Beyond Monitoring:
OSS Best Practices from Leading APAC Service Providers

Webinar: June 27, 2012 at 7:00 PM PST

June 28, 2012 10:00 AM Singapore/Malaysia

Presented by:

Roger Hosier, CTO, OSI, Thiagi Selladurai, OSS Head, Maxis, &

Andrew Lim, Project Manager, OSI

Your Presenters for Today

Roger Hosier

CTO, OSI

Thiagi Selladurai

OSS Head, Maxis

Andrew Lim

Project Manager, OSI

About OSI

OSI is a global provider of Operations Support Systems (OSS) solutions for communications service providers. OSI's flagship NetExpert® platform provides visibility and service assurance for the largest service providers in the world. OSI has established its leadership in product and service innovations worldwide since its founding in 1989.

Select OSI Customers

at&t — Your world. Delivered.

Sprint

maxis.

TATA indicom

Taiwan Mobile

NTT Communications

SingTel

movistar

verizon business

JAPAN TELECOM

TeliaSonera

T Mobile

Telefonica

vodafone

maxis.

OSI

Agenda

- **Mobile Service Provider Key Challenges** – *Roger Hosier, OSI*
  - Data accuracy, integration across systems, time to resolution
  - Asian market service provider dynamics
  - Maxis as a best practices leader in OSS
- **Maxis Best Practices** – *Thiagi Selladurai, Maxis*
  - Maxis company profile
  - Maxis OSS FM introduction
  - RAN Site Fault Management
- **OSI Best Practices** – *Andrew Lim, OSI*
  - Rich object modeling, incorporating inventory
  - Alert enrichment
- **Q&A** – *All Participants*

Service Provider Challenges – A Global Perspective

Service Provider Challenges

What we hear globally – customer concerns

There are thousands/millions of events on the network. We need to know how to prioritize the events so we can reduce overhead and effectively automate as much as possible.

If I could understand how an alarming object is related to the topology of my network, I could more rapidly understand the alarm's impact on the network's health.

I have to touch six different systems just to understand how a network event is related to the network's health.

APAC Service Provider Challenges

The operating environment in mobile voice business is fiercely competitive with an increasing number of players in a highly-penetrated voice market. Malaysia's penetration levels are over 128 percent of the population, which underlines the shift to multiple SIM use.

Estimates put "subscriber" penetration (unique customers) in a multi-SIM market at around 80 percent.

"MALAYSIA STANDS AT THE CUSP OF THE TELECOM INDUSTRY'S TRANSITION FROM VOICE TO DATA. THE DEMAND FOR DATA AND BROADBAND HAS GATHERED CONSIDERABLE MOMENTUM AND AS A COMPANY WE ARE PLEASED TO BE AT THE LEADING EDGE OF THIS TRANSFORMATION."

Sandip Das, Maxis Chief Executive Officer

Maxis – Top Performing

Maxis' non-voice revenue earnings is one of the top performers in the Asian region.

- EBIDTA Margin % - 50.3%

- 45.3% of mobile revenue is non-voice.

- Over 7.5 million of its customers are active mobile Internet users as of Q4 2011.
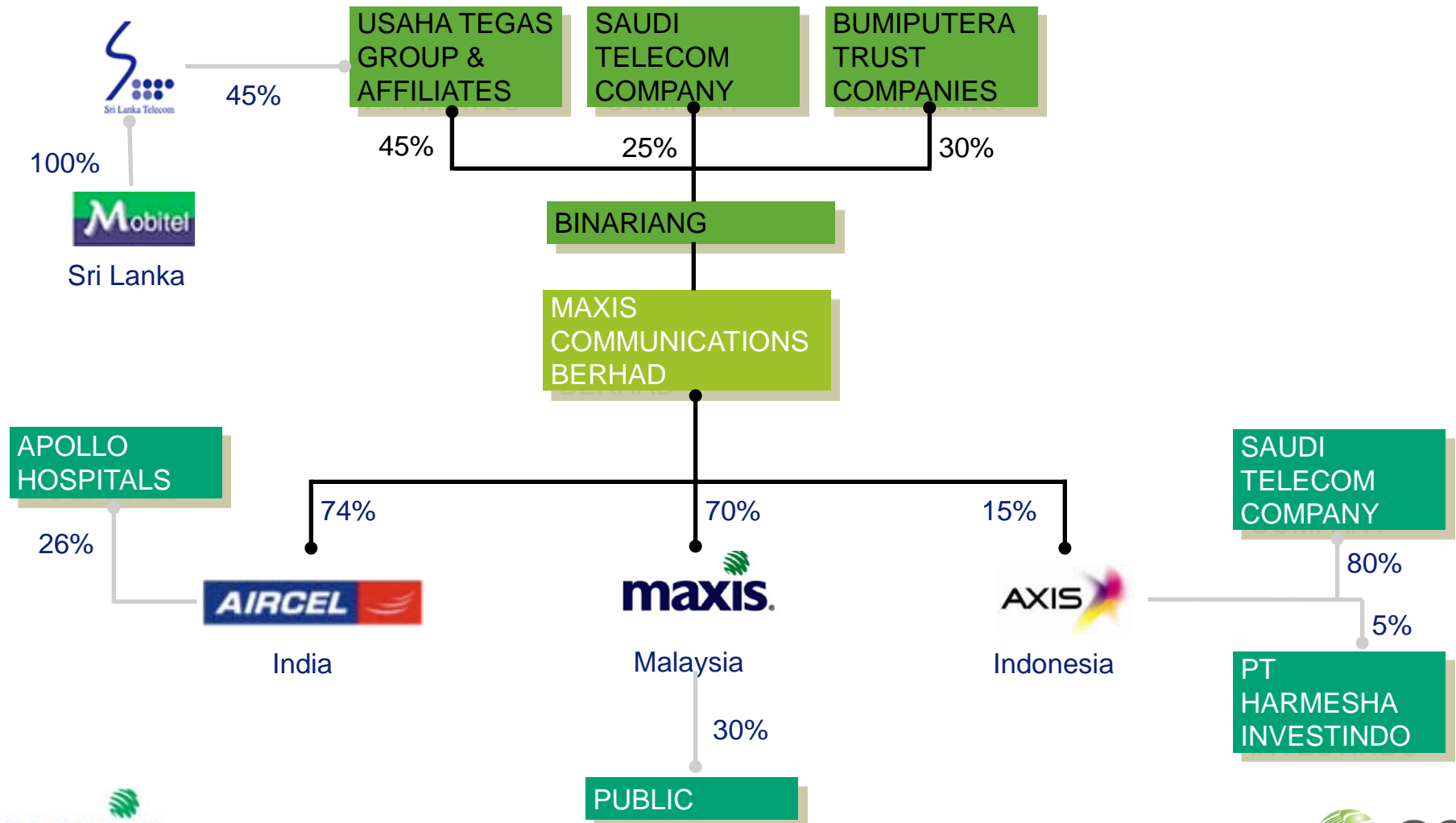
Maxis Company Profile

Maxis Presenter Background, Thiagi Selladurai

- Project Director of the Maxis – OSI NetExpert FM iNMS project 2006/2007 and its evolution

- Head of Maxis OSS Dept

- Oversees all Maxis OSS Systems – FM iNMS, PMS, CMSS Docket, IVR, Work Permit, Inventory

Organization Overview

Shareholding Structure

Sri Lanka Telecom — 45% — USAHA TEGAS GROUP & AFFILIATES

Sri Lanka Telecom — 100% — Mobitel
Sri Lanka

USAHA TEGAS GROUP & AFFILIATES — 45%
SAUDI TELECOM COMPANY — 25%
BUMIPUTERA TRUST COMPANIES — 30%

BINARIANG

MAXIS COMMUNICATIONS BERHAD

APOLLO HOSPITALS — 26% — AIRCEL
MAXIS COMMUNICATIONS BERHAD — 74% — AIRCEL
India

MAXIS COMMUNICATIONS BERHAD — 70% — maxis
Malaysia

maxis — 30% — PUBLIC

MAXIS COMMUNICATIONS BERHAD — 15% — AXIS
Indonesia

SAUDI TELECOM COMPANY — 80% — AXIS
SAUDI TELECOM COMPANY — 5% — PT HARMESHA INVESTINDO

maxis.

OSI

Maxis Malaysia

1995 • Commenced commercial operations in 1995

2001 • Market leader in Malaysia since 2001

TOP10 • Top ten largest companies on Bursa Malaysia with Market Cap of US$14bn

FIVE • Integrated Telco - Mobility, Home, Enterprise, Broadband (Wired & Wireless) & Intl. Gateway

14m • 14 million subscribers with 39% revenue share

$2.85bn • Revenues of US$2.85bn in 2011 with a EBITDA margin of 50.3%

3450 • ~3,450 employees in Malaysia

Source: Maxis annual 2011 Report

Q4, 2011 Services

Consumers
- ❑ Mobile Services – GSM,GPRS,EDGE & 3G
- ❑ VAS
- ❑ Advanced Data Service - Mobile Infotaintment Services
- ❑ Fixed Line Services
- ❑ Broadband Services – Wired & Wireless Broadband
- ❑ International Roaming
- ❑ Home Services - FTTH

Enterprise
- ❑ Voice Services – Trunk Services(ISDN), Corporate Plans
- ❑ Data Services – Leased Circuits, VSAT Services, IP Services
- ❑ Broadband Services – WLAN & ADSL
- ❑ M2M
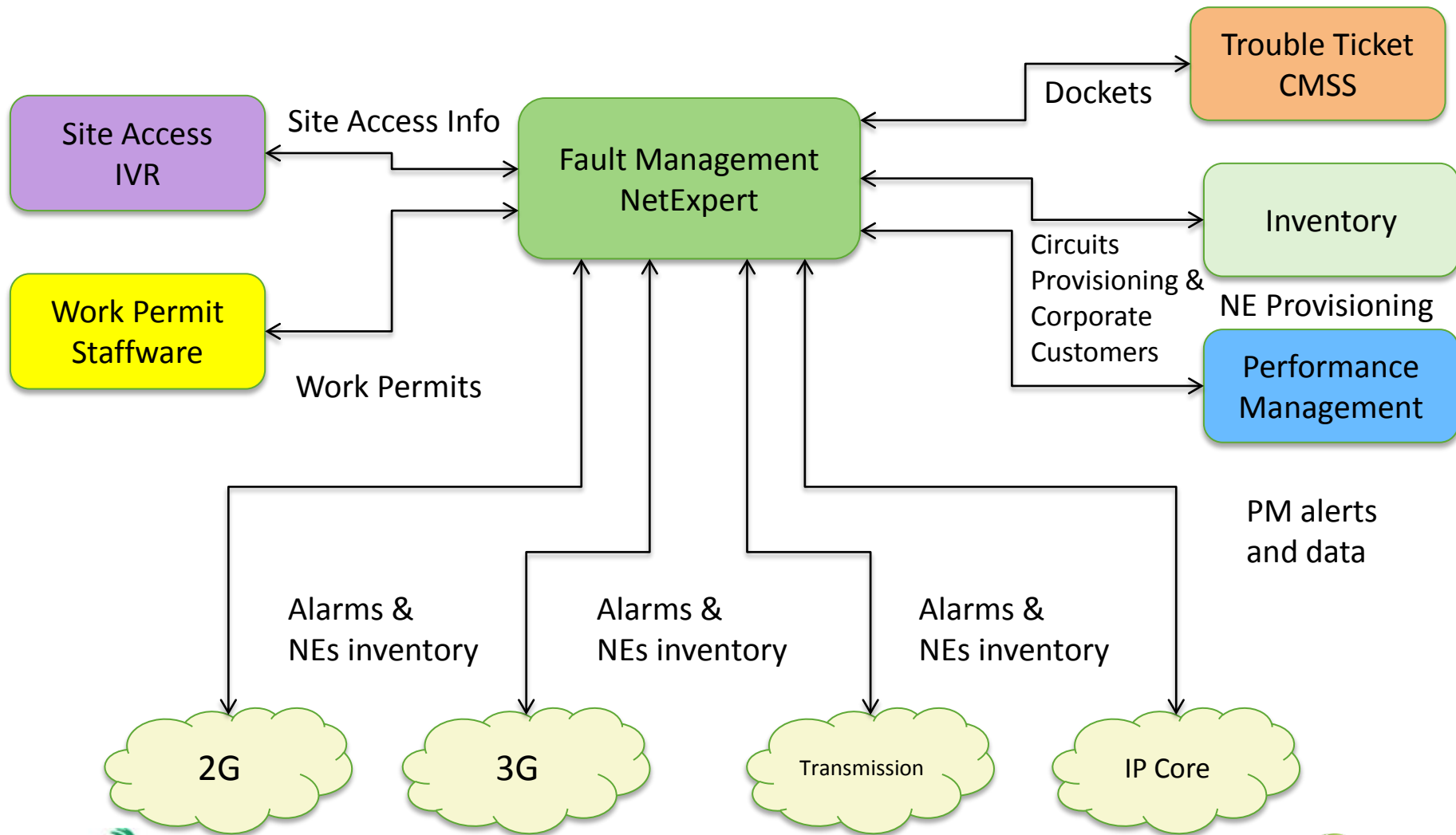- ❑ Cloud Computing

maxis.

OSI

Maxis OSS FM Introduction

Maxis OSS FM

- Uses OSI NetExpert Product & Solution for iNMS

- System was implemented in 2006/2007 and continues to evolve

- Other OSS systems were integrated to Maxis like PMS, Inventory, CMSS dockets, IVR, Work Permit

- Over 90 percent of Maxis network is monitored

Maxis FM iNMS System Overview

Site Access IVR

Work Permit Staffware

Fault Management NetExpert

Trouble Ticket CMSS

Inventory

Performance Management

Site Access Info

Dockets

NE Provisioning

Circuits Provisioning & Corporate Customers

Work Permits

PM alerts and data

Alarms & NEs inventory

Alarms & NEs inventory

Alarms & NEs inventory

2G

3G

Transmission

IP Core

maxis.

OSI

Maxis Best Practices – RAN Site Fault Management

RAN Site Management

Challenges

- Manage high volume of alarms over 13K sites across the country

- Manage environment alarms (contribute to 60% of the network dockets) effectively

- Manage site intrusion & vandalism

Initiatives

- Alarm & Docket Prioritization

- Environment Alarm Auto Detection & Docket Escalation

Case 1 - Alarm & Docket Prioritization

Site Down Alarms

Prioritize VVIP, URBAN or high density traffic sites, regions or locations for manual docket

- Site Priority – **"VVIP, URBAN, RURAL"**
- Site Classification – **"BSC , Hub Sites, Trunk Sites & End Sites"**
- Alarm Quadrant – service impacting, non-service impacting, environmental and performance alarms
- Region – Location

Q...	AMO	Alert Name	Site Classifica...	Site Pri...	RegionBase
Q1	BLOGM1_BTS_CS	C_BTSSiteDown	End Site	RURAL	EM1::BSTW
Q1	BLOGM1_BTS	MOT_OMCR_SITE_Last_RSL_Link_Failure	End Site	RURAL	EM1::BSTW
Q1	KGGAM1_BTS	MAXIS_REQ_SUSPECT_INTRUSION-IVR_N--DOCKET_N--WP_Y	Trunk Site	NONE	EASTERN::EKB1
Q2	LUITM1_BTS++GCLK-MCU..	MOT_OMCR_GCLK_Phase_Lock_Lost=>ITMT	End Site	RURAL	EASTERN::EWP1
Q1	LOBGM1_BTS	MAXIS_REQ_SUSPECT_INTRUSION-IVR_N--DOCKET_N--WP_Y	BSC Site	NONE	EM2::BRML
Q1	SNWGM1_BTS	MAXIS_REQ_SUSPECT_INTRUSION-IVR_N--DOCKET_Y--WP_Y	Hub Site	NONE	KVNILAI::KVNILAI
Q3	TMRIM1_BTS	C_OPTO	End Site	RURAL	EM2::BRBL
Q3	HUJIM1_BTS	OPTO1	End Site	RURAL	NORTHERN::NAS1
Q1	YHANB1_BTS	MAXIS_REQ_SUSPECT_INTRUSION-IVR_N--DOCKET_Y--WP_N	End Site	VVIP	KVNILAI::KVNILAI
Q1	SUANM1_BTS	MAXIS_REQ_SUSPECT_INTRUSION-IVR_N--DOCKET_Y--WP_N	Hub Site	RURAL	EM1::BSTW
Q3	BTEHM1_BTS	C_OPTO	End Site	NONE	NORTHERN::NPG1

Case 2 – Auto Detection & Docket Escalation for Environmental Alarms (Intrusion & Power Alarms)

What are Site Environmental Alarms?

	OPTO Descriptions
OPTO1	Intrusion / Door
OPTO2	Air Conditioner Failure / OVER-TEMP
OPTO3	Rectifier Main failure / MAINS FAILURE
OPTO4	Rectifier High Voltage
OPTO5	Rectifier Battery Low / BACK-UP BATTERY LOW
OPTO6	Rectifier PSU Failure / BACKUP GEN-SET FAIL or NO BATTERY
OPTO7	Rectifier Battery Disconnect
OPTO8	Tower Light Alarms

Power alarm

Intrusion Alarm Initiative Executive Summary

Objective:

- Automate Intrusion Alarm detection – immediate detection & prevention of Site Intrusion
- Control site access, site activity, planned upgrades

Background:

- ~ 1800 "Door alarm" on daily basis
- Manual Monitoring & Correlation – Labor Intensive

Intrusion Alarm Solution

- Integrates with Work Permit & IVR Module
- iNMS validates 'Door Open' alarm whether it is an assigned Engineer entering into the site, or it is a real 'Intrusion Alarm' with correlation
- Differentiates between maintenance access vs. suspect intrusion

EMS Name	INMS Event DateTime	Loc Name	Description
Ericsson ...	2012-06-18 15:22:56	SSQ1B1	SUSPECT INTRUSION at SSQ1B1 [OPTO1] IVR[N], Docket[D11166/06/12
Motorola ...	2012-06-18 15:22:43	KOYAM1	NO INTRUSION at KOYAM1 [OPTO1] IVR[D11129/06/12 WO1:60127000103
Motorola ...	2012-06-18 15:22:30	ALP1B1	NO INTRUSION at ALP1B1 [OPTO1] IVR[201215584:60122215082:Paul F
Motorola ...	2012-06-18 15:22:10	FEPUM1	SUSPECT INTRUSION at FEPUM1 [OPTO1] IVR[N], Docket[N], WP[N]
Motorola ...	2012-06-18 15:21:50	PRTOM1	SUSPECT INTRUSION at PRTOM1 [OPTO1] IVR[N], Docket[N], WP[N]
Motorola ...	2012-06-18 15:21:48	OKONM1	NO INTRUSION at OKONM1 [OPTO1] IVR[201215476:60138860734:Thomas
Motorola ...	2012-06-18 15:20:58	GIAMM1	SUSPECT INTRUSION at GIAMM1 [OPTO1] IVR[N], Docket[N], WP[N]
Alcatel S...	2012-06-18 15:20:00	1670sm-64-KN...	SUSPECT INTRUSION at 1670sm-64-KNTN01main [OPTO1] IVR[N], Docke
Ericsson ...	2012-06-18 15:19:54	EVILM1	SUSPECT INTRUSION at EVILM1 [OPTO1] IVR[N], Docket[N], WP[20121

Intrusion Alarm Processing Logic
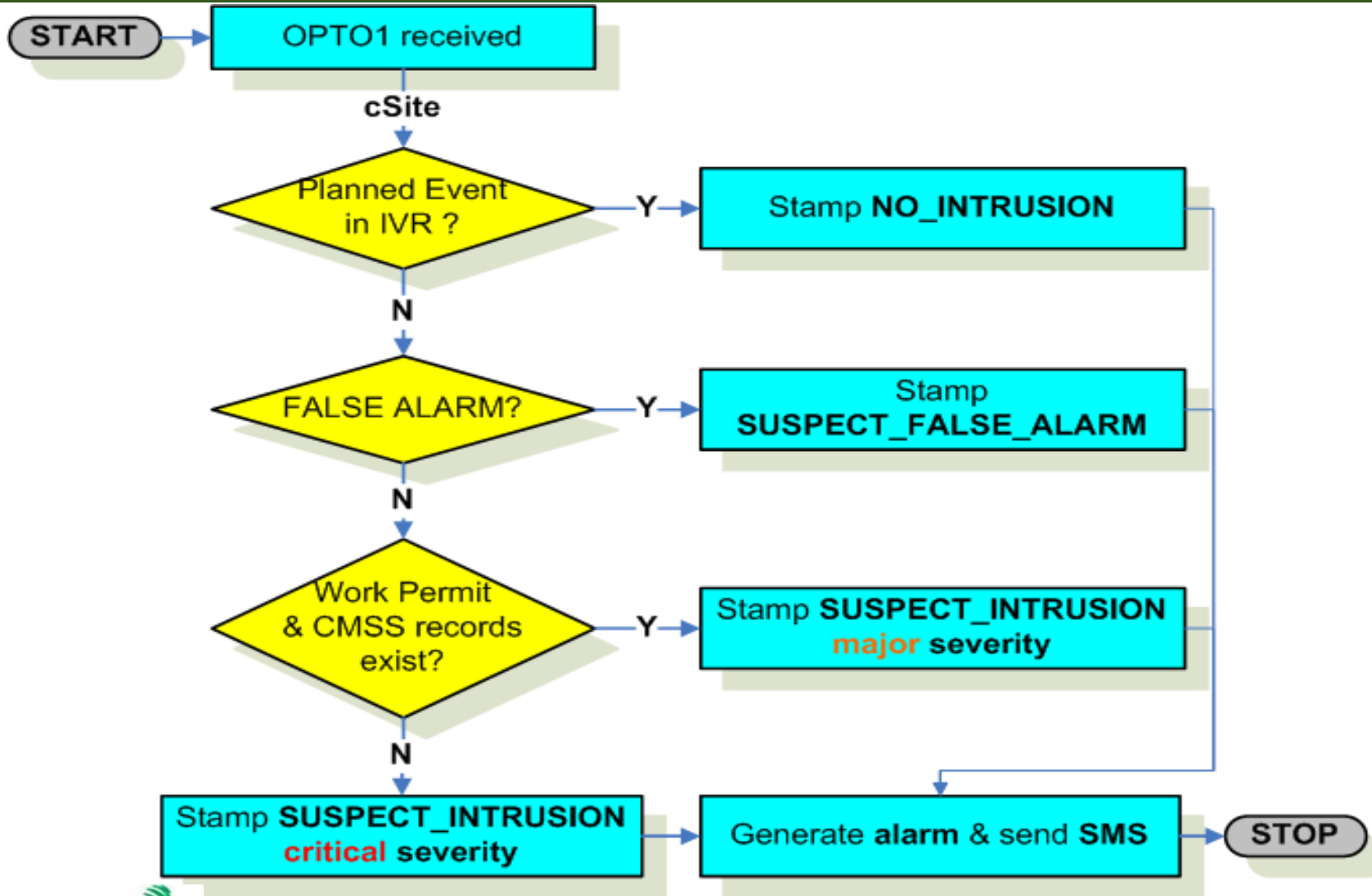
Benefits

- Operational Efficiency – Automates manual check steps related to site intrusion

- Prevents unnecessary truck roll – Docket raised for genuine site intrusion

- Reduces revenue leakage – prevents site intrusion

- Frees up NOC/SOC controllers to focus on other real network alarms

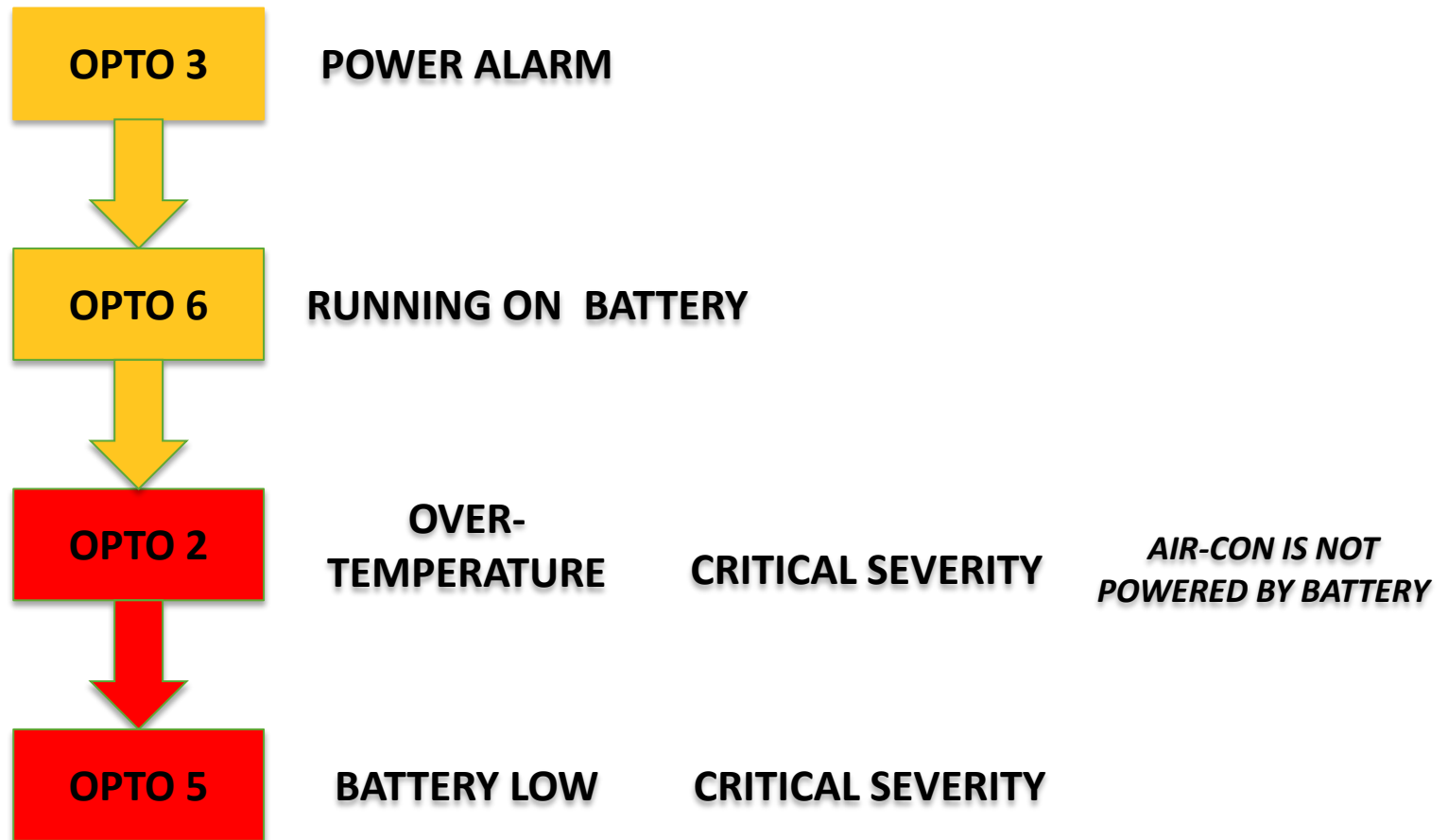# Power Alarm Initiatives Executive Summary

Objective:

- Automate power alarm detection and docket escalation

Background:

- ~ 2.5% of sites report power issues daily
- Multiple related alarms are generated for a single site power failure
- Manual power alarms management is labor intensive

Power Alarms Behavior

OPTO 3	**POWER ALARM**		
OPTO 6	**RUNNING ON BATTERY**		
OPTO 2	**OVER-TEMPERATURE**	**CRITICAL SEVERITY**	*AIR-CON IS NOT POWERED BY BATTERY*
OPTO 5	**BATTERY LOW**	**CRITICAL SEVERITY**	

Power Alarms Solution

- Site Prioritization - Categorize RAN Sites with Site Classifications (eg. Hub, Trunk, BSC and End Site)

- Opto Alarms Correlation

- Set appropriate Sleeping Time to auto trigger docket

- Display the Correlated Power alarms in alarm panel

Power Alarms Correlation

<u>Step 1</u>

- Correlates all occurring OPTO2-OPTO7 alarms into a single correlation alarm => C_OPTO
- C_OPTO alarm as primary alarm
- Only C_OPTO can trigger an auto docket creation

  => Doesn't have <u>multiple</u> alarm rows and dockets
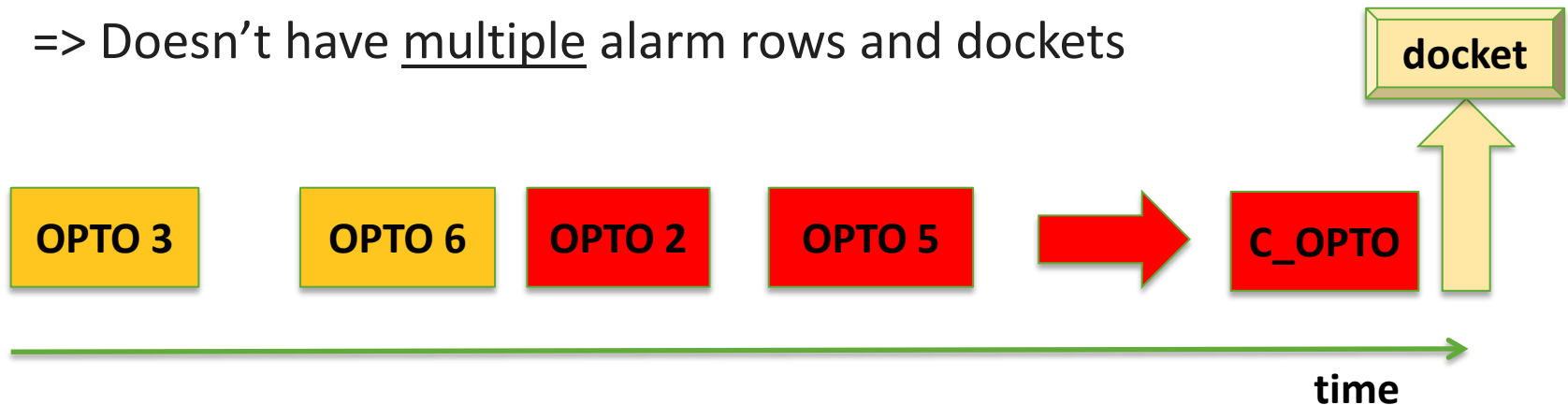
- Handles false alarm condition of Site Reset: OPTO2-7 triggered simultaneously

Set Sleeptimes (Wait Periods)

Step 2

- Assigns configurable sleeptimes (wait periods) for each type of basic OPTO alarm. The sleeptimes control between raising docket too soon vs. too late.

OPTO 3	POWER ALARM	180mins
OPTO 6	RUNNING ON BATTERY	30mins
OPTO 2	OVER-TEMPERATURE	15mins
OPTO 5	BATTERY LOW	5 mins
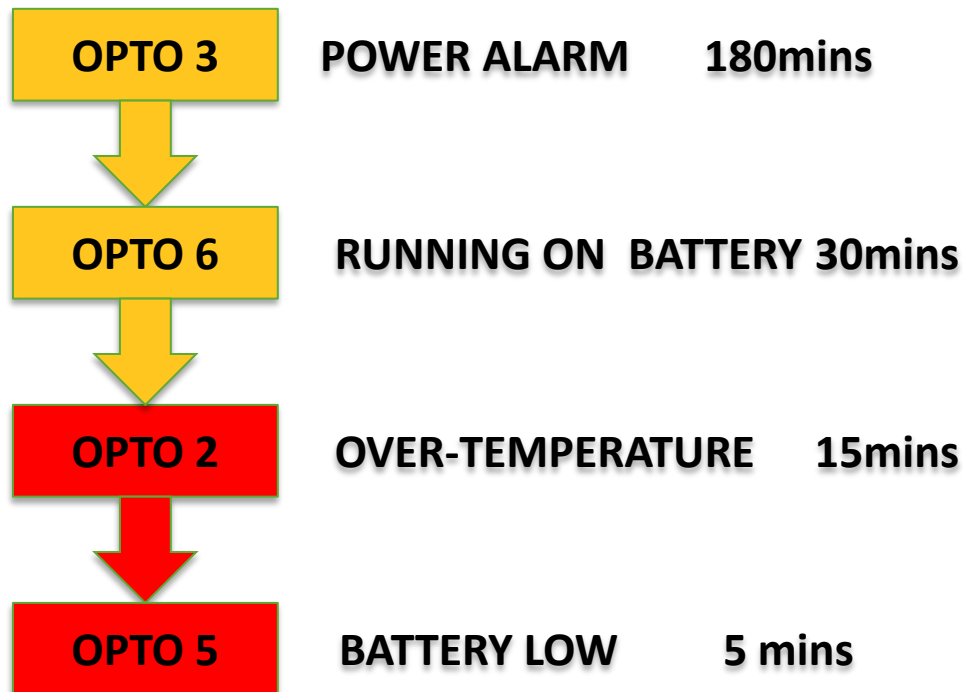
C_OPTO Behavior

- C_OPTO takes the shortest waiting periods from its basic OPTO alarms' generation ie. from most critical OPTO alarm

- C_OPTO docket escalated based on this time

Docket created based on the shortest sleeptime, OPTO5 = 5mins

Copyright 2010-2012, OSI Inc
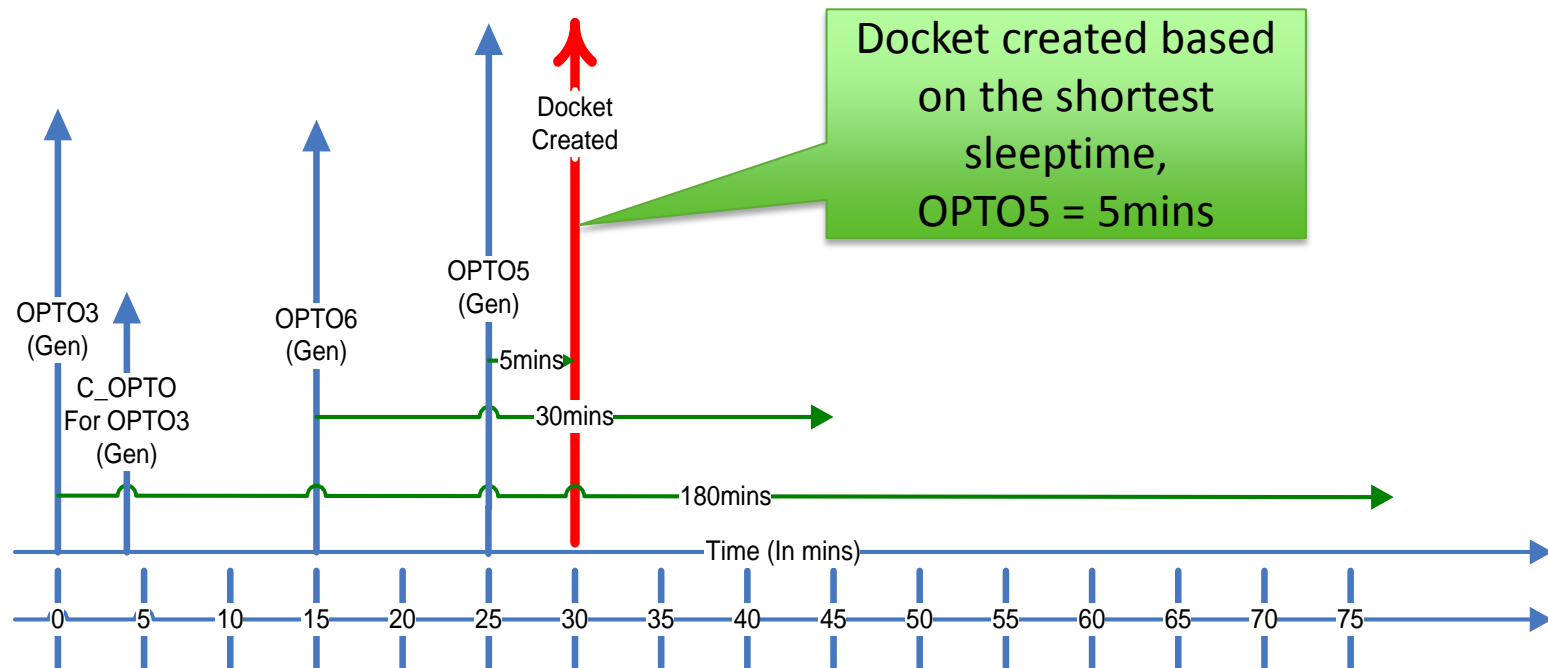
C_OPTO Behavior

- If any basic OPTO alarm clears, C_OPTO sleeptime adjusts to next shortest occurring basic OPTO alarm sleeptime

Copyright 2010-2012, OSI Inc
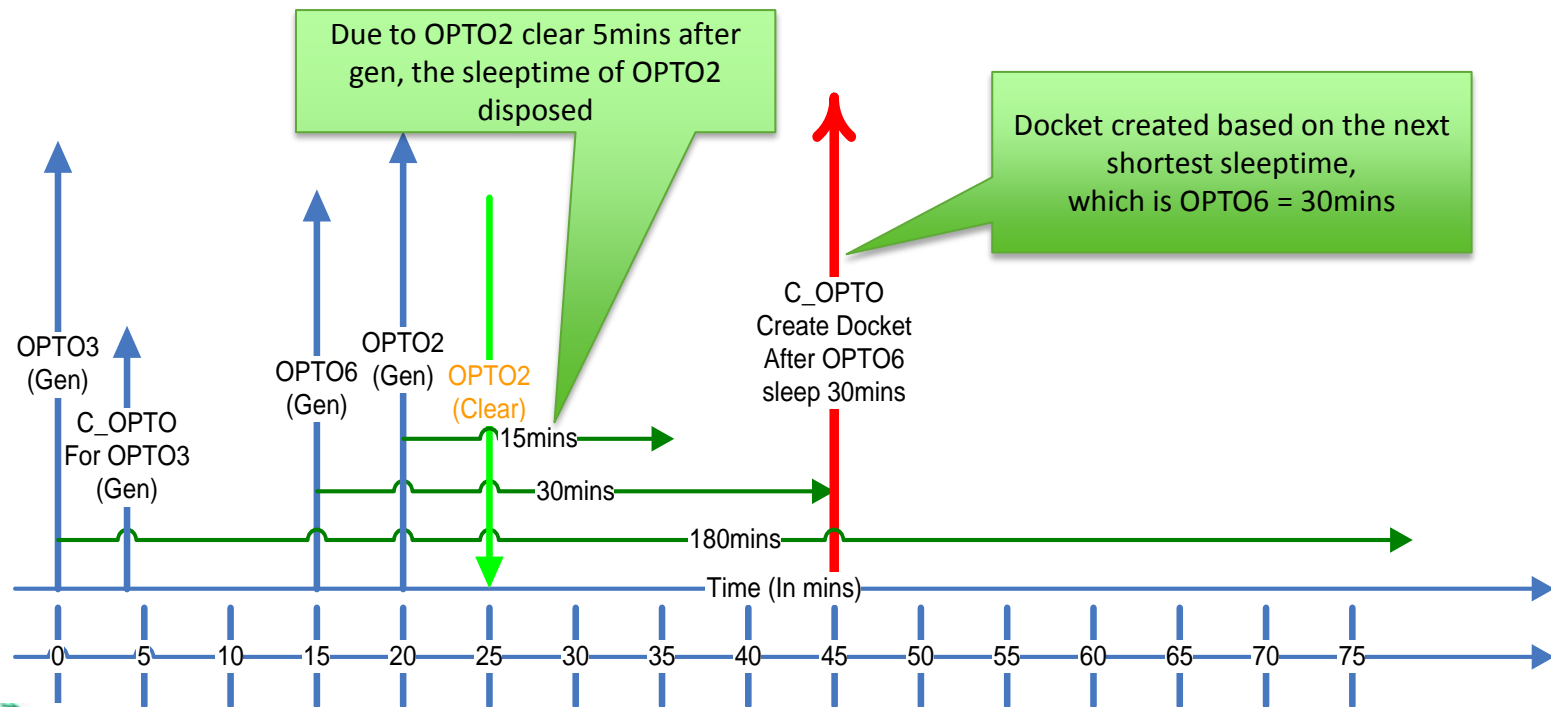
C_OPTO Behavior

- If all the basic OPTO or C_OPTO alarms clear before they reach their wake-up times => no auto docket process is triggered.

OPTO3
(Gen)

C_OPTO
For OPTO3
(Gen)

OPTO6
(Gen)

OPTO2
(Gen)

OPTO6
(Clear)

OPTO2
(Clear)

C_OPTO
(Clear)

OPTO3
(Clear)

15mins

30mins

180mins

Time (In mins)

Due to all alerts cleared before they reach their wake up times, no auto docket is triggered at the end of the process

0   5   10   15   20   25   30   35   40   45   50   55   60   65   70   75
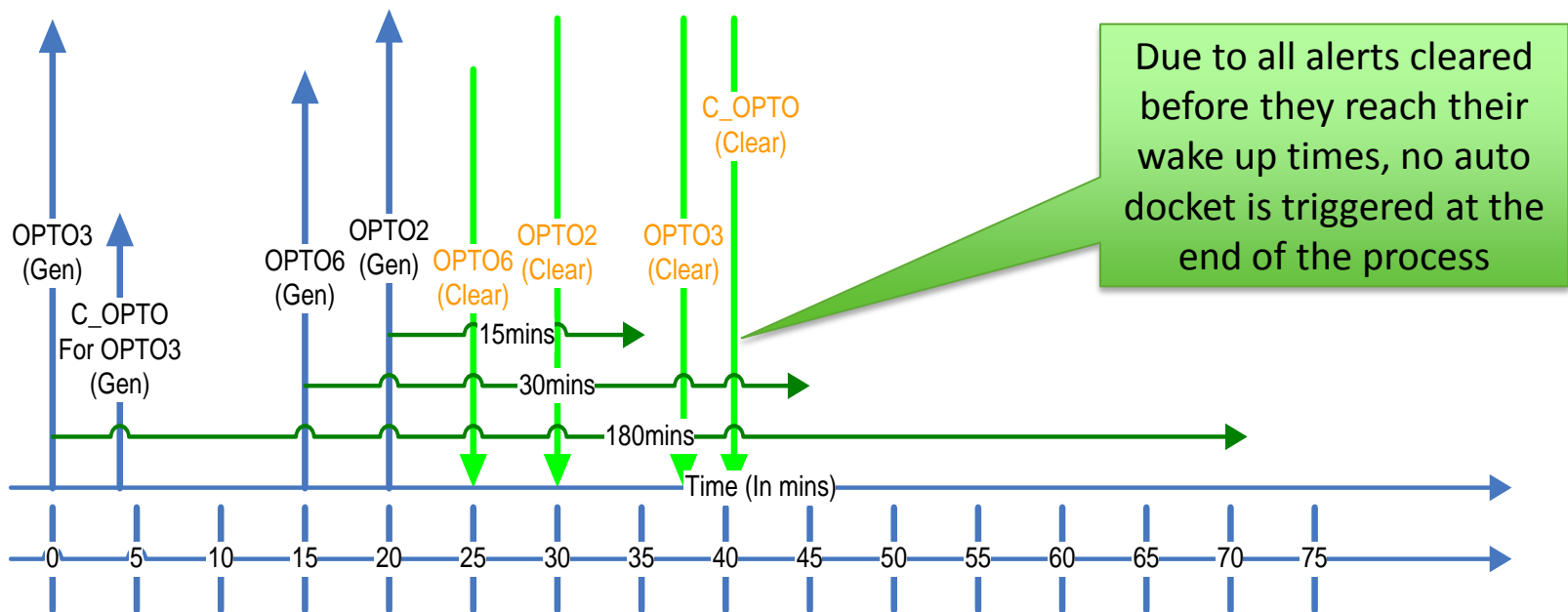
Prioritize Hub, Trunk, BSC Sites > End Sites

- Sleep timings based on field trials

maxis.

Hub, Trunk, BSC Sites Sleeptimes 6mins

OPTO 3	POWER ALARM 6mins
OPTO 6	GEN-SET / BATTERY 6mins
OPTO 2	OVER-TEMP 6mins
OPTO 5	BATTERY LOW 6mins
C_OPTO	7 -9 mins → docket

End Sites Sleeptimes 180mins – 5mins

OPTO 3	POWER ALARM 180mins
OPTO 6	GEN-SET FAIL RUNNING ON BATTERY 30mins
OPTO 2	OVER-TEMPERATURE 15mins
OPTO 5	BATTERY LOW 5 mins
C_OPTO	180mins – 5mins → docket

OSI
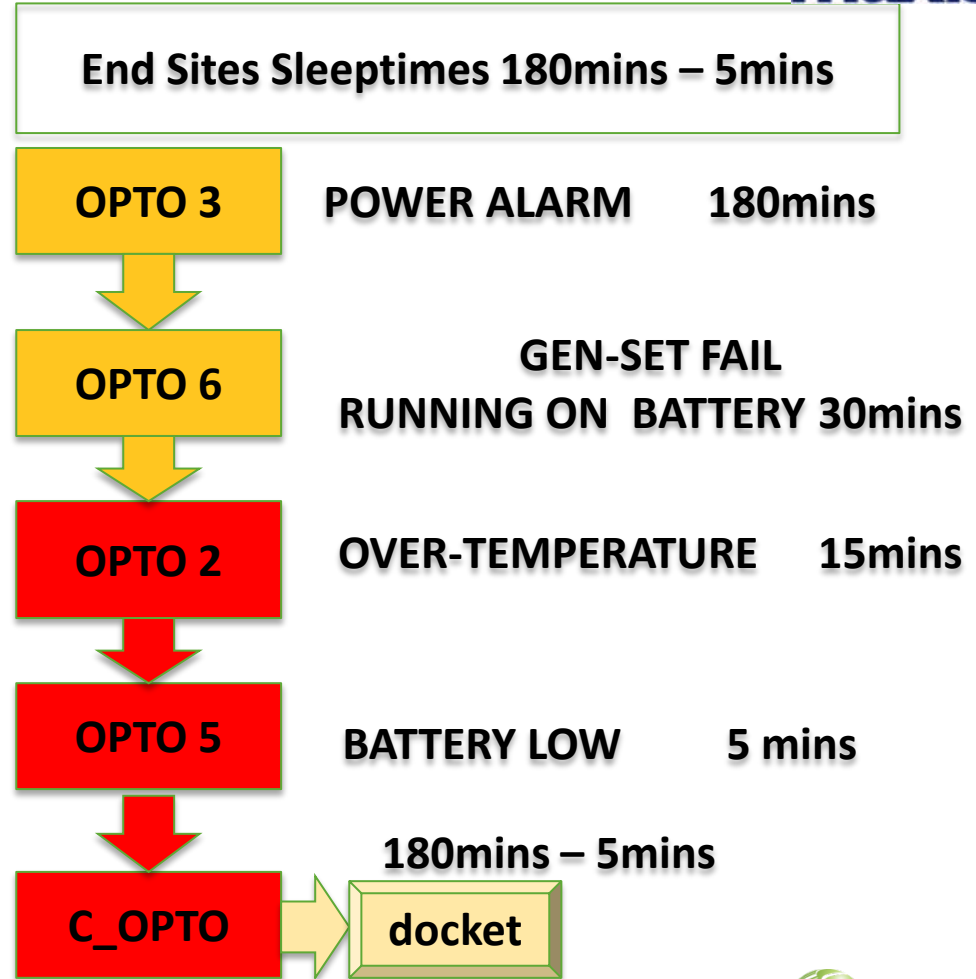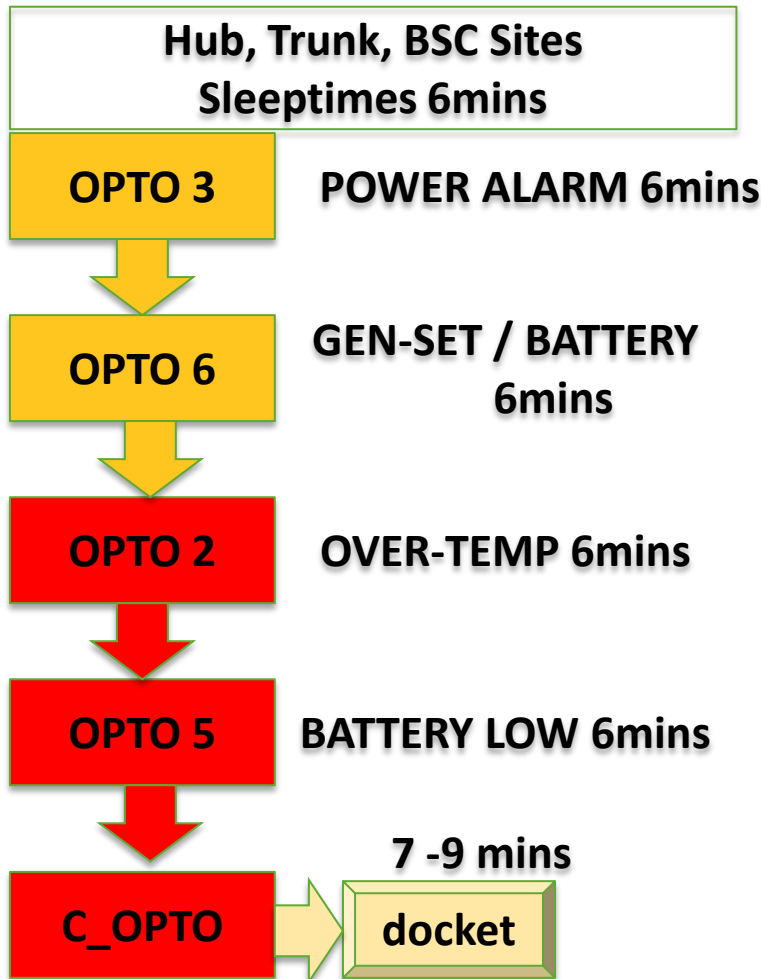
Basic OPTO alarms are associated to C_OPTO docket
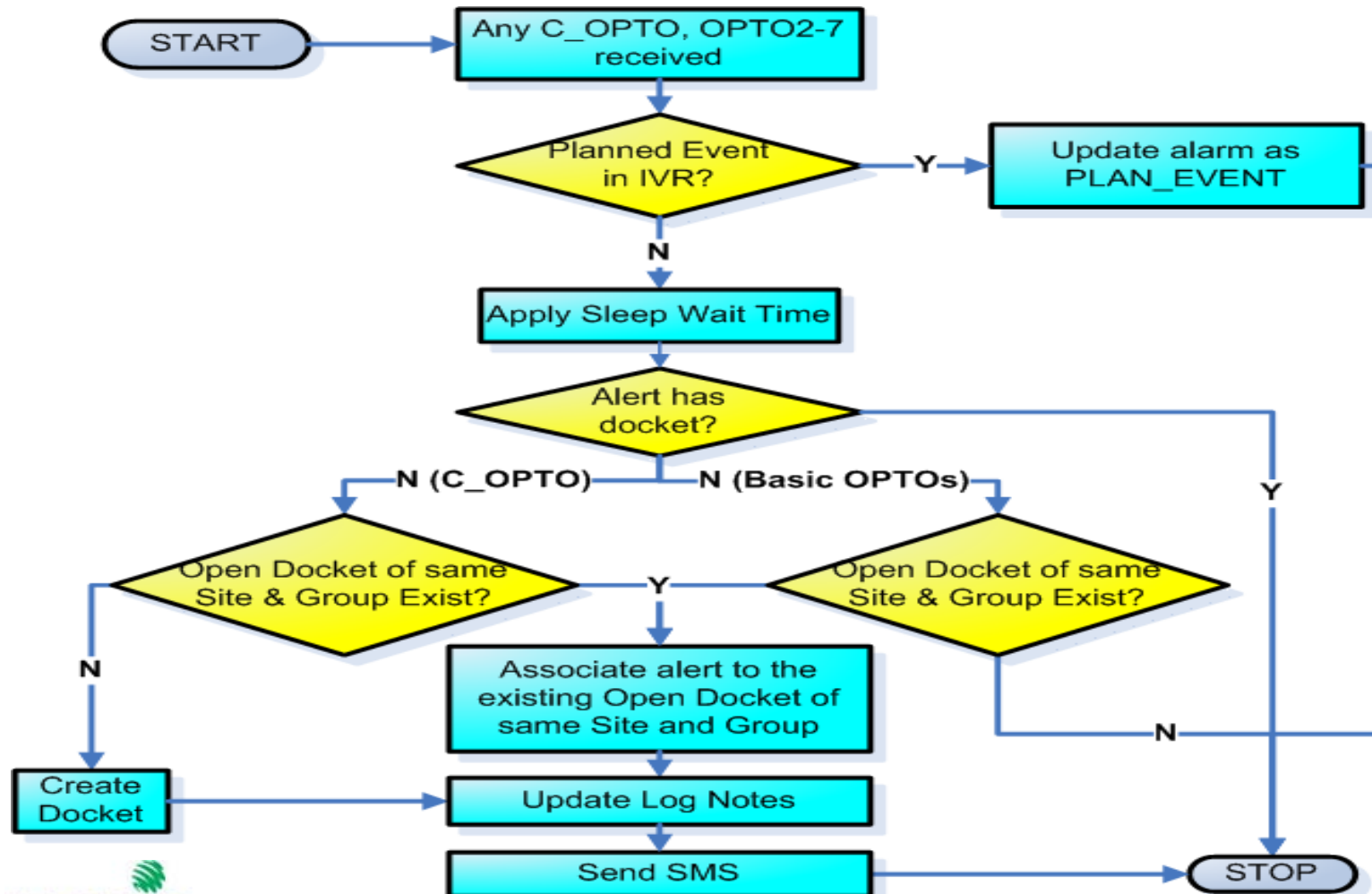
Benefits

- Operational Efficiency - Auto Detection and Docket Escalation

- Optimize docket escalation - Specific Power alarms allowed time to CBI

- Reduce Site Outages

- Effective alarm monitoring - Multiple Site power alarms are correlated into single alarms

- Free up NOC/SOC controllers to focus on other real network alarms

Benefits (based on sleep timings set)

Critical sites => average of 7 to 9 minutes to auto docket

SITENAME	SITE_CLASSIFICATION	ALERT_TYPE	ALERT_FIRST_GENERATED	DOCKET_CREATED	DOCKET_ID
LKINM1	Hub Site	OPTO6,OPTO3	22/5/2012 12:07:41 AM	22/5/2012 12:16:14 AM	D14035/05/12
KLNOM1	Hub Site	OPTO2	22/5/2012 3:27:01 AM	22/5/2012 3:35:05 AM	D14077/05/12
BTGPM1	Hub Site	OPTO3,OPTO6	22/5/2012 4:55:55 AM	22/5/2012 5:04:18 AM	D14092/05/12
BERKM1	Hub Site	OPTO6,OPTO3	22/5/2012 5:46:48 AM	22/5/2012 5:55:04 AM	D14101/05/12
TOSAM1	Hub Site	OPTO2	22/5/2012 5:49:25 AM	22/5/2012 5:57:07 AM	D14103/05/12
PAPTM1	Trunk Site	OPTO5,OPTO6,OPTO3	22/5/2012 6:09:32 AM	22/5/2012 6:18:06 AM	D14107/05/12
BONYM1	Trunk Site	OPTO6,OPTO3	22/5/2012 7:27:36 AM	22/5/2012 7:36:06 AM	D14122/05/12
BALAM1	Hub Site	OPTO3	22/5/2012 8:43:25 AM	22/5/2012 8:51:06 AM	D14145/05/12
SBRUM1	Trunk Site	OPTO3	22/5/2012 9:39:59 AM	22/5/2012 9:48:07 AM	D14171/05/12

End Sites => 3 hours – 5 mins to auto docket

SITENAME	SITE_CLASSIFICATION	ALERT_TYPE	ALERT_FIRST_GENERATED	DOCKET_CREATED	DOCKET_ID
BENGM1	End Site	OPTO2	21/5/2012 10:28:37 PM	22/5/2012 12:01:06 AM	D14024/05/12
KMABM1	End Site	OPTO6,OPTO3	21/5/2012 11:56:50 PM	22/5/2012 12:04:17 AM	D14029/05/12
UMASM1	End Site	OPTO5,OPTO6,OPTO3	22/5/2012 12:01:31 AM	22/5/2012 12:10:08 AM	D14031/05/12
SERTM1	End Site	OPTO5	22/5/2012 12:04:56 AM	22/5/2012 12:12:06 AM	D14034/05/12
TOOMM1	End Site	OPTO3,OPTO6	21/5/2012 11:56:54 PM	22/5/2012 12:29:28 AM	D14041/05/12
APONM1	End Site	OPTO6,OPTO3	21/5/2012 11:59:05 PM	22/5/2012 12:31:05 AM	D14043/05/12
PAALM1	End Site	OPTO6	21/5/2012 11:59:11 PM	22/5/2012 12:31:17 AM	D14044/05/12
STURM1	End Site	OPTO6,OPTO3	22/5/2012 12:10:12 AM	22/5/2012 12:42:06 AM	D14049/05/12
GPAIM1	End Site	OPTO6	22/5/2012 12:47:38 AM	22/5/2012 1:20:05 AM	D14058/05/12
JLLAP1	End Site	OPTO6,OPTO3	22/5/2012 12:53:00 AM	22/5/2012 1:25:07 AM	D14060/05/12
GARSM1	End Site	OPTO3	21/5/2012 10:38:59 PM	22/5/2012 1:41:08 AM	D14062/05/12

Benefit Analysis

✓ Setting OPTO 3 sleeptime to 180mins for End Sites

   => 50% OPTO 3 docket savings => 7.5% reduction in total dockets nationwide

All Dockets From All Alarm Sources

- ■ Other NW Dockets 40%
- ■ Other OPTO Dockets 45%
- ■ 50% Savings = 7.5% Reduction in OPTO 3 Dockets Nationwide
- ■ 7.5% Remaining OPTO 3 Dockets
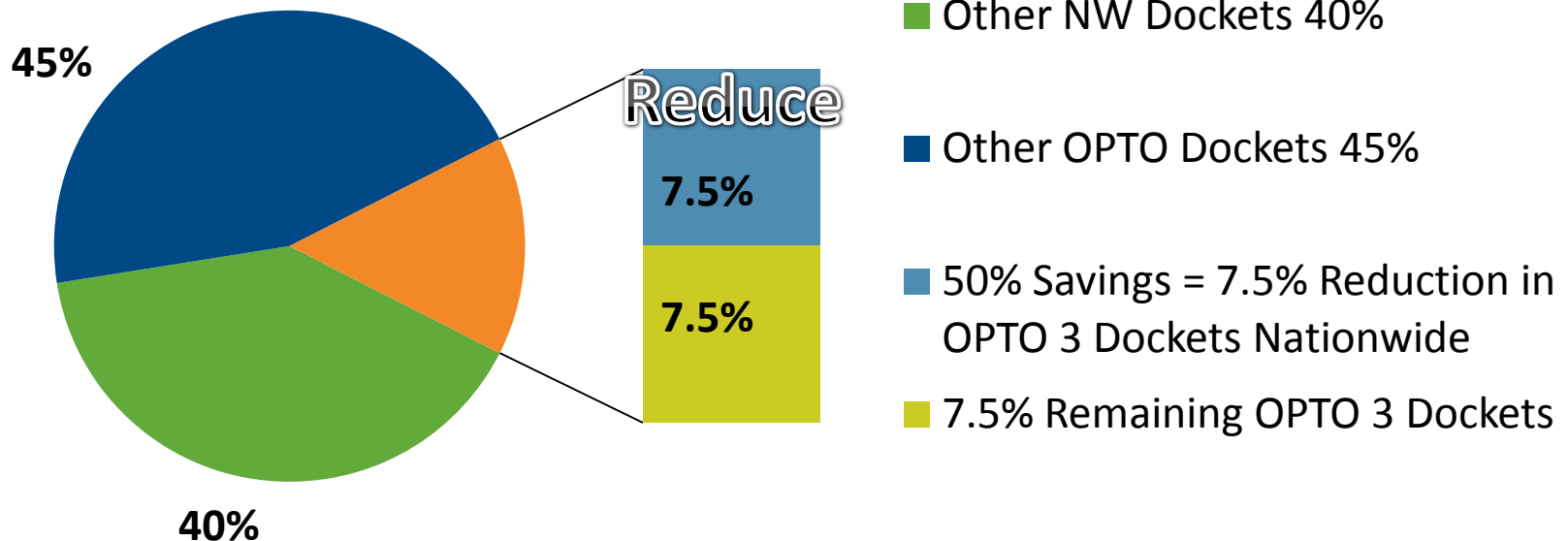
Post 6 Months Benefit Analysis

- Number of open dockets are down by 38%
- Network Availability and Customer Satisfaction has increased

OSI Best Practices – Beyond Monitoring to Rich Object Modeling

OSI Presenter Background, Andrew Lim

- Project Manager with Agilent/OSI since 2002

- Worked on telecom CDR BI solutions, Japan Telecom, TCL, Tata Docomo and Maxis OSS projects

- Project Manager / Account Manager for Maxis since 2008

Rich Object Modeling – Business Need

- Graphical network view with real time alarms
  - Network Topology
  - Circuit Diagram
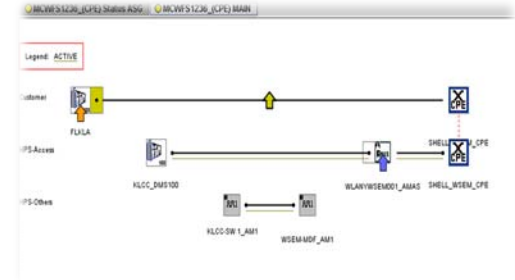
- Flexible network monitoring at different levels
  - Region
  - Corporate Customer tier

- Geographical view places NE on Mapinfo with real time alarms

Rich Object Modeling – Challenges

- Data consolidation
  - *Different systems*

  - *Different interfaces*
    - Flat File FTP
    - Vendor specific interface
      - Alcatel IOO, etc
    - Oracle table sync

  - *Huge data volume*

NetExpert	EMS	Inventory
Alarm Info	Circuit Provisioning Info	Site Info Circuit Info Customer Info

NetExpert MIB

Rich Object Modeling – Using MIBSYNC

- MIBSYNC features
  - *Ability to sync objects between NetExpert and other inventory systems*
    - Delete obsolete objects from NetExpert
    - Create new objects in NetExpert
    - Update existing objects in NetExpert
  - *Smart*
    - Does not process unchanged objects, improves performance
  - *Efficient*
    - Standalone process
    - Conversion and normalization issues are handled as discrete functions
  - *External EMS/inventory can be transformed into Database tables (single standard format)*

Rich Object Modeling – Using MIBSYNC

Inventory Process Using MIBSYNC

Step 1:

Data Conversion and loading processes

MIBSYNC Configuration

NetExpert MIB

Various Inventory Sources

Step 2:
Integrate & normalize inventory data into staging tables

Step 3:
Incrementally synchronize from staging tables into NetExpert MIB
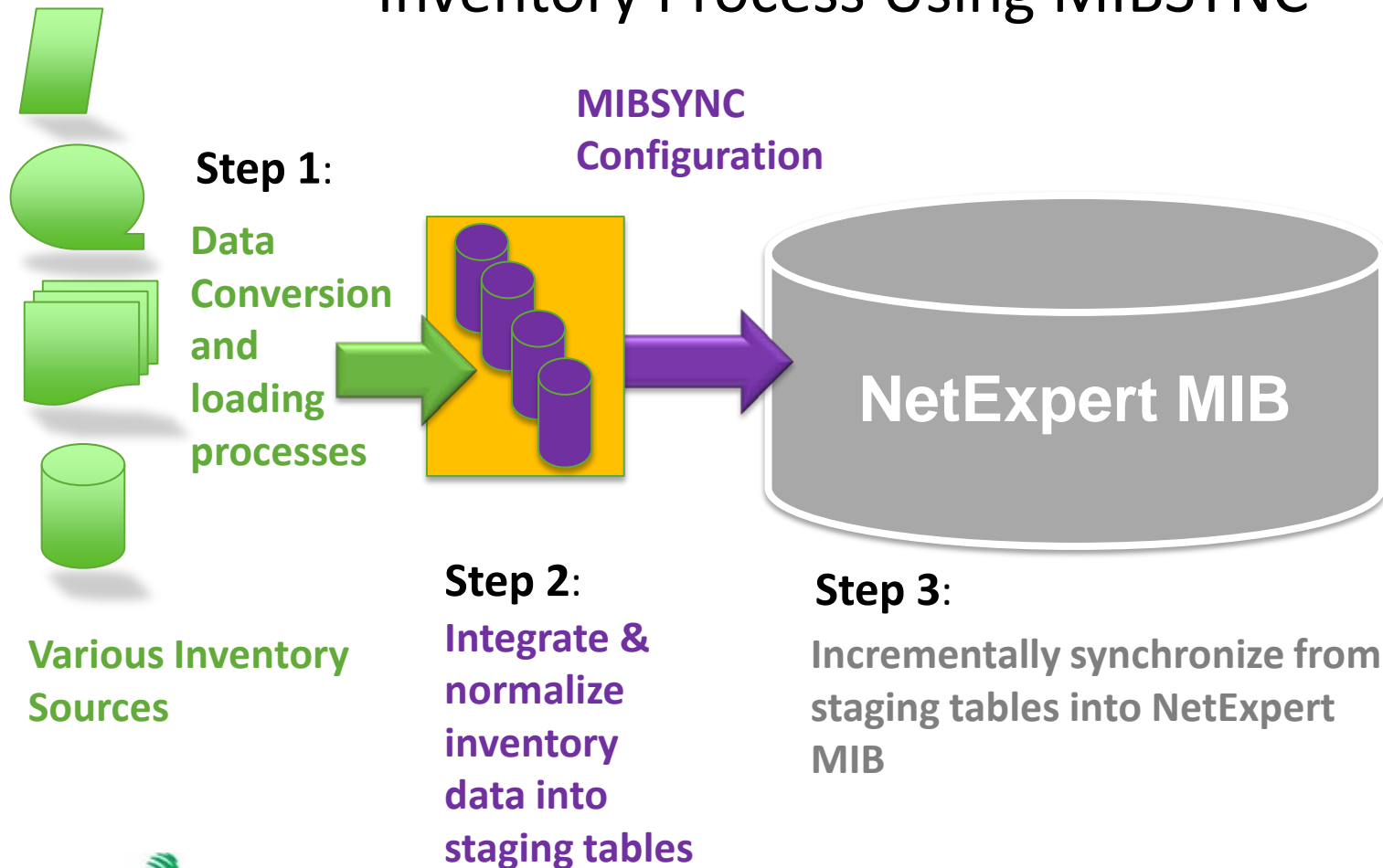
Network Diagram Visualization

- Displays circuit routing details of a circuit in layers
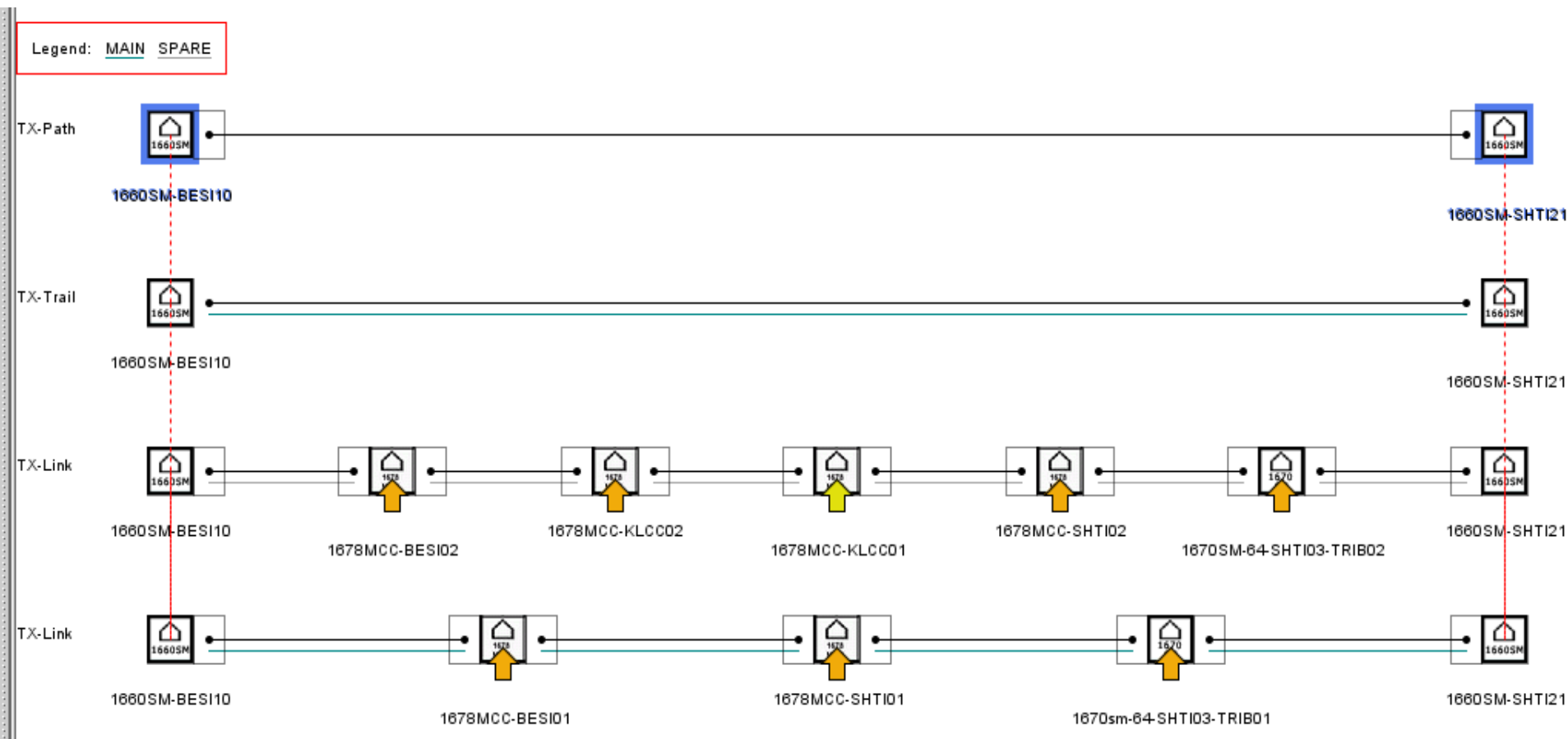
Network Diagram Visualization

- Provides alarm state info on Circuit

Copyright 2010-2012, OSI Inc
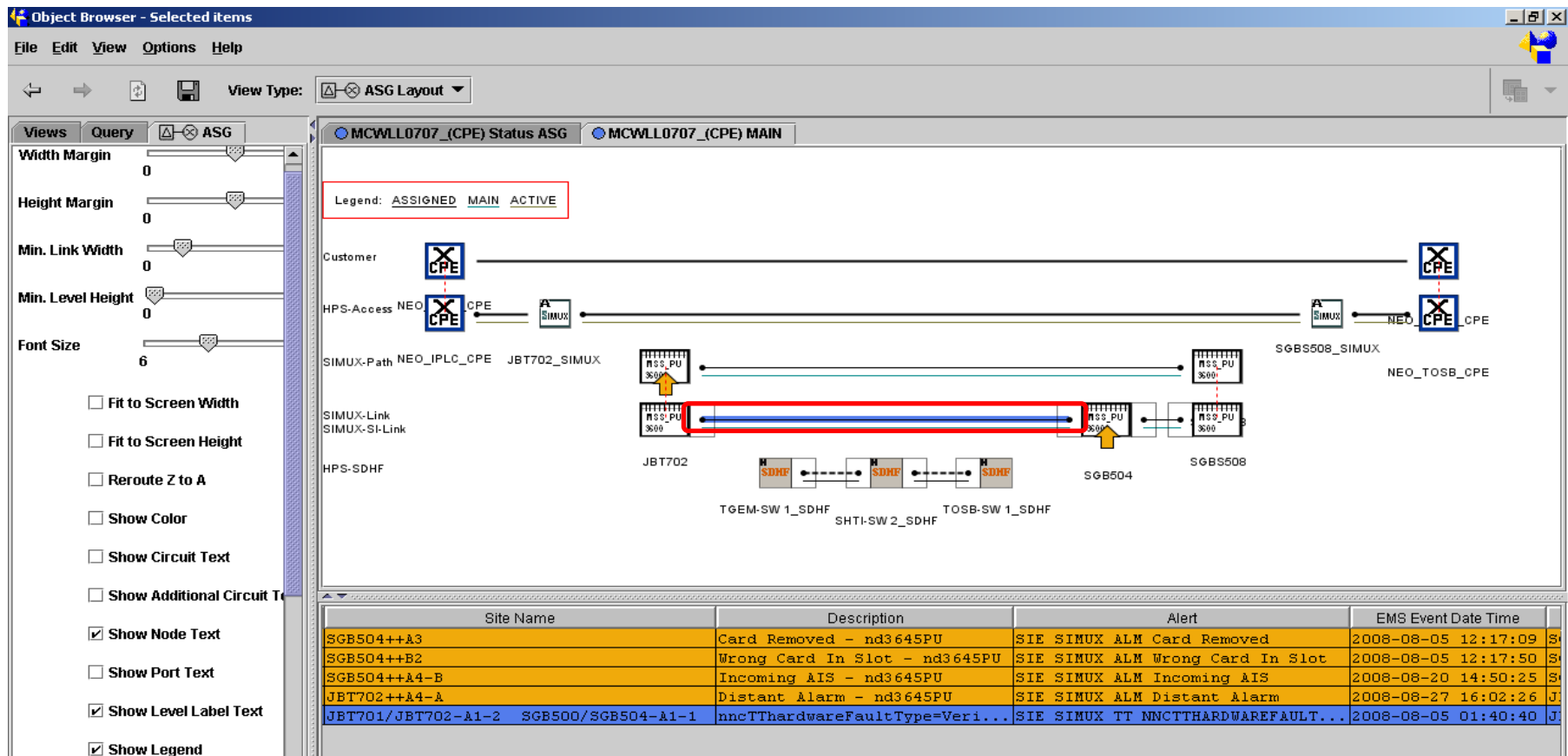
Network Diagram Visualization

- Provides alarm state info on NE
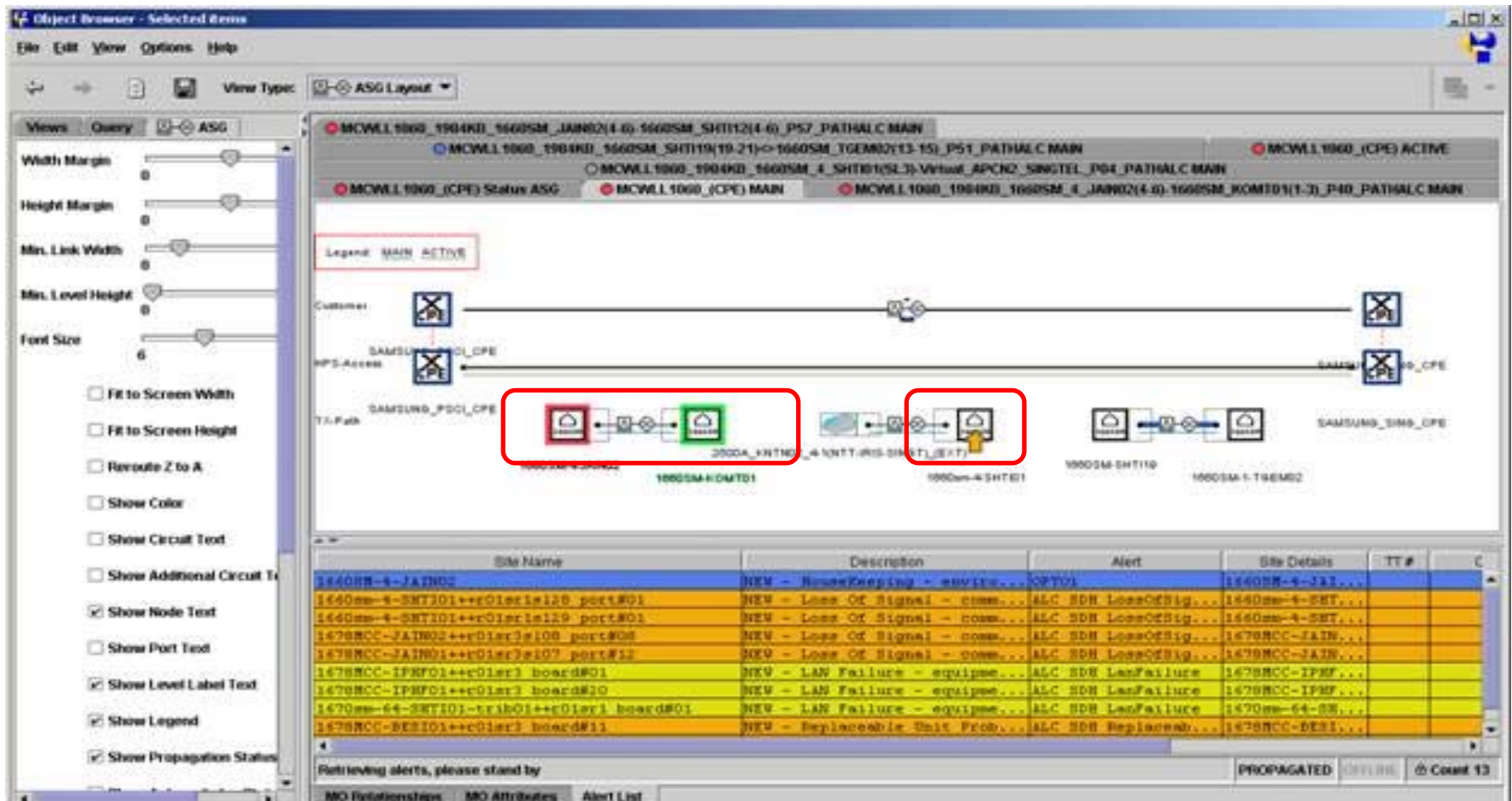
Network Topology Visualization

- Easily shows how NEs are related to each other
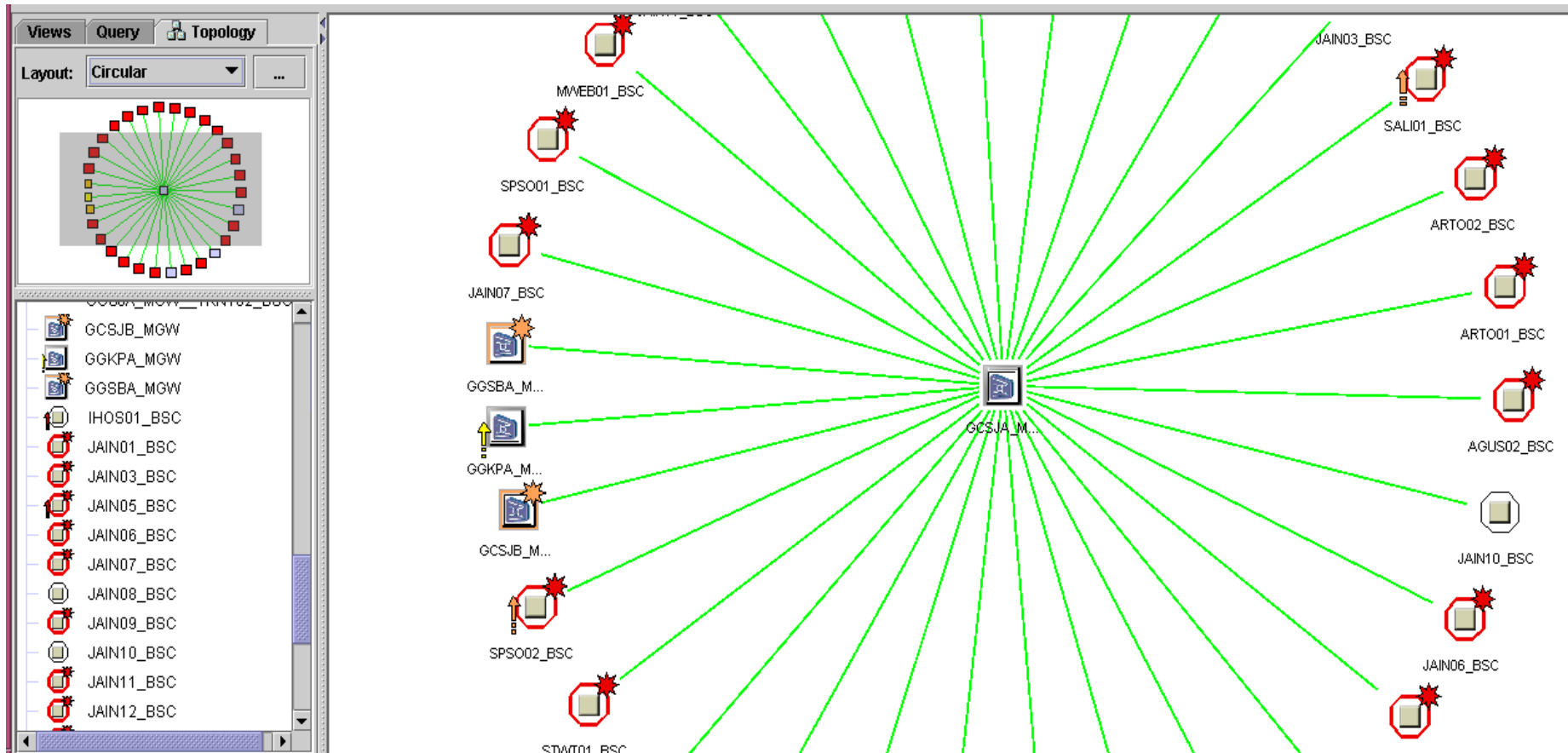
Network Topology Visualization

- Easily shows how NEs are related to each other
  - BSC <-> MGW, BSC <-> SGSN
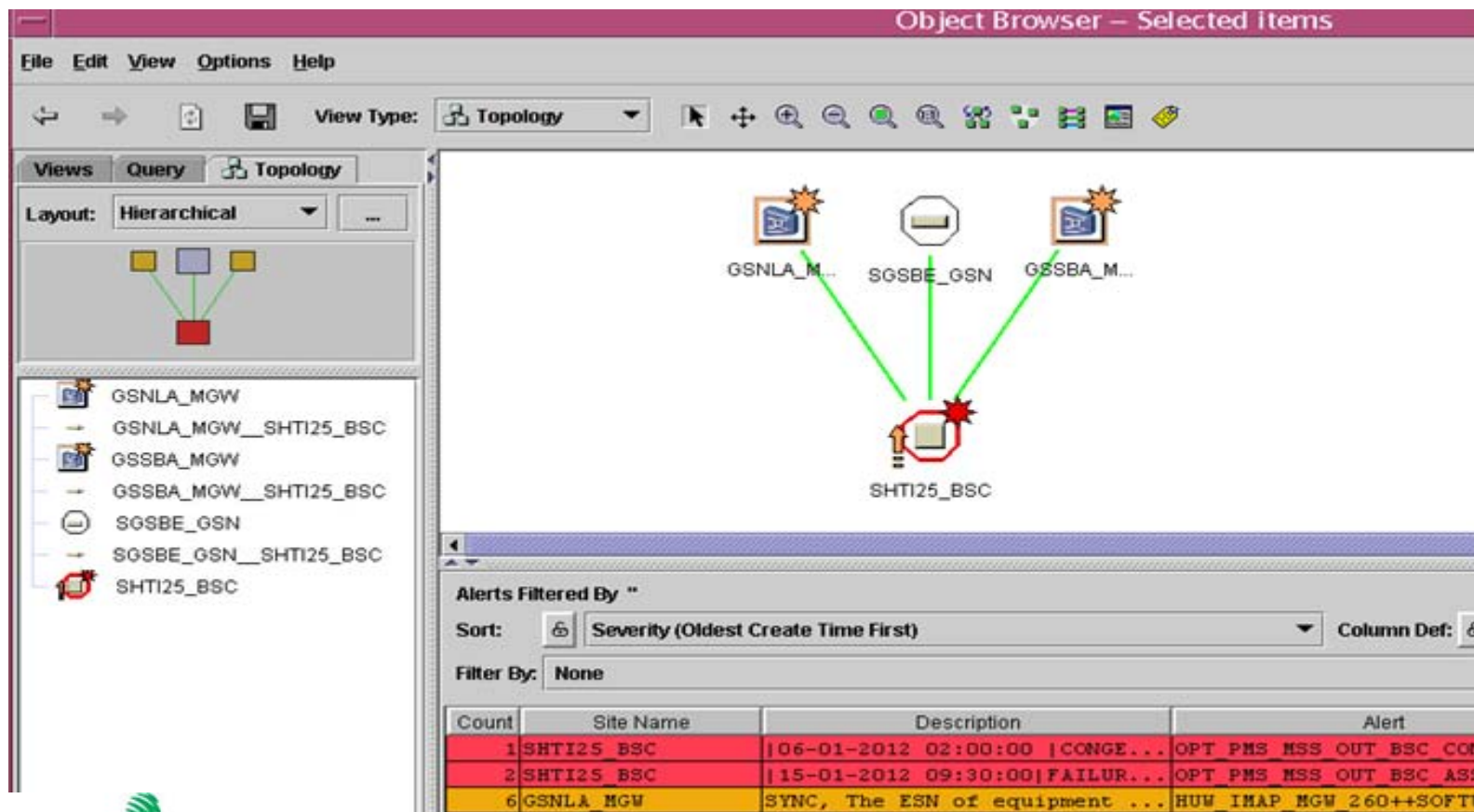
Network Topology Visualization

- Operators can see the state of the NEs
  - Alarm severity. Alarm on itself. Propagated alarm.
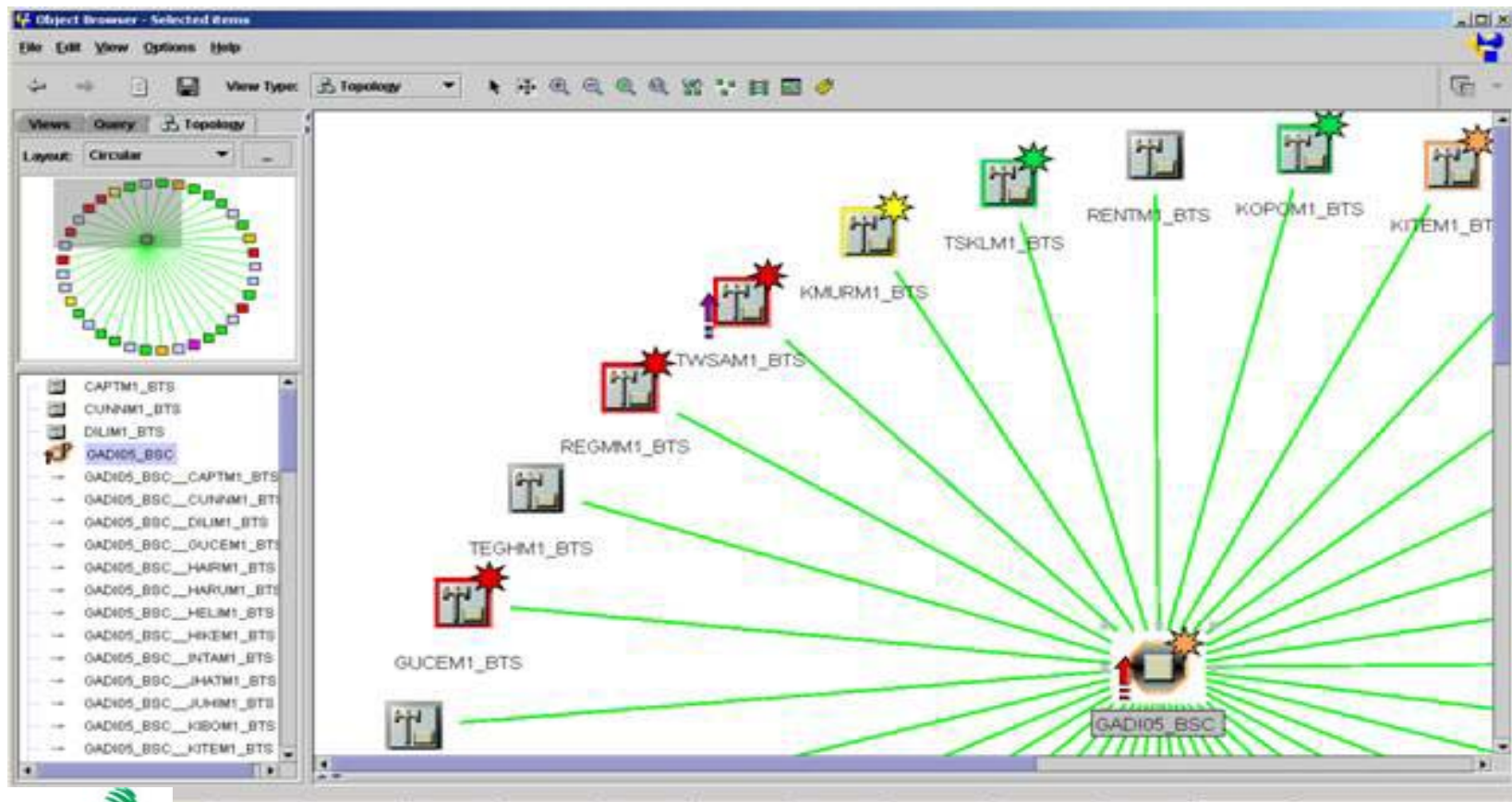
Network Topology Visualization

- Each "link" from Topology View can drill down into multiple E1 circuits.
  - Operators can now easily obtain this info in a single click.
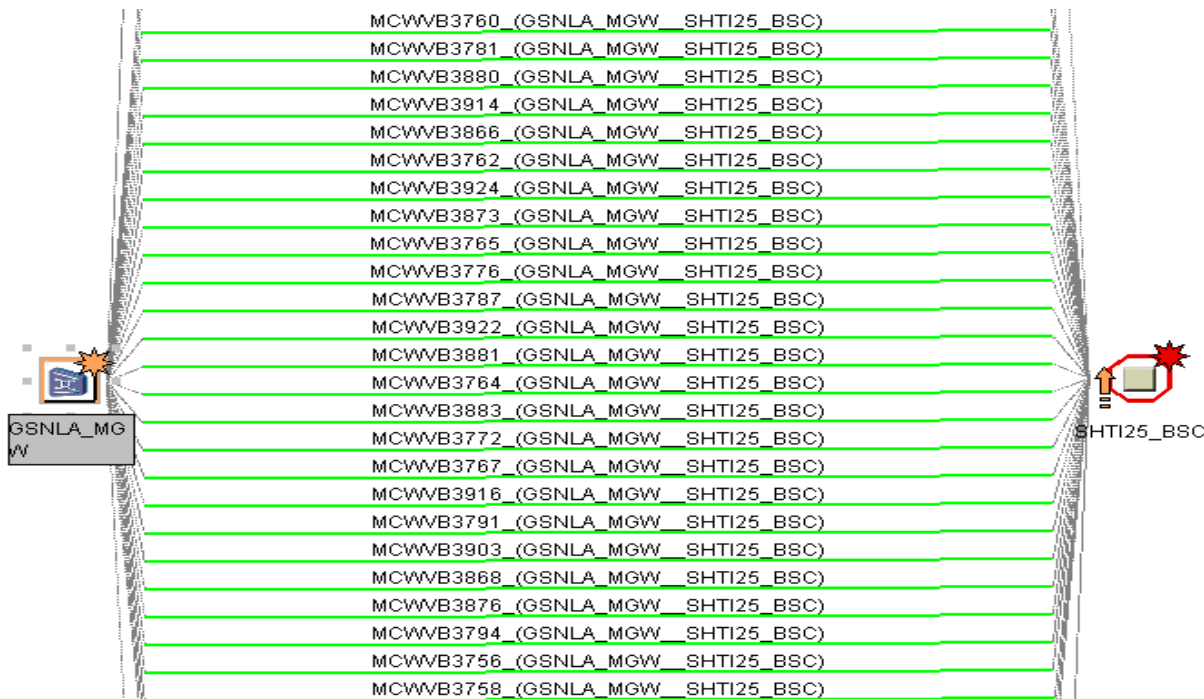
Rich Object Model Feature – Hierarchical View

- Facilitates top-down monitoring for operators
  - Simplified and summarized view
  - Drill down, only when necessary
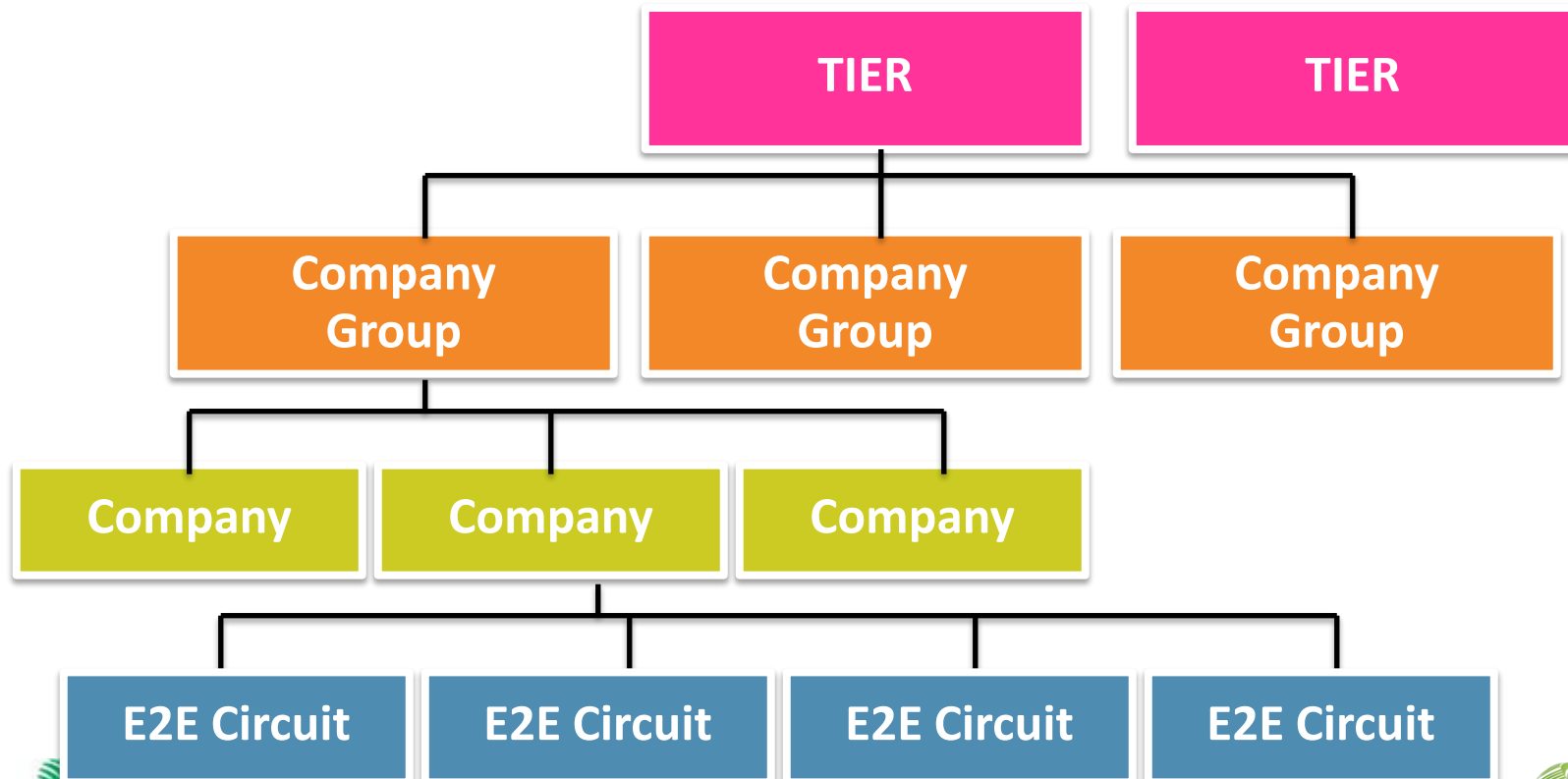
Hierarchical View of Objects

- 1st level (All Tiers of Corporate Customer)
  - Provides a clean summarized view.
  - Operators can easily see the state of each Customer Tier group.
  - Operators can take appropriate action.
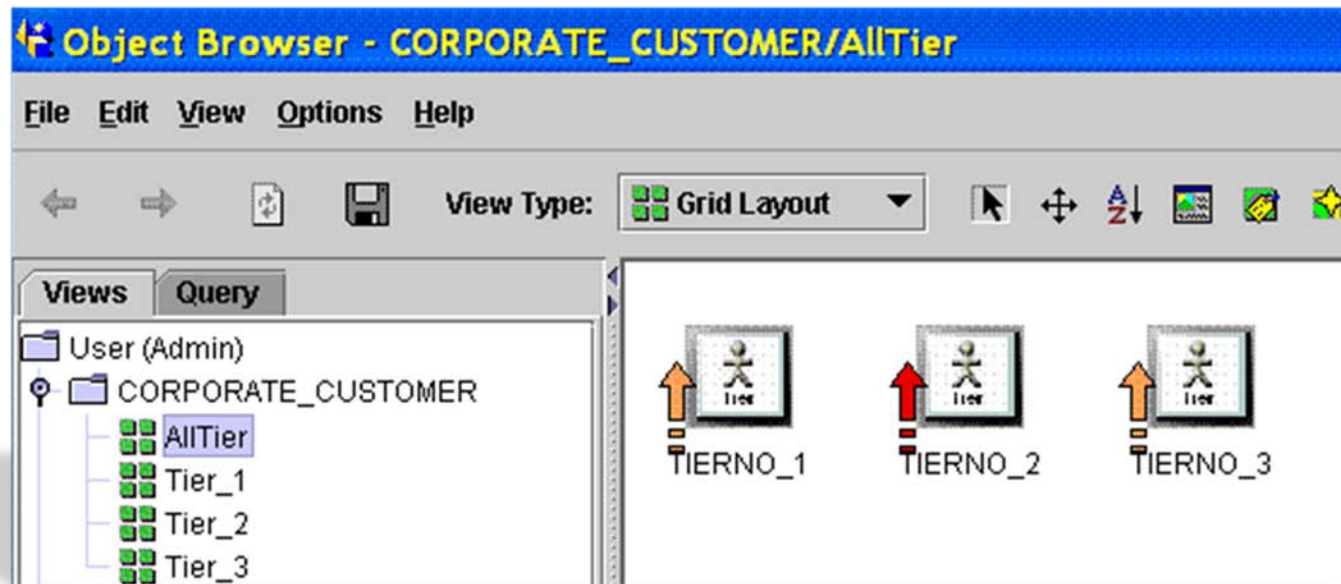
Hierarchical View of Objects

- ## 2nd level (Tier 1 Corporate Customer Groups)
  - Operators can see the state of each Customer Group.
  - Operators can further drill down on any Customer Group as deemed necessary.
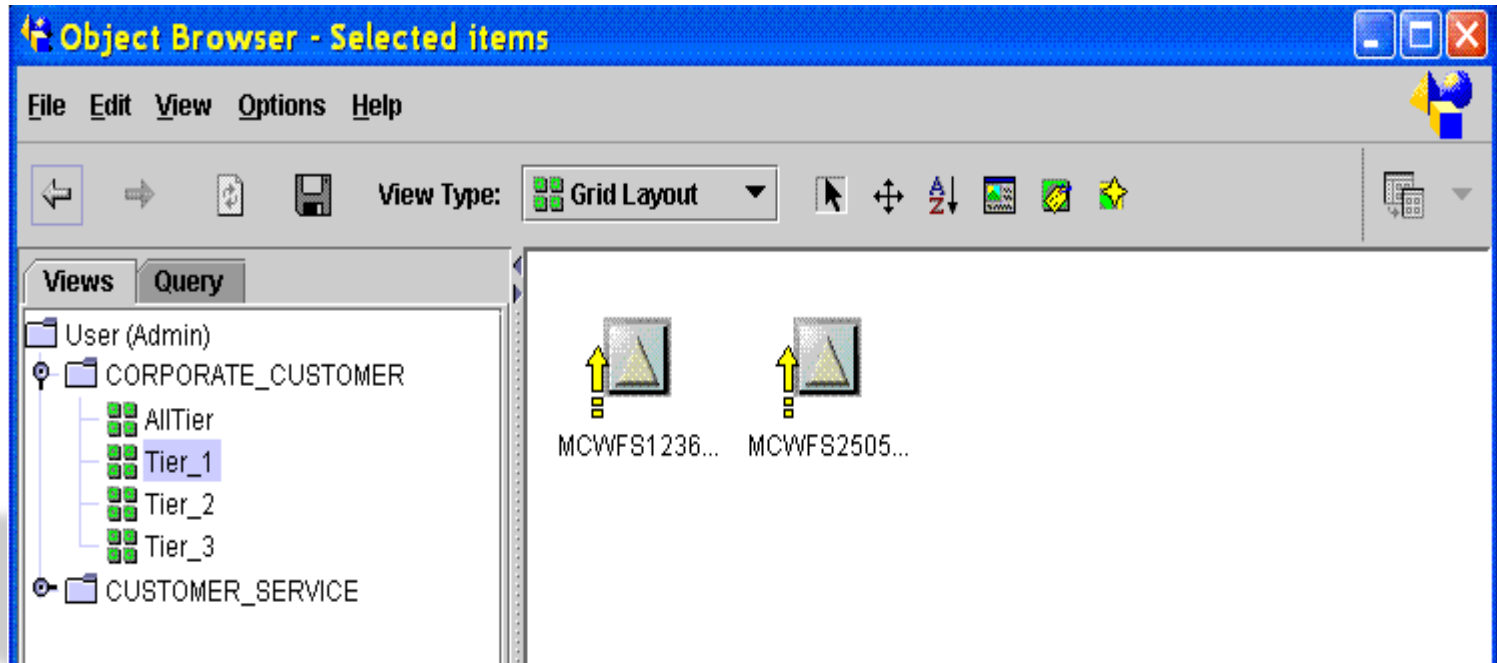
Hierarchical View of Objects

- 3rd level (Sub Companies of 1 Company Group)
    - Only sub companies of the previous Company Group are listed.
    - Operators can easily see which sub company is having problems.
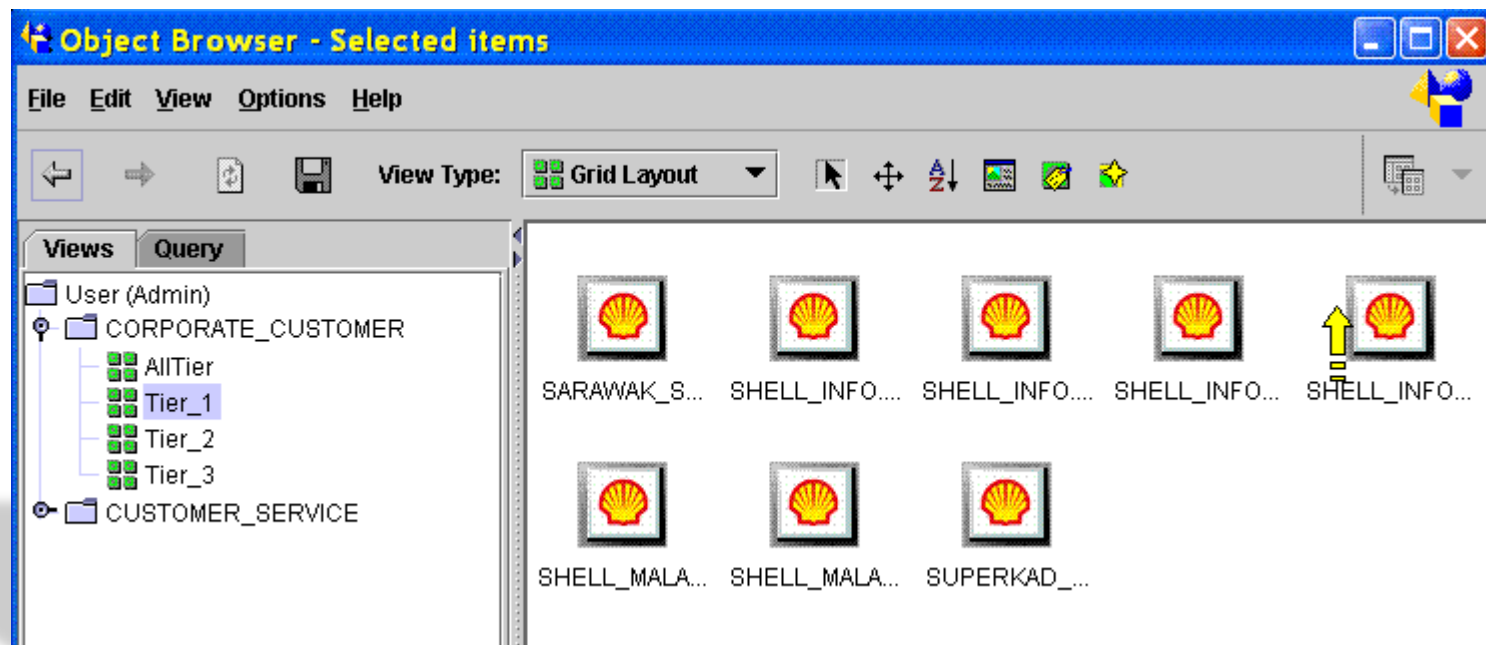
Hierarchical View of Objects

- 4th level (E2E circuits of 1 company)
  - Only circuits related to the company are listed.
  - Operators can see the state of each circuit.
  - Simply select a circuit to view the network diagram (next slide).

Hierarchical View of Objects

- 5th level (Network Diagram of 1 circuit)
  - Operators can easily see the NEs and circuits having alarms.
    - Helps to quickly identify the root cause impacting the customer circuit.
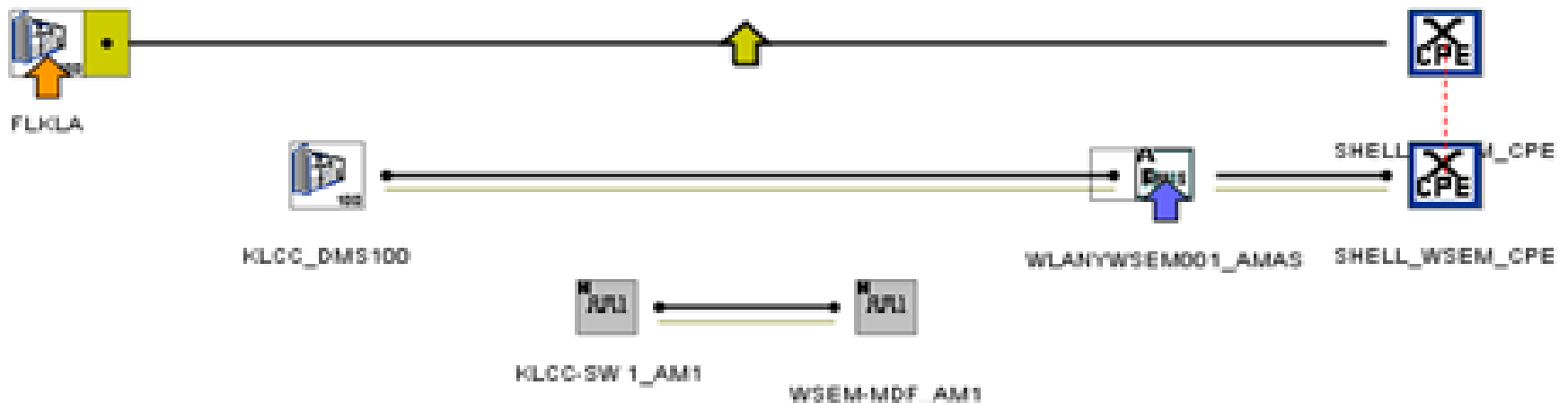
Rich Object Modeling Features

- Mapping of Sites on a geographical map
  - *Maxis customer service personnel can quickly verify if a site is having a network problem by searching for a location reported by a call-in customer.*
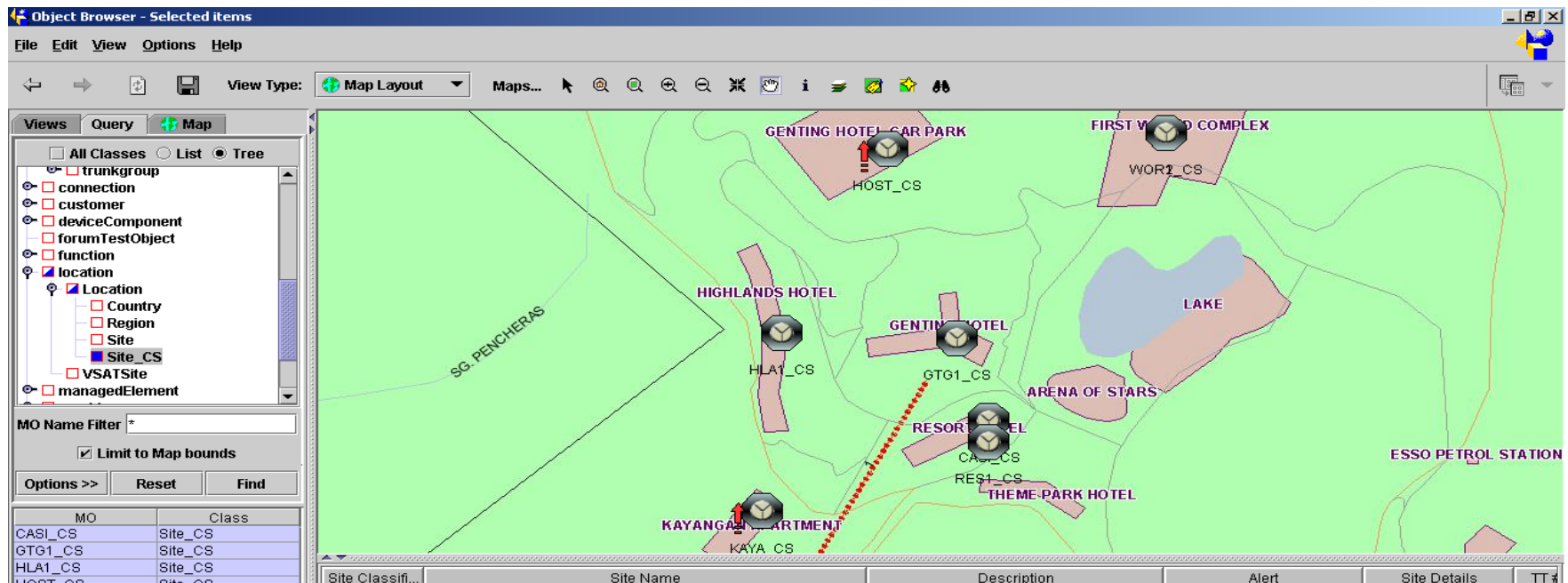
Maxis & OSI Best Practices – Alert Enrichment

Alert Enrichment Features

Ability to correlate partial or total site down based on alarm and inventory info

- Partial site down

AMO	Alert Name	Description	Create ...	C...	TT #
JABAM1_BTS_CS	C_BTSCellDown	2/3 CELLs are failed	19:56:05	1	

- Total site down

AMO	Alert Name	Description	Create ...	C...	TT #
JABAM1_BTS_CS	C_BTSSiteDown	3/3 CELLs are failed	19:35:49	1	

Alert Enrichment Features

Ability to supply additional info of BTS for a BSC alarm

AMO		Description
KPNG07_BSC++DIP::97RBLT	KRUGM1_BTS++TG::86	NEW – Different causes possik
KPNG07_BSC++DIP::51RBLT	ONE1B1_BTS++TG::38	NEW – Different causes possik

BTS info queried from inventory based on BSC alarm info.

This BTS info is not present in the BSC raw alarm data.

Alert Enrichment Features

Ability to supply additional info of impacted Corporate Customer

AMOname	Circuit △	Additional Circuits	Customer Org	Customer	Service
FCSBA++PDTC::4	TMVTH1WEF0066 (FN...	TMVTH1WEF0066	ASTRO	MEASAT_BROADCAST_NETWOR...	FNW/CORPORATE
FCSBA++PDTC::1	MCWFS2766_(CPE)	MCWFS2766	ASTRO	GSM1711_ISD-SYS_OPS	FNW/DATA

Search additional info in inventory based on the affected network interface

Additional info on impacted Corporate Customer

Solution Implementation Team

Sivanenderan Arunasalam

SME, NOC / SOC, Maxis

Zulkifli B M Aini

RAN Manager,
NOC / SOC, Maxis

Kriengchai Chansaenwilai

Solution Architect, OSI

Patnaree Kritkumthorn

Senior Engineer, OSI

David Lim

Engineer, OSI

Kim Fah Chong

Engineer, OSI

Wan Yow Chan

Engineer, OSI

For Additional Information

For additional information, please contact:

- info@osi.com

These slides are intended for distribution purposes only. OSI reserves the right to revise this document and to make changes in the content from time to time without notice. OSI may make improvements and/or changes to the product(s) and/or programs described in this document any time. The trademarks and service marks of OSI are the exclusive property of OSI, and may not be used without permission. All other marks are the property of their respective owners.

OSI