Symbian: the new open-source mobile OS
Overview of topics - theory

- History of OS
- The Symbian Foundation
- Future outlook
Overview of topics - practical

- Development options
- Native applications in C++
- Qt
- Selling an application
- Where to go for help
About /me

- Tam HANNA
  - CEO, Tamoggemon Ltd.
  - Runs web sites about mobile computing
History of Symbian
- Developed by Psion
  - Series5
  - Revo

- “Thrown out” to Symbian
Series 60

- First versions
  - Introduced on 7650

- S60v2 still common
  - Nokia N70
S60v3

- Renamed due to virus problems
- Introduces mandatory signing
  - Binary break
- Three feature packs
  - Downward compatible
S60v5

- S60v3 + touch
  - Lives along v3

- Very basic GUI

- Partially downward compatible
  - Apps run, but can't be controlled due to lack of buttons
Symbian^3

- Roll-out now

- Better GUI for S60v5
  - Mostly downward compatible

- Ask me for a demo
  - Hands-on!
The Symbian Foundation
Symbian Ltd

- Commercial enterprise
- Belonged to phone manufacturers
- Developed, sold Symbian
Nokia bought shares from others

Announced opensourcing at SEE2008

Packet moveage to EPL
  - Issue: existing packets
Who owns it

• Non-profit organization
  – Governed by boards
  – Members picked on “amount of merit”

• Founded by various cell phone companies

• Every organization can become a member
  – “Smallish” software houses can also join
Symbian Foundation - I

- Meritocracy

- Council system
  - Councils decide
  - Membership by election
Symbian Foundation - II

- Income sources
  - Nokia
  - Membership
  - Signing
Symbian Foundation - III
Symbian Foundation - V

- Membership – 1,500,-$ / yr
  - Election rights
  - Packet owner right
  - „Dating site“
  - Extra rights (Software-Hardware)
  - Rebates at Events

- Individuals: Symbian DevCo
## The Symbian Foundation Platform Plan

### Open for contribution

<table>
<thead>
<tr>
<th>Year</th>
<th>Symbian^2</th>
<th>Symbian^4</th>
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<tbody>
<tr>
<td>2009</td>
<td><strong>Symbian^2</strong></td>
<td></td>
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<tr>
<td></td>
<td>• Personal: Customisable home screen supporting embedded widgets and other personal content</td>
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<td></td>
<td>• Dynamic: Ability for apps to take action in response to the user's changing location</td>
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<tr>
<td>2010</td>
<td><strong>Symbian^4</strong></td>
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<td></td>
<td>• Direct UI*: Fresh new user experience</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Qt integrated as primary runtime environment*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Majority of SHA1 in place</td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td><strong>Symbian^5</strong></td>
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</tbody>
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### Symbian^3
• Looking good: Graphics support for advanced layering and effects
• Sounding clear: High performance networking architecture enabling fixed internet performance, ideal for streaming high def video and high quality VoIP calls

**Also available:**
• SDK based on Forum Nokia SDK 5th Edition, compatible with Symbian OS r9.x and S60 5th Edition
Symbian Foundation Platform Plan
Open for contribution

2009 2010 2011

Milestone dates to be confirmed by Release Council

Functionally Complete
Hardened

Functionally Complete
Hardened

Functionally Complete
Hardened

SYMBIAN
What to expect

- Will switch to QT
  - Known to open-source heads
  - Native development will remain possible

- Symbian^4 – new UI stack
  - LARGE binary break
C++

- Symbian “fooked” C++
  - “C with objects”

- Somewhat difficult to learn and understand

- But:
  - Apps somewhat easy to sell
  - Full device access
.NET CF

- Net60
  - from third party

- Must be purchased

- Great communality with PPC et al
J2ME

- Oldest run time environment
- Developing for it is somewhat easy

- But:
  - Bad user experience (prompts)
  - Might be dropped from future boxen
Various Web 2.0-Technologies available
Easy to develop for

But:
- Selling results is difficult at times
- Extremely limited functionality
Native applications in C++
Carbide.c++

- Free, Eclipse-based IDE
- Contains dangerously buggy UI editor
  - COMMIT CODE TO CVS FREQUENTLY!!!
Basic app structure

- Five classes:
  - Application
  - Document
  - App UI
  - View
  - Container

- Auto-generated
• Do not touch

• Let Carbide generate them, and ignore

• Development mantra: if it works, its ok
  – FOOK the rules
AppUi

- Use as “static repository”
  - Stores global data
- Can be accessed easily from forms

CLocaNoteAppUi* temp =
(static_cast<CLocaNoteAppUi*>(CCoeEnv::Static())
->AppUi()))
View / Container

- Contain logic for “forms”
- One view, one container per form
Two-phase initialization

- Handsets always low on memory

- “Clean up stack” catches object references
  - Stack unwinding, clean-up

- Can generally be ignored
/**
 * First phase of Symbian two-phase construction. Should not contain any
 * code that could leave.
 */

CTouchCalcContainerView::CTouchCalcContainerView()
{
    // [[[ begin generated region: do not modify [Generated Contents]
    iTouchCalcContainer = NULL;
    // ]]]] end generated region [Generated Contents]
}

/**
 * The view's destructor removes the container from the control
 * stack and destroys it.
 */

CTouchCalcContainerView::~CTouchCalcContainerView()
{
    // [[[ begin generated region: do not modify [Generated Contents]
    delete iTouchCalcContainer;
    iTouchCalcContainer = NULL;
    // ]]]] end generated region [Generated Contents]

    }
/**
 * Symbian two-phase constructor.
 * This creates an instance then calls the second-phase constructor
 * without leaving the instance on the cleanup stack.
 * @return new instance of CTouchCalcContainerView
 */
CTouchCalcContainerView* CTouchCalcContainerView::NewL()
{
    CTouchCalcContainerView* self = CTouchCalcContainerView::NewLC();
    CleanupStack::Pop( self );
    return self;
}

/**
 * Symbian two-phase constructor.
 * This creates an instance, pushes it on the cleanup stack,
 * then calls the second-phase constructor.
 * @return new instance of CTouchCalcContainerView
 */
CTouchCalcContainerView* CTouchCalcContainerView::NewLC()
{
    CTouchCalcContainerView* self = new ( ELeave ) CTouchCalcContainerView();
    CleanupStack::PushL( self );
    self->ConstructL();
    return self;
}
/**
 * Second-phase constructor for view.
 * Initialize contents from resource.
 */

void CTouchCalcContainerView::ConstructL()
{
    // [[[ begin generated region: do not modify [Generated Code]
    BaseConstructL(R_TOUCH_CALC_CONTAINER_TOUCH_CALC_CONTAINER_VIEW);
    // ]]] end generated region [Generated Code]

    // add your own initialization code here

}
Active objects

- Primitive form of multi-tasking
- An AO runs “in the background”
- Needed for some API calls
void CSaveImageAO::SaveAsL(CFbsBitmap* aBitmap, TFileName& aFileName, TUid aImageType, TUid aImageSubType)
{
    iImageEncoder->Convert( &iStatus, *aBitmap);
    SetActive();
}

void CSaveImageAO::DoCancel()
{
    iImageEncoder->Cancel();
}

void CSaveImageAO::RunL()
{
    iObserver->ImageSaved(iStatus.Int());
}

TInt CSaveImageAO::RunError(TInt aError)
{
    iObserver->ImageSaved(aError);
    return KErrNone;
}

Testing

- Simulator
  - Very slow
  - With HookLogger => mem leak buster

- Real device (might need DevCert)
  - Faster
  - Works via USB
  - Install Nokia PC Suite, TRK
### The Framework

<table>
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<tr>
<td>Carbon/Cocoa</td>
</tr>
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<td>Mac OS X</td>
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</table>
The Framework - II

- Core
  - Multithreading
- GUI
  - 2D Graphics Canvas
- OpenGL®
- WebKit
- Scripting
- Multimedia
- Networking
- XML
- Database
- Unit Testing
Licensing

- LGPL
  - Viral against framework
  - !! Good idea !!

- Commercial
  - Keep your framework changes
  - Bad idea

- Free
Some theory
Signals and Slots - 1

- “ Callbacks à la Qt”

- Used for Event-Processing

- Become C++ at compile time
  - moc
Signals and Slots - II

- **Signals**
  - Emitted by QObjects
  - “Something has happened”

- **Slots**
  - Member functions
  - Called if something has happened
Signals and Slots - III

- Signals are connected to Slots
- Signal happens -> Slot fired

- Connections are governed by rules

- Checks happen at runtime(!!!)
Files - 1

- .cpp
  - Source code

- moc* - Files
  - Contain glue
  - Automatically generated -> no CVS
files - II

- .ui
  - WYSIWYG-GUI
  - Contain resource-HTML
  - ui*.h-file is created at runtime

- .pro
  - Control the project
Files - III

- .h
  - Headers
  - Every QObject needs one
  - ui*.h auto generated - no CVS
A small example
QMainWindow

- Main Window of application
QMainWindow - II
QMainWindow - III
QMainWindow - IV

Geben Sie Text ein
#ifndef MAINWINDOW_H
#define MAINWINDOW_H

#include <QtGui/QMainWindow>
#include <QString>
#include <QTextStream>

namespace Ui
{
    class MainWindow;
}

class MainWindow : public QMainWindow
{
    Q_OBJECT

public:
    MainWindow(QWidget *parent = 0);
    ~MainWindow();

public slots:
    void sliderMoved(int val);

private:
    Ui::MainWindow *ui;
};
#include "mainwindow.h"
#include "ui_mainwindow.h"

MainWindow::MainWindow(QWidget *parent)
    : QMainWindow(parent), ui(new Ui::MainWindow)
{
    ui->setupUi(this);
}

MainWindow::~MainWindow()
{
    delete ui;
}

void MainWindow::sliderMoved(int val)
{
    QString myStr;
    QTextStream myStream(&myStr);
    myStream<<val;
    ui->label->setText(myStr);
}
QMainWindow - VII

![Diagram of QMainWindow with QLineEdit and QLabel components, showing `valueChanged(int)` and `sliderMoved(int)` signals connected to the UI elements.](image-url)
QDialog

- Popup window

- Activated via `exec()`
  - Can return value
Selling applications
Signing

- **Express signed** – 20$
  - Doesn’t permit all capabilities
  - Usually no checks done

- **Certified signed** – 200$
  - Permits most capabilities
  - Thorough checks (!!!)
Signing - II

- **Certificate needed**
  - Obtained from TrustCenter Germany

- **Requires registered company**
  - Recommendation: UK Limited
  - [www.go-ahead.de](http://www.go-ahead.de)
Ovi Store

- Nokia’s sale channel
- 70% of gross
- Somewhat slow ATM
Traditional channels

- Various traditional ESD’s
  - Handango
  - MobiHand

- Diminishing importance
Where to go for help
## Developer Discussions

### Feedback to Forum Nokia, Open Discussion, Jobs and News

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<td>4,934</td>
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<tr>
<td>Open Discussions</td>
<td>how to convert mod to... by Pealercus</td>
<td>934</td>
<td>24,429</td>
</tr>
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### Development Platforms
Forum Nokia - II

- Free to register and use
  - But: bad search engine
- Most questions get answered quickly
  - Nokia employees around

http://discussion.forum.nokia.com/forum/
Nokia Wiki

- Nokia-operated Wiki
- Contains valuable tutorials
Symbian Foundation

- Has developer help services of its own
- Less developed than Nokia’s

=> Stick to Nokia until told otherwise
fan pages

• www.allaboutsonbian.com
  - For users

• www.symbian-freak.com
  - Hacker forum

• tamss60.tamoggemon.com
  - My blog (for developers)
The end

Questions?
Answers at tamhan@tamoggemon.com

images by Julius Kusuma, Cimexus of Canberra, adactio, 3dh3m, JNL, Thomas Wolf, JmSchneid, InductiveLoad