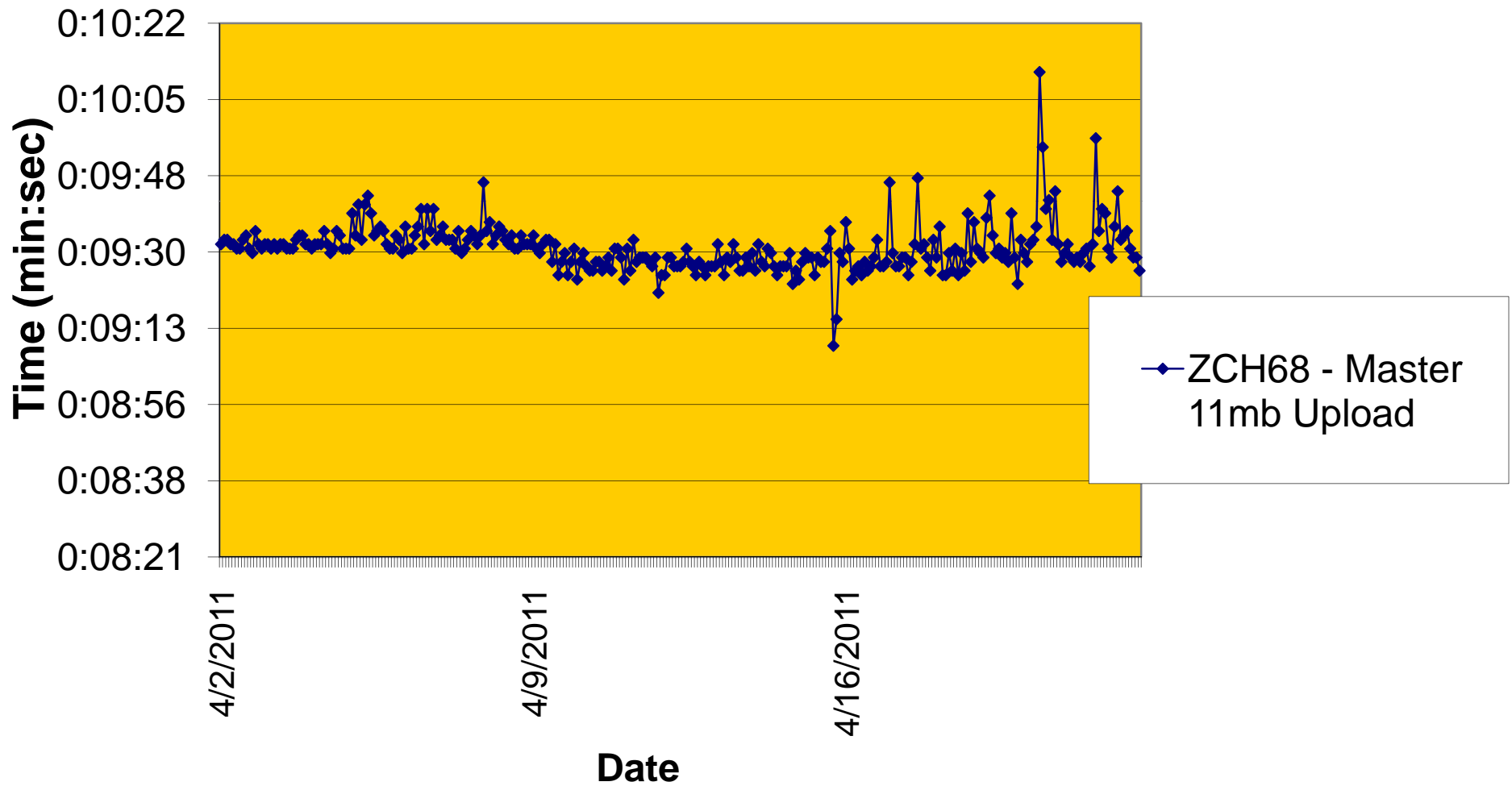
# Graphical Data for Trend Analysis

## San Diego CA – Master (Sterling VA) Upload 11mb



# Graphical Data for Trend Analysis

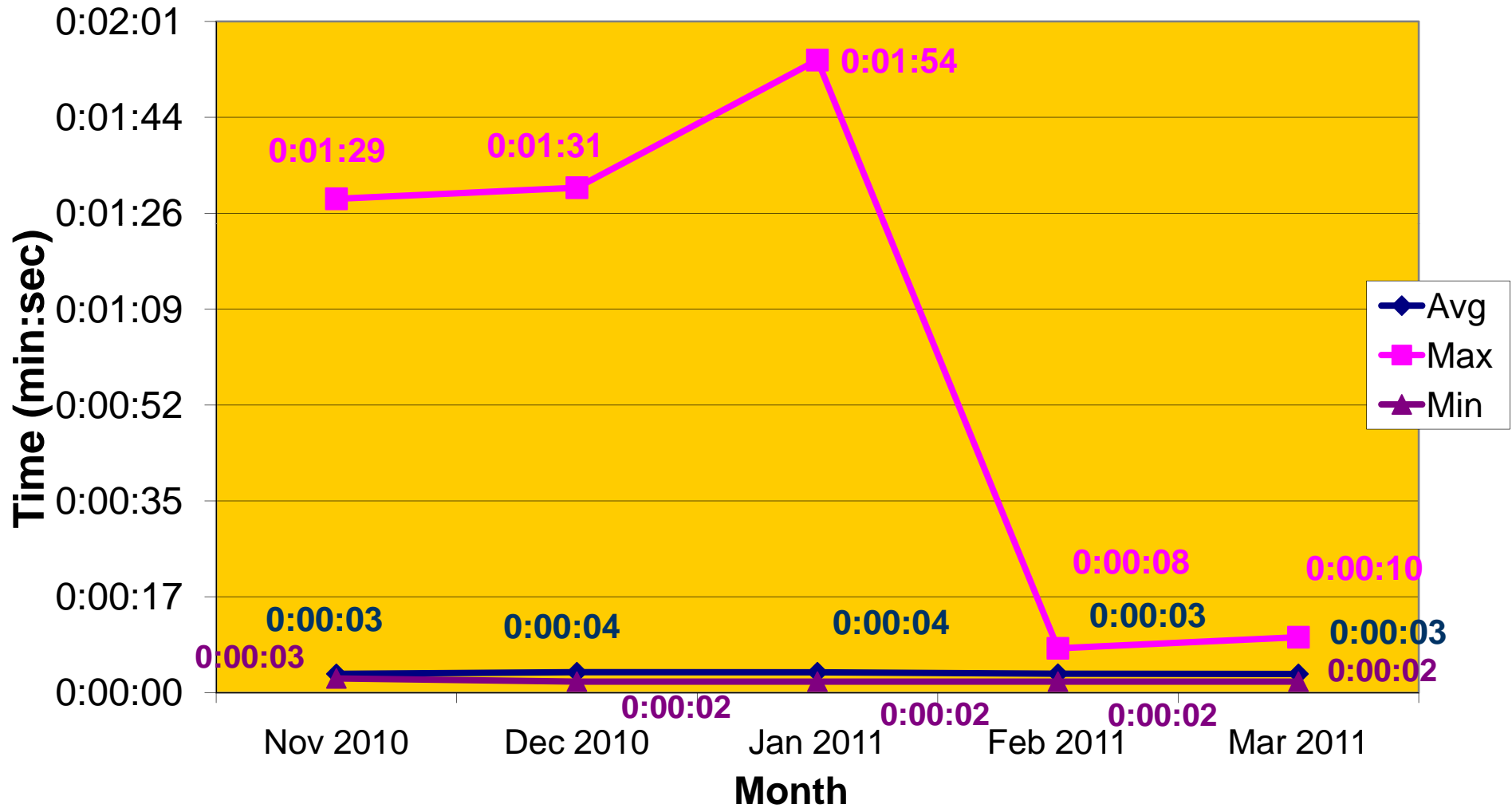
## Beijing China – Master (Sterling VA) Upload 11mb





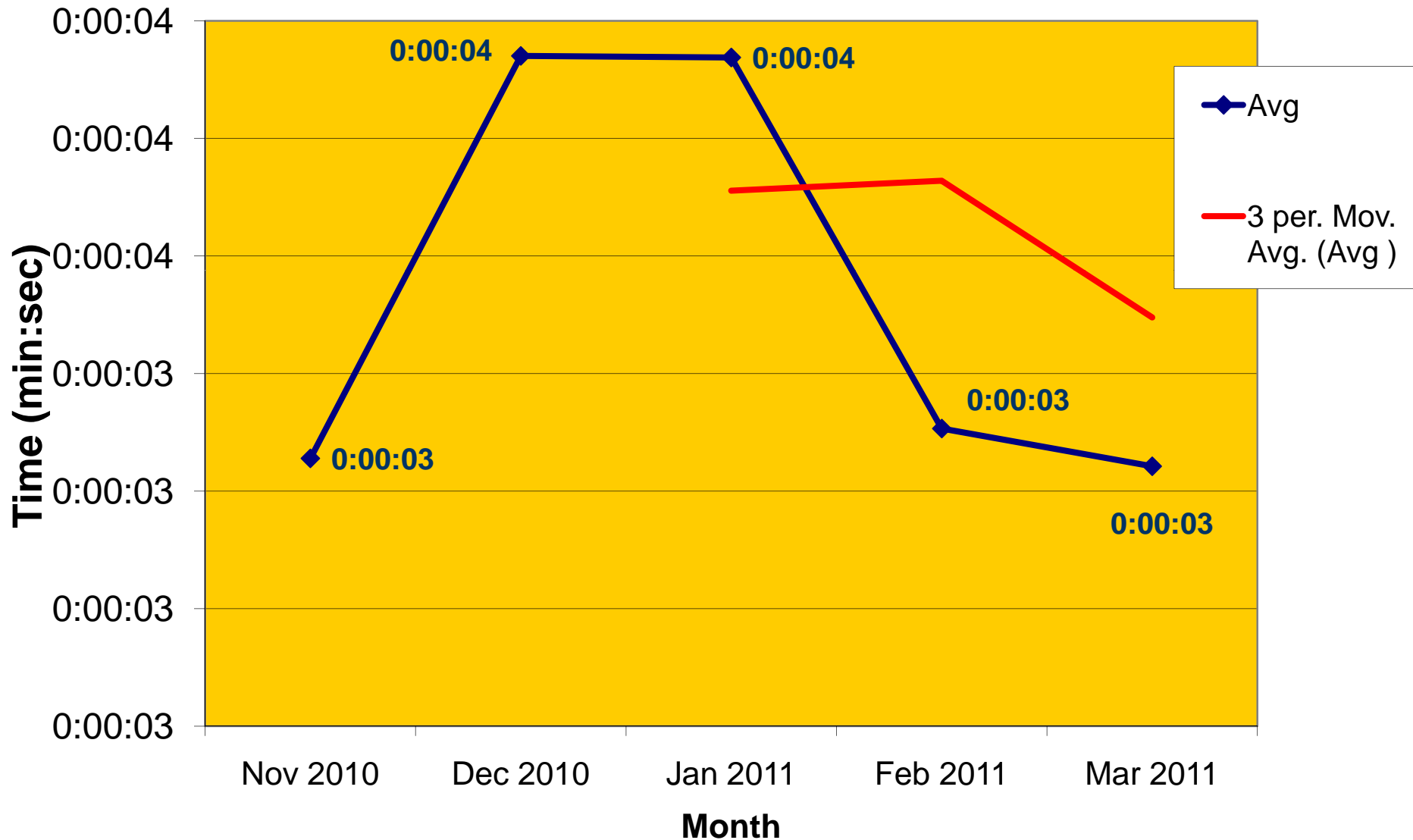
# Graphical Data for Trend Analysis

## Plantation FL – Plantation FL 11mb Upload Monthly AVG, Max, Min Data



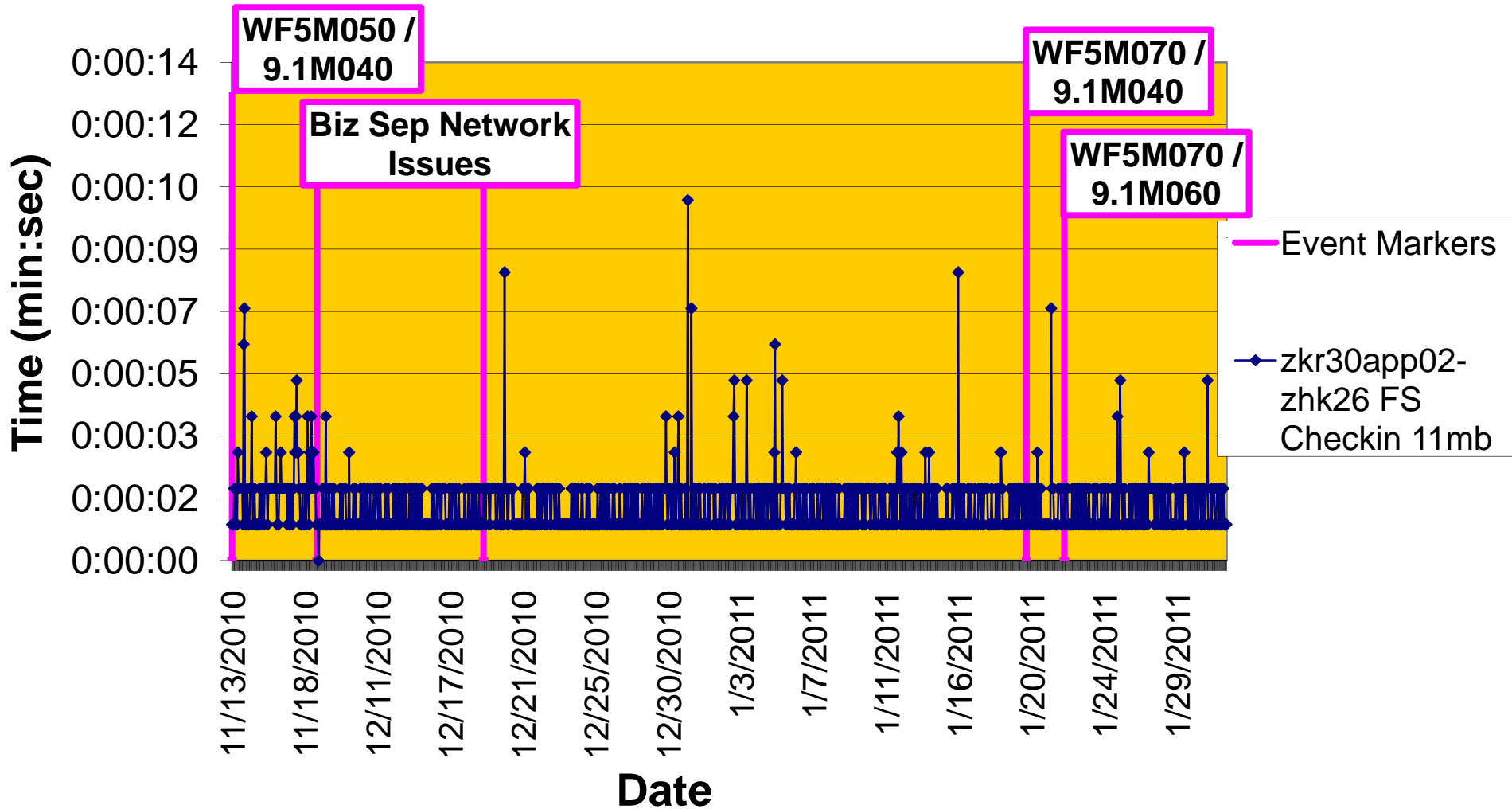
# Graphical Data for Trend Analysis

## Plantation FL – Plantation FL 11mb Upload



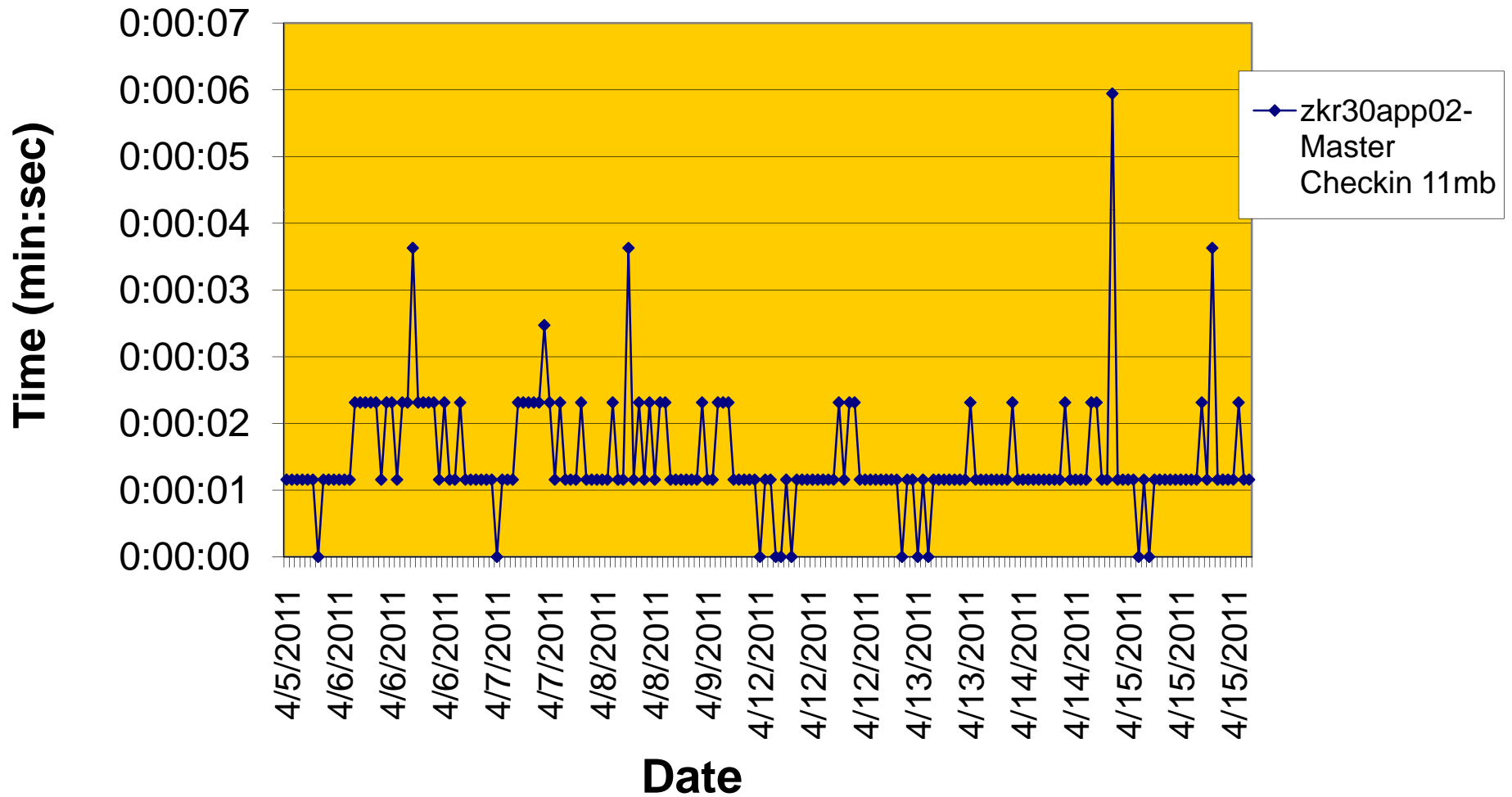
# Graphical Data for Trend Analysis

## Seoul S. Korea – Hong Kong Checkin 11mb



# Graphical Data for Trend Analysis

## Seoul S. Korea - Master Checkin 11mb



## Operations working as expected

- Register and UnRegister
- CreatWS and DeleteWS
- Remove

## Operations with major issues

- Checkout
- Download

## Operations with minor issues

- Upload
- Check In
- Import

## Operations not tested

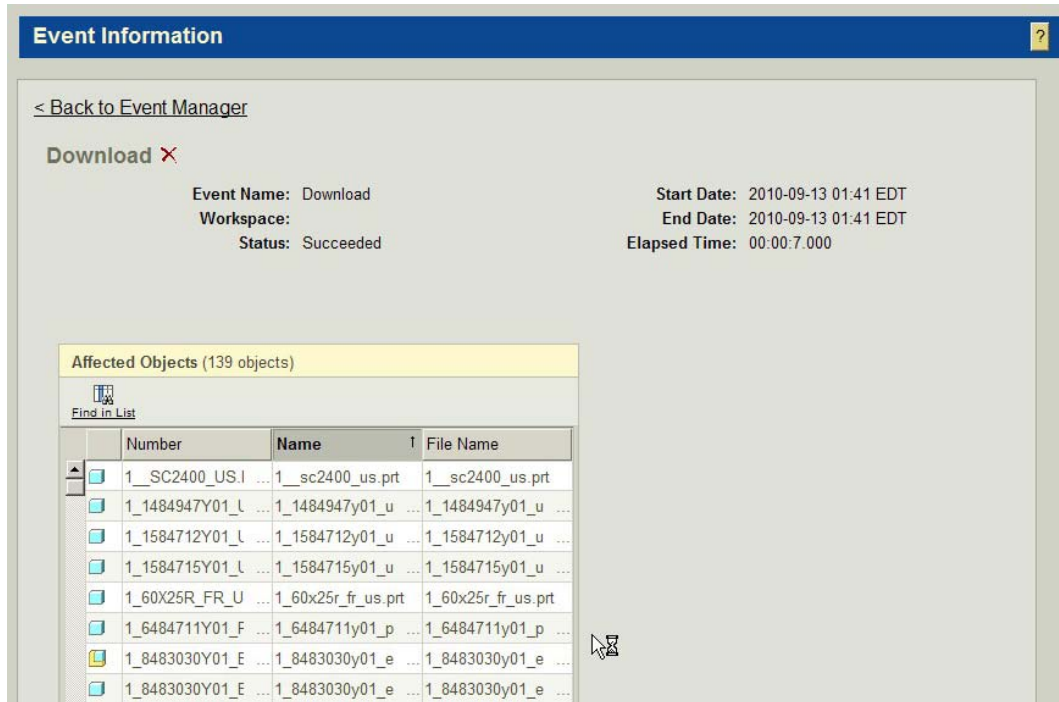
- UndoCheckout
- Export

# SPT Deficiencies (Major Issues)

## Download Issues:

> Download times completely inaccurate.

Note: Event Manager times are completely inaccurate as well.



**Event Information**

< Back to Event Manager

**Download** ✖

Event Name: Download  
Workspace:  
Status: Succeeded

Start Date: 2010-09-13 01:41 EDT  
End Date: 2010-09-13 01:41 EDT  
Elapsed Time: 00:00:7.000

Affected Objects (139 objects)

Find in List

Number	Name	File Name
1_SC2400_US.I ...	1_sc2400_us.prt	1_sc2400_us.prt
1_1484947Y01_U ...	1_1484947y01_u ...	1_1484947y01_u ...
1_1584712Y01_U ...	1_1584712y01_u ...	1_1584712y01_u ...
1_1584715Y01_U ...	1_1584715y01_u ...	1_1584715y01_u ...
1_60X25R_FR_U ...	1_60x25r_fr_us.prt	1_60x25r_fr_us.prt
1_6484711Y01_F ...	1_6484711y01_p ...	1_6484711y01_p ...
1_8483030Y01_E ...	1_8483030y01_e ...	1_8483030y01_e ...
1_8483030Y01_E ...	1_8483030y01_e ...	1_8483030y01_e ...

EX:139 object (33Mb) assembly downloaded from the Master

- Manually recorded time - 69 s
- SPT recorded time – 7 s

# SPT Deficiencies (Continued)



## Download Issues (Continued):

- > Download operation listed as CheckOut operation in log files. The following two issues might be related to this issue as the options are valid, working, documented (1 of them) options for the CheckOut operation.
- > Log file indicates that there is a “CheckOutAll” option available however it is not documented. When the option is added to the operation file with a value of “true”, it recognizes it and the log indicates that all dependents are checkout but they are not.
- > Log file indicates that there is a “Download” option available however it is not documented. Option set with a value of “false” would essentially be an “Add to workspace” with link only. When added to the operation file with a value of “false”, it is recognized but ignored and the default “true” is used and the content of the EPMDocuments is downloaded.

# SPT Deficiencies (Continued)



## Download Issues (Continued):

- > Could not get “IncludeInstance” option with the value “selected” to work, client just hangs. Tested option with “Instance” sub-option specifying a single instance of a multi-instance part.
- > “Readonly” option – not sure what this option is supposed to do so it was not tested.



# SPT Deficiencies (Continued)



## Checkout Issues:

- > Checking out all components of an assembly takes multiple minutes.
  - Manual checkout of 139 object assembly takes under 10 seconds (without download)
  - SPT check out of same assembly takes over 12 minutes

```
=====
Running...operation number: 1
-----
>>>>> operation START: 02:54:38.540
139 extra files found for secondary checkout
Checkout file 0: wtws://Prod/download_test/1_1484947y01_us.prt
Checkout file 1: wtws://Prod/download_test/1_1584712y01_us.prt
.
:|
Checkout file 135: wtws://Prod/download_test/1_xtal-14x9_8_us.prt
Checkout file 136: wtws://Prod/download_test/1_xtal-7_00x5_00-10pinh190_us.prt
Checkout file 137: wtws://Prod/download_test/1_xtal12_5x3_5_us.prt
      RESULT: WCCheckoutOperation OPERATION - SUCCESS
<<<<<< operation END: 03:06:55.279
=====
```

# SPT Deficiencies (Continued)



## Checkout Issues (Continued):

- > Operation option “CheckOutAll” not documented. Need this option to checkout all dependents of an assembly and not just add them to the workspace. The “Dependency” option only determines what will be added to the workspace, not checked out.
- > If the “CheckOutAll” option is included when dealing with family tables an error is generated in the log saying the Checkout operation failed. However, all objects are checked out when viewing the server side workspace.
- > Operation option “Version” is useless since checking out the non-latest version requires the user to over-ride a conflict. Operation fails.
- > Log file indicates that there is a “Readonly” option available but it is not documented. Not sure what this option is supposed to do so it was not tested.
- > Could not get “IncludeInstance” option with the value “selected” to work, client just hangs. Tested option with “Instance” sub-option specifying a single instance of a multi-instance part.

# SPT Deficiencies (Continued)



## Import Issue:

> Log indicates that the import fails if the proimpex.log and proimpex.errors files do not already exist in the TestModelsPath folder. Objects appear to be in local cache when viewing folder with Windows Explorer.

## Upload/Check In Issue:

> Upload and Check In times do not reflect the interactive user performance.

<b>Operation</b>	<b>SPT Time</b>	<b>Manual Time</b>
Upload	322 secs	262 secs
Check In	64 sec	16 secs

Dataset: 139 objects, ~33 Mb

Note: the larger number of objects in the dataset the larger the discrepancy.

# Motorola Enhancement Requests to PTC



The following enhancements would make the tool much more useful.

- > Need the ability to specify a Preferred File Server. This will give the ability to setup scheduled jobs that can test different PFSs from the same location.
- > Need the ability to either specify a config.pro or set the “dm\_” options from within the tool.
- > A timestamp in the file name of the log file to make them unique would be useful.
- > Need the ability to test operations other than CAD (BOM Management, Mass Change, Web Browser etc.)

## Useful links:

- SPT User Documentation:

[LINK](#)

- SPT Binaries:

[LINK](#)

- ProE Compatibility Matrix:

[LINK](#)

- Windchill System Maintenance and Monitoring Checklist:

[LINK](#)

## Useful links:

- Windchill System Validation Technical Brief:

[LINK](#)

- Jlink info and error messages:

[LINK](#)

# Questions