ANSWERv6 for TIMES: Status Report

Ken Noble
Noble-Soft Systems, Australia

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Overview

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◆ Multi-region ANSWER-TIMES
◆ ANSWERv6 for TIMES: Summary
◆ Benefits of ANSWERv6 for TIMES
◆ Loose ends
◆ Future Intentions
◆ Acknowledgments
Background

◆ 2000: Single-region ANSWERv3 for MARKAL adapted to create single-region ANSWER-TIMES prototype (ABARE)
◆ Dec 04, Jun 05: Single-region ANSWER-TIMES prototype updated
◆ Sep-Nov 2005: Single-region ANSWER-TIMES further updated, feasibility of adapting multi-region ANSWERv5 for MARKAL to create multi-region ANSWER-TIMES investigated
◆ Sep 2006: ANSWERv6 for MARKAL released
  ➢ Flexible Timeslices, Technology Items Filters, Rule-based Constraints
◆ Oct-Nov 2006: Good progress on adapting multi-region ANSWERv6 for MARKAL to create multi-region ANSWERv6 for TIMES

Multi-region ANSWER-TIMES - 1

◆ Ingredients in the multi-region ANSWERv6 for TIMES pot:
  ➢ ANSWER-TIMES multi-region database structure from Nov 2005
  ➢ ANSWERv6 for MARKAL Visual Basic code (100,000+ lines)
  ➢ ETSAP TIMES GAMS code v150 (with modified *.ANS routines) and ETSAP TIMES GAMS code v217
  ➢ Some TIMES GAMS DDs
  ➢ Lessons learned from Sep-Nov 2005 multi-region ANSWER-TIMES feasibility study and from single-region ANSWER-TIMES

◆ The main game – modify the ANSWERv6 for MARKAL code such that the modified code supports working with both MARKAL and TIMES
  ➢ And handles the special needs of TIMES
Multi-region ANSWER-TIMES – 2
Home Screen

Multi-region ANSWER-TIMES – 3
Data Screen – Process Tab
Multi-region ANSWER-TIMES – 4
Process Form – “Set Memberships” Tab

Multi-region ANSWER-TIMES – 5
Process Form – New “I/O Commodities, Units” Tab
Multi-region ANSWER-TIMES – 6
Data Screen – Constraint Tab

Multi-region ANSWER-TIMES – 7
All User Constraints Handled + Rule-based
Multi-region ANSWER-TIMES – 8
Resolve Rule-based Constraint

Multi-region ANSWER-TIMES – 9
Home Screen – Run Model
Multi-region ANSWER-TIMES – 10
Run Model and Results

◆ Run Model from multi-region ANSWER-TIMES database fully functional
  ➢ Separate DDs generated for each internal region
  ➢ TRADE DD generated containing bitrade links
  ➢ Special RULE DDs generated if any rule-based constraints

◆ Results - ANSWER-TIMES VB code adjusted to import results contained in single ANT file created by multi-region TIMES run
  ➢ But, ANT file code dates back to 2000 so must run with REDUCE ‘NO’
  ➢ And not all results parameters are put out to ANT file that are put out to VEDA-BE

ANSWERv6 for TIMES: Summary - 1

◆ Majority of standard TIMES Sets and Parameters in v2.1.7 TIMES GAMS code recognized
  ➢ Will enhance to support advanced TIMES model variants, if there appears to be a demand

◆ Representation inside ANSWER-TIMES of “internal”, “external” regions and bitrade links has been refined

◆ Most Home Screen functions already working

◆ “Run Model” for single/multiple regions is fully operational for standard TIMES

◆ ANSWER-TIMES Import Results mechanism already working
  ➢ But TIMES GAMS code that produces ANT file for ANSWER import needs some updating
ANSWERv6 for TIMES: Summary - 2

- **Most Data Screen functions already working**
  - New/Copy/Delete/Edit Item, Add Row, Direct Cell Edit, Text Tip, etc

- **Process tab facilities enhanced to better handle special needs of TIMES**
  - “New Process”, “Edit Process” specification form incorporating I/O Commodities, definition of Commodity Groups, with auto-generation of associated TIMES Sets and Parameters (not yet fully operational)
  - Technology (Process) Items Filters facility available

- **User Constraints revised so that all types are now handled**
  - Special _GLOBAL region handles cross-region constraints
  - Rule-based Constraints facility available

- **RES graphics mechanism has been adjusted to cater for bitrade links between regions**

Benefits of ANSWERv6 for TIMES

- **For those familiar with ANSWER-MARKAL, easy to approach TIMES within the same interface paradigm**
  - Can focus on TIMES aspects and not have to be concerned with interface aspects

- **For new users, ANSWER has a gentle learning curve**
  - Beneficial in promoting use of TIMES, perhaps especially within universities?
  - Particular interest in constructing ANSWER-TIMES training databases to demonstrate important TIMES features

- **New ANSWER features will become available for both TIMES and MARKAL**

- **ANSWER-TIMES User Manual can be created based very substantially on existing ANSWER-MARKAL User Manual**
Loose ends - 1

◆ “New Process”, “Edit Process” form made fully operational
◆ BiTrade tab layout to be devised and made operational
  ➢ Right now BiTrade links can be defined using other tabs
◆ “Import TIMES GAMS DD” made fully operational
◆ More TIMES GAMS DDs are needed for integrity testing
  ➢ ANSWER-TIMES “Import TIMES GAMS DD” – “Run Model” cycle should generate the same LP matrix as that from running TIMES GAMS DD directly against TIMES GAMS code in Command Prompt window
  ➢ A fairly demanding test of integrity!
◆ Check to ensure all standard TIMES Sets and Parameters in latest TIMES GAMS code are supported

Loose ends - 2

◆ Insert additional TIMES knowledge into ANSWER database re domains for parameters (only IREs for IRE_* parameters, etc)
◆ Constraints Set Memberships tree made more user-friendly?
◆ User option “identical timeslices in each region”
◆ Facility to insert model years into ANSWER-TIMES database
◆ Allow >10 character Item names, etc, etc

◆ “Nothing is particularly hard if you divide it into small jobs”
  ➢ Henry Ford
Future Intentions

◆ ANSWERv6 for TIMES available early 2007 for evaluation by interested parties (ETSAP Partners, existing ANSWER-MARKAL clients)

◆ Collaborate with ETSAP TIMES experts to construct ANSWER-TIMES training databases

◆ ANSWER-MARKAL User Manual updated to include documentation of TIMES-specific facilities

◆ Enhance to support advanced TIMES model variants, if there appears to be a demand

◆ Develop ANSWER-TIMES “smart” spreadsheets, if there appears to be a demand

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