Defining Common Standards for Calendar Systems and Holiday Data

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Introduction - Me

- From New Zealand
- Work on KDE
- Co-Maintainer of kdelibs Localization
- Maintainer of kdelibs Calendar Systems
- Co-Maintainer of KDE PIM KHolidays



If I lived 3000 Years Ago...

- •The Berlin Gold Hat
- Neues Museum
- 1000 BC
- 0.75 m tall
- 57 month calendar





Purpose

- Explain why we need support
- Examine what support currently exists
- Explain the problems with current solutions
- Propose a new collaborative project



Calendar Systems



Today

Gregorian	Monday 8 August 2011 AD/BCE	2011-08-08				
Julian	Monday 26 July 2011 AD	2011-07-02				
Hebrew	8 Av 5771 AM	5771-11-08				
Islamic Civil	Yaum al-Ithnain 8 Ramadan 1432 AH	1432-09-08				
Jalali / Persian	Do shanbe 18 Mordad 1390 AP	1390-05-18				
Coptic	Pesnau 2 Mesore 1727 AM	1727-12-02				
Ethiopian	Segno 2 Nehase 2003 AM	2003-12-02				
Indian National	Somavãra 18 Shrāvana 1933 SE	1933-05-18				
Chinese	9 Yi-Wei 4709	4709-07-09				
Japanese	8 August Heisei 23	平成23-08-08				
Taiwanese / Mingao / RoC	8 August 0100	0100-08-08				
North Korean / Juche	8 August 0100	0100-08-08				
Thai / Buddhist	8 August 2554	2554-08-08				



Why do we need alternative Calendar Systems?



Can't everyone just use the Gregorian?



No!

- Several countries only official Calendar System
- Many countries have multiple official Calendars
- Many religions use for daily life
- Official and unofficial holidays defined by them
- Standard feature in Windows, Mac, and CLDR





Daily Life

SATURDAY Louis	சனி
சாவசித்து மாசி ஸபா	இராசிபலன்
225 (பிரதமை இரவு மணி 9.36 வரை பூரட்டாதி பகல் வ.பிரதமை இரவு மணி 9.36 வரை பூரட்டாதி பகல் மணி 4.04 வரை கியாற் இரவு மணி 1.17 அகஸ் மணி	மேஷம் கூ விசனம் ரிஷயம் கூ எதிர்ப்பு மிதுனம் க சித்தி கடகம் கி விரோதம் சிம்மம் கு விவேகம் கன்னி க பானவரவு துலாம் ப யாத்திரை விருச்சி இசதி தனுக க கலக்கம் மகரம் க ஆனந்தம் தம்பம் க உற்சாகம் மனம் க செலவு
52 மரண. பகல் மணி 4.04 வரை சித்தரியாகம்	செவ்
ரிஞ்சிபுரம் அங்காளபரமேஸ்வரி மயாண சூஐ	சந்.குரி கு கும், சந்கும் ராகு பயிலும் மக
ாடுவிடும் விழா திருவள்ளூர் வீரராகவா தெப்பம	புத சனிலு.கம் சனி(வ) கக் த.கும்,கேதுகம் கேது
ிரதமை திதி பரிகாரம் - தயிர்	哆哆
தம்பம் ராசி இருப்பு நா. 0-54 சூரிய உ. 6.25 லல்லீநேரம் காலை 11.00–12.30 மாலை 5.00–6.00	கோக்கு தாள்
Re :9.00 - 10.30 Rub :1.30 - 3.00 8-3-2008	குடிர் :6.00 - 7.:0 கூலம்: கிழக்க



Current Support (1)

Calendar	Win	OSX	CLDR	KDE		
Gregorian	Х	Х	Х	Х		
Hebrew	Х	Х	Х	Х		
Islamic / Hijri Civil	Х	Х	Х	Х		
Jalali / Persian	Х	Х	Х	Х		
Japanese Era	Х	Х	Х	Х		
Taiwanese / Minguo / RoC	Х	Х	Х	Х		
Thai / Buddhist Era	Х	Х	Х	Х		
Coptic		Х	Х	Х		
Ethiopian		Х	Х	Х		
Ethiopian Amete Alem		Х	Х			
Indian National		Х	Х	Х		
Chinese Lunisolar	Х		Х			
Islamic Lunar		Х	Х			
				I JESKTO		

Desktop

Current Support (2)

Calendar	Win	OSX	CLDR	KDE
Islamic Um Al Qura	Х			
Korean / Tangun	Х			
East Asian Lunisolar	Х			
Japanese Lunisolar	Х			
Taiwanese Lunisolar	Х			
Julian				Х
ISO 8601				
Hindu Lunar				
North Korean / Juche				



Current Support (3)

- No support in POSIX, glibc, Gtk
- No support in iCalendar (CALSCALE)
- So not supported in Kontact / Evolution, etc
- Supported in Outlook / Exchange but not exported
- "Supported" in OSX Calendar but not correctly



KDE Support

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The Problem

- No standards defined
- No standard names
- No standard formulas
- No standard test suite
- Can cause interoperability problems
- Unicode CLDR defines names not formulas
- The 'definitive' academic resource is closed license (and wrong!)

A Technical Digression

- Converting between all calendars doesn't scale
- Needs a common conversion medium
- Julian Day number
- Day 0 = 1 January 4713 BC
- 8 August 2011 = Day 2,455,782
- Store the JD and convert into required calendar
- Astronomical / Observational calendars a problem



Proposed Collaboration (1)

- Formal definitions of each Calendar System
- Standard Formulas
- Standard Translations
- Standard Test Suite
- Initial work under FreeDesktop.org based on KDE
- Approach Unicode and/or IETF for merging



Proposed Collaboration (2)

- KDE code going into Qt5
- Find someone for glibc support
- Work with ICU to implement
- Work with IETF to get into iCalendar standard
- Once in iCalendar... Profit!
- Interim solution using current iCalendar



Holiday Data















KHolidays

- Part of kdepimlibs
- Database of national holidays in PLAN format
- API available throughout KDE and Plasma
- Used in Calendar apps and Financial apps



KHolidays in use



NIH?

- Why a separate library and file format?
- Why not use iCalendar?
- If it's good enough for Mozilla and Evolution...

Calendar - Holiday Files

You can also find calendars to subscribe to at iCalShare.com.

We've got some calendar holiday files available for download. You can either download and then import them into Sunbird or Lightning or you can just subscribe to these calendars by copying their URL and then adding them as new remote calendar files. More information on installing a holiday calendar can be found in the Adding a holiday calendar article.

	A
Albania Holidays thanks to Besnik Bleta	2011
Algeria Holidays thanks to Imad Tbahriti	2007-2020
Argentina Holidays thanks to Hernan Belloni	2011-2013



But...

- iCalendar is just not flexible enough
- Doesn't support alternative calendar systems
- Doesn't support complex recurrence rules
- Doesn't support different observance day
- Poor category support
- Doesn't support day-off type
- Doesn't directly support regional variations
- etc...



Easter

}

```
QDate HolidayParserDriverPlan::easter( int year )
{
   if ( m parseCalendar->calendarType() != "gregorian" ) {
       return QDate();
   }
   // Algorithm taken from Tondering
   // http://www.tondering.dk/claus/cal/node3.html#SECTION003137000000000000000
   int q = year \% 19;
   int c = year / 100;
   int h = (c - (c / 4) - (((8 * c) + 13) / 25) + (19 * q) + 15) % 30;
   int i = h - ((h / 28) * (1 - ((29 / (h + 1)) * ((21 - q) / 11))));
   int i = (vear + (vear / 4) + i + 2 - c + (c / 4)) \% 7;
   int l = i - j;
   int month = 3 + ((1 + 40) / 44);
   int day = l + 28 - (31 * (month / 4));
```

return QDate::fromJulianDay(julianDay(year, month, day));



San Pedro y San Pablo

- 29 August
- Chile: Move to the nearest Monday





More Examples

- Chinese New Year
- Ramadan
- UK: Christmas Day extra day off if falls on weekend
- NZ: Wellington Anniversary Day in Wellington only



With iCalendar you must manually calculate and enter the date for every year

Maintenance Nightmare



What's good about KHolidays

- Does support alternative calendar systems
- Does support complex recurrence rules
- Does support different observance day
- Good category support in next release
- Does support day-off type, better in next release
- Does directly support regional variations
- etc...



What's bad about KHolidays

- PLAN format not originally designed for this use
- Custom extensions
- Ugly syntax, hard to express complex rules
- Makes maintenance harder than necessary
- No translations
- Restricted to KDE



PLAN Example

"San Pedro y San Pablo"

holiday on (([6/29] == [tuesday after ([6/28])] ||

[6/29] == [wednesday after ([6/28])] ||

[6/29] == [thursday after ([6/28])]) ?

[monday before ([6/29])] :

(([6/29] == [friday after ([6/28])])?

[monday after ([6/29])]:[6/29]))



A Proposed Collaboration

- A shared database would benefit all
- A new common standard file format
- A common set of data files
- Initially hosted by FreeDesktop.org
- Later propose to IETF as RFC
- A common shared library like libical?
- Clean slate: a true collaboration?



Thank you...

- http://community.kde.org/KDE_Core/KCalendarSystem
- http://community.kde.org/KDE_PIM/KHolidays
- jlayt@kde.org

