



中国移动开发者大会
Mobile Developer Conference China 2016

Android安全无障碍密码键盘的实现

背景

今年年初，因为安全问题支付宝安全键盘辅助功能被迫下架



背景 - 原生方案

Android 原生的无障碍
碍解决方案



背景 - 语音提示

为世界带来微小而美好的改变

Video 1:



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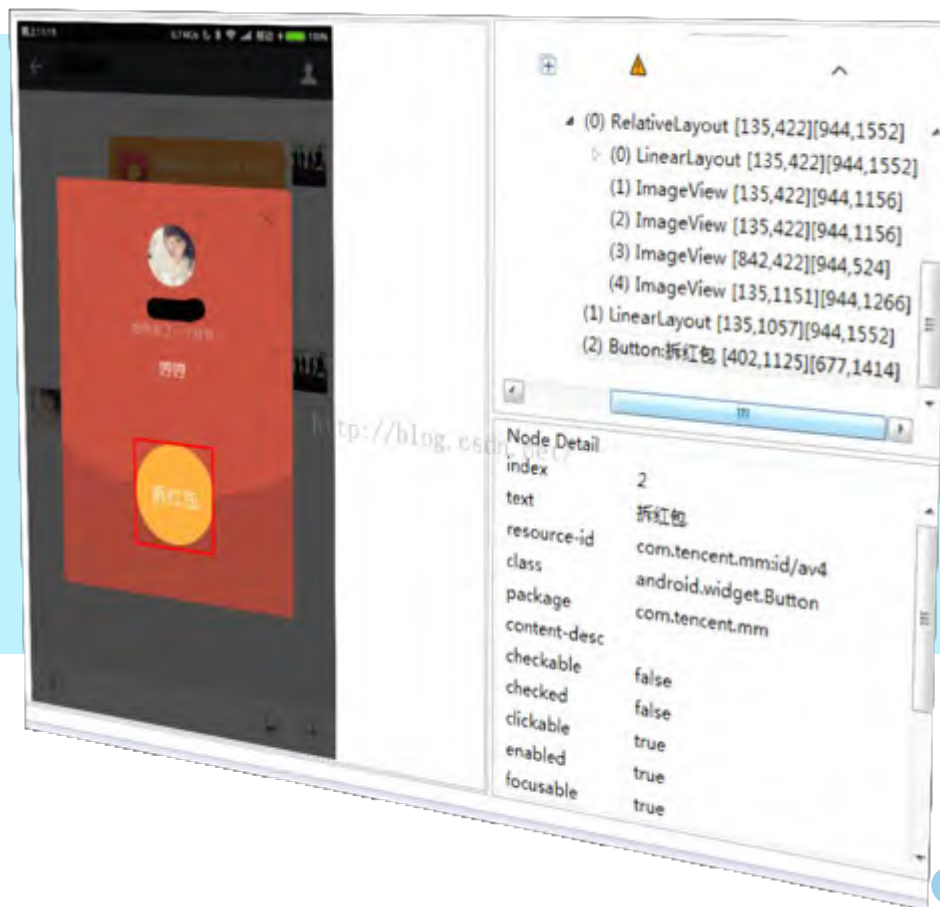


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背景-Accessibility

什么是Accessibility辅助功能？

1. 抢红包
2. 静默安装
3. 自动化测试



背景 - 安全问题

隐私泄漏

PASSWORD



背景 - 泄漏详情

#adb shell uiautomator events

```
09-12 10:44:49.174
EventType: TYPE_VIEW_CLICKED;
EventTime: 40171456;
PackageName: com.android.test;
MovementGranularity: 0;
Action: 0 [
ClassName: android.widget.Button;
Text: [7];
ContentDescription: 7;
.....
];
recordCount: 0
```

```
09-12 10:44:52.575
EventType: TYPE_VIEW_CLICKED;
EventTime: 40174857;
PackageName: com.android.test;
MovementGranularity: 0;
Action: 0 [
ClassName: android.widget.ImageButton;
Text: [退格键];
ContentDescription: 退格键;
.....
];
recordCount: 0
```

紧急方案 - 阻止Accessibility

Accessibility系列方法:

```
public void xxx(...) {  
    if (mAccessibilityDelegate != null) {  
        mAccessibilityDelegate.sendAccessibilityEvent(this, ...);  
    } else {  
        xxxInternal(...);  
    }  
}
```

```
public void setAccessibilityDelegate(@Nullable AccessibilityDelegate delegate) {  
    mAccessibilityDelegate = delegate;  
}
```


分析- NullAccessibilityDelegate

自定义
AccessibilityDelegate

```
Class NullAccessibilityDelegate extends AccessibilityDelegate {  
    .....  
    public void onInitializeAccessibilityEvent(View arg1,  
        AccessibilityEvent arg2) {  
        //Do nothing.  
    }  
    .....  
    public void sendAccessibilityEvent(View arg1, int arg2) {  
        //Do nothing.  
    }  
    .....  
}
```

问题

- 语音反馈
- 焦点

Video 2:

为世界带来微小而美好的改变

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分析

Q：如何做到安全 & 无障碍？



事件传递

```
public boolean performClick() {  
    .....  
    sendAccessibilityEvent(AccessibilityEvent.TYPE_VIEW_CLICKED);  
    .....  
}  
//View.java
```



```
public void sendAccessibilityEventUncheckedInternal(AccessibilityEvent event)  
{  
    .....  
    getParent().requestSendAccessibilityEvent(this, event);  
}  
//View.java
```

事件传递

```
public boolean requestSendAccessibilityEvent(.....) {  
    .....  
    mAccessibilityManager.sendAccessibilityEvent(event);  
    .....  
}  
//ViewRootImpl.java
```

```
public void sendAccessibilityEvent(AccessibilityEvent event) {  
    .....  
    doRecycle = service.sendAccessibilityEvent(event, userId);  
}  
//AccessibilityManager.java
```

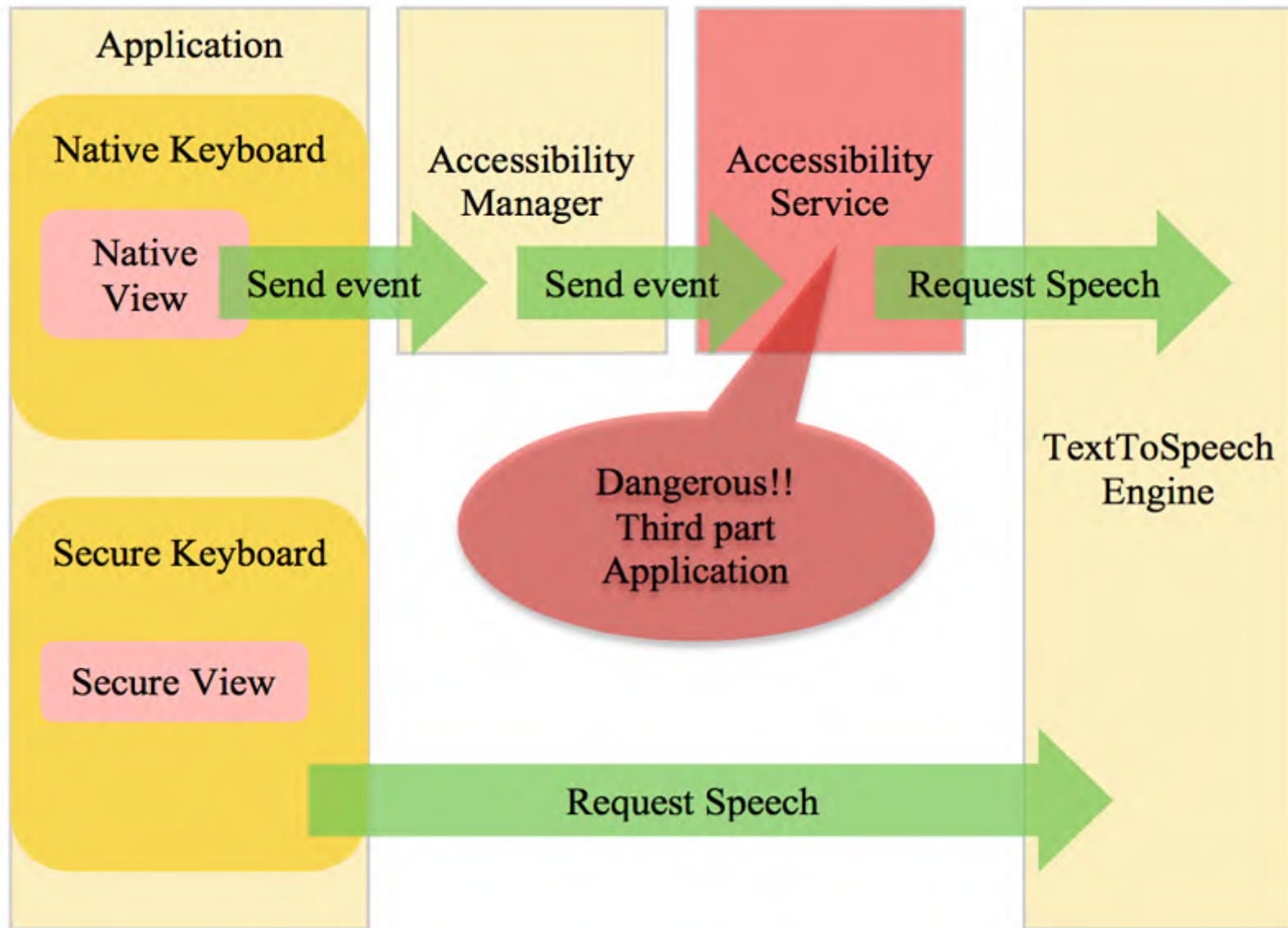
TalkBack的语音反馈

//TalkBack 代码片段:

```
mTempTts = new TextToSpeech(mContext, mTtsChangeListener, engine);
```

```
private int speakCompat(CharSequence text, HashMap<String, String> params) {  
    return mTts.speak(text.toString(), SPEECH_FLUSH_ALL, params);  
}
```

TextToSpeech



拦截-Accessibility Event

```
//Accessibility事件出口
public void sendAccessibilityEvent(int eventType) {
    boolean handled = false;
    if (null != mSabEventListener) {
        handled = mSabEventListener.handleAccessibilityEvent(this, eventType);
    }
    if (!handled) {
        super.sendAccessibilityEvent(eventType);
        return;
    }
}
```


控制-Accessibility Focus

```
public boolean requestAccessibilityFocus() {  
    .....  
    viewRootImpl.setAccessibilityFocus(this, null);  
    .....  
    sendAccessibilityEvent(AccessibilityEvent.TYPE_VIEW_ACCESSIBILITY_FOCUSED);  
    .....  
}
```

//View.java代码片段

实现效果



Video 3:

为世界带来微小而美好的改变

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任重道远

目前，支付宝已经和业界权威的无障碍机构达成了合作意向，持续关注视障用户的反馈意见。

支付宝内部也将无障碍支持作为标准列入开发规范，支付宝的产品将进一步完善无障碍功能的支持。



“技术的发展，是为了跨越鸿沟，而不是带来新的不平等。”